

**VOLUME XI**

**NUMBER 1**

**JANUARY-FEBRUARY**

**THE  
FIELD ARTILLERY  
JOURNAL**

**EDITED BY**

**ARTHUR F. CASSELS**

**LIEUTENANT-COLONEL (FIELD ARTILLERY), UNITED STATES ARMY, RETIRED**

**THE UNITED STATES FIELD ARTILLERY ASSOCIATION  
WASHINGTON, D. C.**

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## THE FIELD ARTILLERY JOURNAL

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PUBLISHED BIMONTHLY FOR

THE UNITED STATES FIELD ARTILLERY ASSOCIATION

BY J. B. LIPPINCOTT COMPANY

227 SOUTH SIXTH STREET

PHILADELPHIA, PA.

LONDON OFFICE: J. B. LIPPINCOTT COMPANY, 16 John St., Adelphi.

EDITORIAL OFFICE: War Department, Washington, D. C.

Entered as second-class matter November 20, 1915, at the post office at Philadelphia, Pennsylvania under the Act of March 3, 1879

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**The subscription price of The Field Artillery Journal is \$3 per annum. Subscribers should notify us promptly of changes in their addresses, and of failure to receive The Journal.**

**The Field Artillery Journal pays for original articles accepted.**

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**THE UNITED STATES FIELD ARTILLERY ASSOCIATION**

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MAJOR-GENERAL LEROY S. LYON, U. S. ARMY

Died February 23, 1920, at Camp Zachary Taylor, Ky. Brigadier-General U. S. A., August 5, 1917. Commanded 65th Field Artillery Brigade, 40th Division, Camp Kearney, California. Promoted Major-General U. S. A., April 12, 1918. Commanded 31st ("Dixie") Division, Camp Wheeler, Ga. General Lyon arrived in France October 7, 1918, ahead of the 31st Division, and was assigned to duty with the 77th and 78th Divisions during the heavy fighting of October, 1918.

# THE FIELD ARTILLERY JOURNAL

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VOL. XI

JANUARY-FEBRUARY, 1921

NO. 1

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## Artillery Harness and Animal Traction

LECTURE DELIVERED TO THE STUDENT OFFICERS, FIELD ARTILLERY SCHOOL, FORT SILL, OKLAHOMA, NOVEMBER 5, 1920.

BY LT. COLONEL FRED T. AUSTIN, FIELD ARTILLERY.

MANY predictions have been made that the days of the horse, as far as his use with the Field Artillery is concerned, are numbered, and that in the near future all types of Field Artillery carriages will be motor drawn. While it is possible that, sooner or later, mechanical traction will entirely replace the horse, and I think experiment should be continuously carried on to that end, it is apparent that the time has not yet arrived when we can safely abolish animal traction for our light regiments.

We are essentially a mechanical nation, and for that reason I am aware that there are many officers in our service who consider it a waste of time to give further consideration to animal traction. Such officers seem to feel that if they admit our service has any further use for the horse, and especially if a desire is shown to improve that method of traction, they are not progressive and "abreast of the times." This opinion had steadily gained ground prior to the recent war. To this can be attributed, to a large extent, the lack of interest and a consequent lack of instruction in the training of the personnel in animal management and traction, so sadly apparent in many of our regiments during the war.

It is not my purpose in this lecture to attempt a discussion of the relative merits of mechanical and animal traction. It is sufficient for us that the War Department has decided that, for the present, divisional artillery shall be horsed. It therefore behooves us as artillerymen to keep up our interest in the horse,

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and to give this mode of traction the same careful and painstaking study as we are giving to the motors in the course at this school.

The question of mobility of field artillery is a vital one. All the training in shooting which you have received here will be of little use to you in war unless you have learned how to secure the maximum efficiency from the means employed for moving your guns. Mobility is such an element of success in war that we must concede, as far as artillery is concerned, that good marching is second in importance only to good shooting. While the ultimate end of all training is, of course, to shoot, it may be said that under the normal conditions of war, unless we know how to march, we will seldom get the opportunity to shoot. On the other hand, if we do not know how to shoot there is no use in marching. Good marching and good shooting go hand in hand, and when combined insure the success of a battery. Neither should be neglected, for both are indispensable in war. In future no officer should be rated a well-equipped field artilleryman who is not thoroughly conversant with every detail, both theoretical and practical, of that part of artillery equipment upon which so much depends—the high degree of mobility demanded of our light guns. The officer who, through ignorance of the proper application of the principles of traction, cannot move his battery to the required place at the appointed time is as useless as the one who does not know how to shoot after his battery has been placed in position.

In discussing this subject I shall endeavor to point out what I consider faults in our harness and system of traction, not, however, with a view of finding excuses for galled shoulders and sore necks in our teams, but that by understanding the causes which produce these troubles we may be better prepared to avoid them. Even with the faulty arrangement of our harness, I believe that troubles are experienced much more frequently by want of knowledge in adjusting harness and lack of attention to details of march discipline than to a deficiency of means.

## ARTILLERY HARNESS AND ANIMAL TRACTION

I am aware that some of you have had considerable experience in the use of the equipment, and the demonstrations that follow may seem to you obvious and elementary. Undoubtedly there are many officers, however, who have either given the theoretical side of the question little consideration, or who, through failure to apply correct mechanical principles to the problem, have arrived at erroneous conclusions. One of the many examples I may cite was brought to my attention in an article which appeared a short time ago in one of our service publications in which an officer of long service in the field artillery makes the assertion that, "in order to get the maximum draft from our horses the breast collar, traces, and breeching should be in one line and as near as possible parallel with the ground" (see Fig. 3). I hope we may be able to show the error of adjusting artillery harness in that manner.

In discussing the angle of traction let us first consider the mechanical principle involved, which appears to be that "a given force, when applied precisely in the direction in which it is desired to produce motion, confers greater power than when applied under an angle." According to this principle, it would seem that in order to get the maximum effect from the work of our horses, the traces should be horizontal, or, rather, parallel, with the road. This would be absolutely true in principle if the surface over which the carriage is to be moved were absolutely smooth. As such a condition rarely exists, and as the carriage must more often be moved over ruts and obstacles, it is evident that this principle should not be exactly applied.

Let Fig. 1 represent the line of a carriage, and the line AB a smooth surface. According to our mechanical law, a given force would have the greatest effect in moving the wheel along AB when applied in the direction CD, which is parallel to AB. But when the wheel gets into a rut or meets a stone, the maximum power is no longer obtained by applying the force in the direction CD. Let F represent an obstacle in contact with the wheel. It is now evident that to get the maximum effect, the force must be applied in the direction CE, which is at right



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angle to the line CF. Considering the varying conditions of surface over which artillery carriages must be moved, and the fact that the direction of the applied force cannot in practice be varied at will, it is evident that the force should not be applied in the direction CD, but somewhere between CD and CE.

I trust that this simple demonstration, which I believe is based on correct mechanical principles, makes it clear that, as far as the carriage is concerned, the traces of an artillery team should not be horizontal or parallel to the ground. It is more

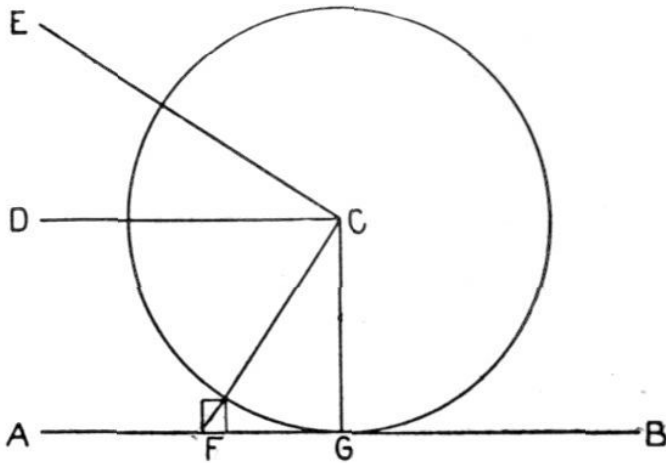


FIG. 1.

important, however, to regulate the angle of traction with reference to the horse than to the carriage exclusively.

Let us now consider what influence, if any, the conformation of the horse has on the angle of traction. In doing this it should be recognized that in order to avoid waste of power and injury to the animal the horse must be permitted to exert his force in draft in a direction best suited to the peculiar mechanism of his frame.

There is one point upon which I think all field artillerymen of experience will agree, and that is that the best disposition of traces in draft is when the line of traction falls normal to the

## ARTILLERY HARNESS AND ANIMAL TRACTION

slope of the horse's shoulders (see Fig. 5). It will be seen that when the traces make an angle other than ninety degrees with the slope of the shoulders, a part of the force exerted in draft is dissipated through a component in a direction parallel with the slope of the shoulders. This component not only causes the collar to rise, with a consequent danger of choking the animal, but wastes energy.

We thus see that, in order to avoid loss of energy, the

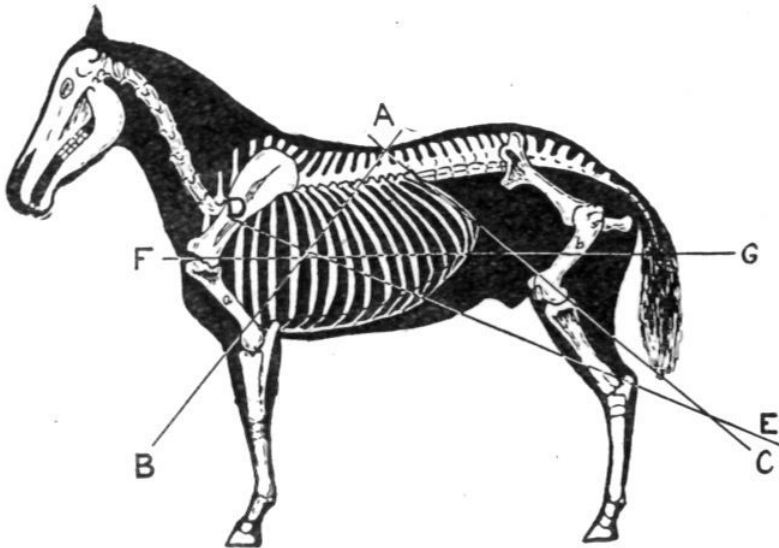


FIG. 2.

animal's tractive force must be applied in a direction normal to the slope of his shoulder. Let us also see what other mechanical features of the horse's conformation influence the question of the angle of traction.

In considering what members are brought into action, and in what direction the effort is made by a horse in draft, we note that there is one bone in each of the front and hind legs through which the remaining portion of the leg acts as a lever for supporting and propelling the body (Fig. 2). I refer to the arm bone (*a*) and thigh bones (*b*). Now, we know that the best

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result of lever action is had when the force is applied in a direction normal to the lever. Drawing the lines AB and AC normal to and through the lower ends of the arm and thigh bones respectively, we find that when the horse is standing in a state of rest these two lines intersect each other at the fourteenth vertebra which is, as you know, the centre of motion of the horse. DE is a

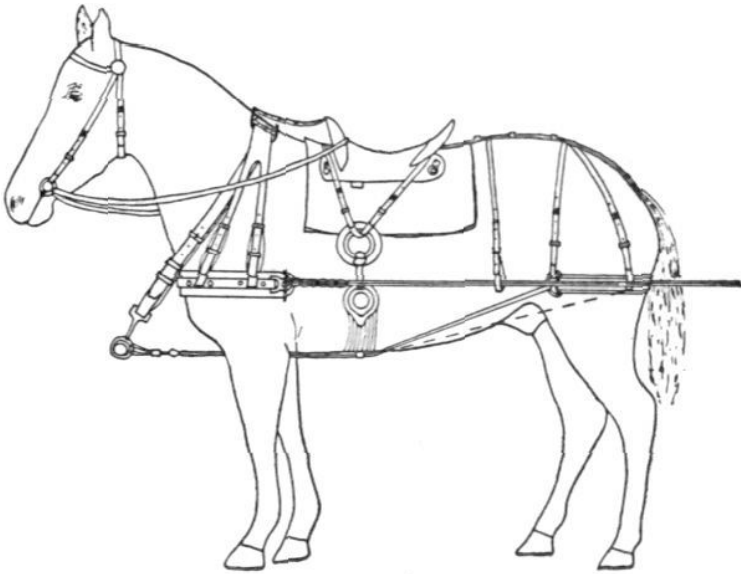


FIG. 3.

line drawn normal to the slope of the shoulder (the proper position of traces), and FG is a horizontal line showing the present position of the lead and swing traces of our teams. Now, the line CA is that in which the propulsion is effected by the hind legs. It is quite evident that when the horse is leaning forward to pull, lowering his forehead, and extending the hind legs more to the rear, the thigh bone (*b*) becomes more nearly vertical, the lines CA, representing the direction of propulsion, and DE the proper direction of the trace, will practically coincide. In other words, the direction of the propelling force of the hind legs will be exactly contrary, as it should be, to that in

## ARTILLERY HARNESS AND ANIMAL TRACTION

which the resistance to traction occurs, whereas it will form a considerable angle with the horizontal trace represented by the line FG.

The drill regulations state that a horse can exert a greater power of traction when ridden. This applies particularly to the lead and swing horses, whose traces are horizontal. It is evident that if the resistance is in the direction FG (Fig. 2), and the effort to overcome the resistance is applied in the direction CA, there is a vertical component exerted which tends to lift the horse's front feet off the ground. This force is exerted on a lever-arm of a length from the line FG to the ground. It is to overcome this vertical component that the cannoneers are mounted on the off horses when the pulling is hard, as prescribed in the drill regulations. Now, it seems to me that this arrangement is somewhat like the case of the man who, in taking his grain to the mill, solved the problem of balancing the load on the mule by placing a rock in the end of the sack of sufficient weight to offset the weight of the grain.

If the traces of the lead and swing horses incline to the rear with the same angle as the wheel traces, so that the line of the applied force coincides with the line of resistance, no vertical component with the consequent waste of power, would occur.

We will next determine the exact point at which the traces should be attached to the collar (Fig. 2). It will be noted that the lower end of the shoulder-blade is jointed to the top end of the arm-bone, which causes the lower end of the former to move forward at each step taken by the horse. The muscles of the back and withers, which are attached to the upper end of the shoulder-blade, cause the upper end of this bone to move backward at the same time that the lower end moves forward; consequently, the shoulder-blade rotates backwards and forwards on a fixed point (D), which is somewhat below its centre. (This action of the shoulder-blade can be seen by observing the horse in motion.) Now, it seems hardly necessary to point out that the proper point of attachment of the traces is opposite the immovable point of the shoulder-blade. This is nearly the point

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of attachment of the traces on our steel collar, though as a matter of fact, even when the trace-plates are placed in their highest adjustment, the point of attachment is, for the average horse, somewhat too low.

We now come to a feature which is inherent in our harness and system of traction. I refer to the peculiar disposition of the swing and lead traces (Fig. 4), the former being attached to the front ends of the wheel traces, and the latter to the front ends of and in prolongation of the swing traces. Assuming that the lead and swing horses are of the same height, and that they are standing on level ground, this arrangement brings the lead traces horizontal. The swing traces are also practically horizontal, the rear ends being only a very little lower, due to attachment to the lower branch of the split-wheel trace.

I venture to say that nowhere else have you seen such a peculiar arrangement of traces. Now, we have previously demonstrated that, in considering the carriage, the applied force should not be exerted in a horizontal direction. We have also shown that the traces should leave the collar in a line normal to the slope of the horse's shoulders. It is therefore seen that this arrangement of the lead and swing traces, being in a horizontal position, violates the mechanical principles relating to both the horse and the carriage.

The chief fault, however, of this horizontal arrangement of lead and swing traces is the component of downward pull caused by the change in direction of the line of traction near the point where the swing and wheel traces join. This downward pull is borne on top of the necks of the wheel horses. It will be seen that if the lead and swing pairs were hitched directly to the carriage their traces would assume the positions shown by the dotted lines (Fig. 4). You can easily get an idea of the amount of downward pull, which is borne by the top of the horse's neck, if, when your battery is well in draft, as in climbing a hill, you will ride alongside the wheel horse and reach down and attempt to lift the trace where it changes direction at the shoulder. It seems unnecessary to dwell upon the evils of this defect in our

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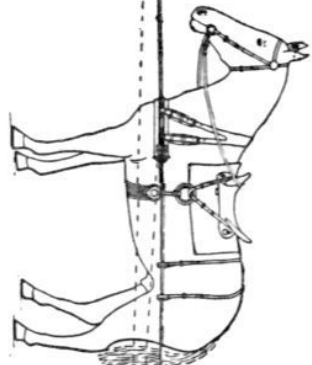
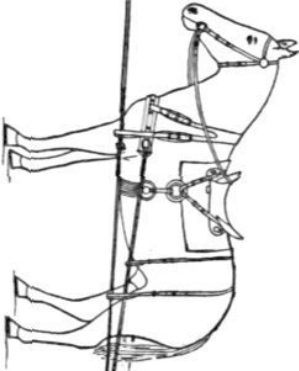
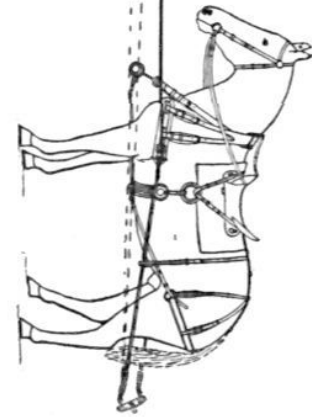
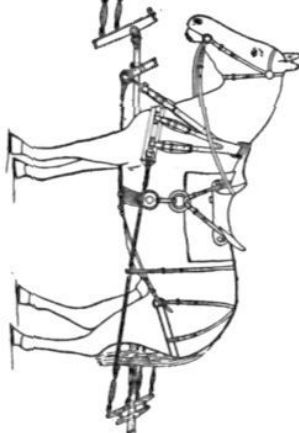


FIG. 5.

FIG. 4.



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system, for sore necks\* and "stove up" forelegs after long marches, are usually the forceful, if mute, reminder of a very faulty arrangement of traces.

In passing it may be mentioned that in the French and English harness, where the arrangement of traces are practically the same as our own, a "holding up strap" at the saddle transfers the down pull from the horse's neck to the saddle. No such appliance is issued with our harness, but such straps can be improvised and attached to the saddle by the stirrup-strap loop. This has been done in the batteries attached to this school. It would seem that the only reason for adopting such an arrangement of traces must have been their great convenience in fast manoeuvring. Some of you will recall that this feature of our harness was much appreciated back in the days when our batteries were rated on their ability to "put up a snappy drill" at a fast trot and gallop rather than on the successful performance of long and difficult marches. Considering that artillery in the field rarely moves faster than a walk, and that the galloping of artillery teams is now seldom required, there seems to be no good reason for retaining this faulty system of traction.

While the steel collar has been replaced by the breast collar, I am of the opinion that for the purpose of traction the former, when properly used, is the best article of any appliance of which I have any knowledge. On the other hand, when improperly used this collar appears to be one of the poorest articles, for horses are quickly rendered unserviceable when improperly fitted. Unfortunately, even among our regular batteries, the steel collar was not always thoroughly understood and properly used, and it was thought too much to expect inexperienced officers, coming into the service during war, to become sufficiently familiar with its several adjustments to warrant its continuance in the service. I might add that, in my opinion, the steel collar does not require more instruction and care than is required in keeping the carburetor of a motor in proper adjustment under

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\* Trouble from sore necks will be greatly reduced in the near future by the use of a metal neck-pad.—ED.

## ARTILLERY HARNESS AND ANIMAL TRACTION

varying conditions. In view of the facts stated, and because it requires no adjustments, except in height, the breast collar was adopted for our service. It was not adopted because it is superior in any respect to the steel collar, but because, requiring practically no adjustments when changed from one horse to another, or when a horse grows thin in campaign, it is nearly "fool-proof," though it resembles the breeching a little too much, perhaps, to be entirely so.

The many evils of the breast collar are apparent to anyone who knows anything at all about traction. You may have observed that its use brings the line of traction some six inches lower on the horse than with the steel collar, and it has probably occurred to you that the horse appears to be "falling over his load." The bearing area is much lessened as compared with the steel collar, with a corresponding increase pressure per unit of bearing surface on the horse. The greatest fault, however, and the one most harmful to the horse, is the necessary placing of the point of attachment of the trace to the collar so low as to bring the pull opposite, or very nearly so, to the articulation of the shoulder-blade with the arm-bone (F, Fig. 2). It will be recalled that this is the point that moves forward at each step of the horse through rotation of the shoulder-blade on its centre. It is seen that the pull of the traces applied at this point must cause the animal discomfort, if not pain. The breast collar interferes with the free movement of the horse's fore legs, causing him not only to travel in an unnatural manner, but as would be expected, shortens his stride. It also contracts the lungs, the front portion of which, you will recall, lie well forward in the chest cavity, as does also the heart.

In my opinion, based on some experimentation, at least 25 per cent. of the draft power of the horse is lost in using the breast collar instead of the steel collar. I would like to see further experiment made with what is known as the "humane collar." It is extremely simple in its adjustments, besides permitting the attachment of the traces at the same point as with the steel collar—the immovable centre of the shoulder-blade.



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The function of the single-tree is to take up the alternate lengthening and shortening of the traces due to the movement of the horse's shoulders while in draft. Where the breast collar is used it will be seen that this movement is much greater than was the case with the steel collar, due to the necessary placing of the breast collar at the point of maximum rotation of the shoulder-blade. To illustrate: When the horse advances his right shoulder, shortening the trace on that side, the right end of the single-tree moves forward a corresponding distance. Conversely, when the left shoulder is advanced the left end of the single-tree moves forward, the single-tree turning on its centre. Now, while this arrangement functions properly for a single horse, let us consider what happens when three horses are hitched in tandem, as they are in the team. It is obvious that if the three horses were to keep step with each other at all times, the single-tree would function the same as with a single horse. But when one of the horses is out of step, assuming that all horses are pulling equally on the traces, it is apparent that the traces will move with the motion of the shoulders of the two horses that are in step, or nearest so, causing the breast collar of the other horse to slip backward and forward around his breast.

Now, let us consider how the various features of our harness and system of traction can be improved. In doing this we must take into consideration the fact that, due to the recent war, a large amount of equipment is on hand, and consequently no change of design, involving the expenditure of much money, would be considered at this time. The changes which I shall suggest would necessitate practically no expense, if adopted, as the material on hand could be utilized with very little alteration.

As has previously been stated, all traces should be so arranged that the horses can exert their full force under a correct angle of traction, where the maximum of the force exerted will be converted into useful work, and not dissipated by changing the direction of the line of traction. Such a condition can be had only in a system where all traces throughout the team lead, without a change of direction, from the collar to the single-tree.

## ARTILLERY HARNESS AND ANIMAL TRACTION

On account of the length of traces that would be required, it is, of course, inadvisable to attach the lead, swing and wheel horses to the same double-tree with separate traces, otherwise this arrangement would seem to be best.

Although a lead-bar on the end of the pole (Fig. 5) presents some objections, particularly some thrashing about at fast gaits, it is believed that its adoption is warranted, since the objectionable features seem insignificant in comparison with the many faults that its adoption would correct. This system which is similar to that employed for the artillery by Germany, Austria, Italy and some other countries, as well as in all commercial work where heavy hauling is done, does away with practically all of the defects, with exception of the breast collar, which I have pointed out as existing in our present system of traction. The wheel horses would be attached, as now, directly to their single-trees, with traces under the proper angle of traction, and the component of downward pull on the top of their necks, which is the cause of so much trouble, would be removed. It will be seen that when the lead and swing horses are in draft the end of the pole will be slightly lifted, until its direction is in prolongation of the lead and swing traces. With carriages that are not equipped with pole support, this lifting of the end of the pole is important, as all weight is removed from the top of the necks of the wheel horses. The trace of the swing horse is attached to a mogul spring, hooked to the lead-bar on the end of the pole. The trace of the lead horse is prolonged by an additional trace of the same length as the swing trace and attached to the same mogul spring. It is believed that this arrangement of traces would require but little alteration of the present equipment. Wheel traces, with one of the chains which form the front fork removed, would be of proper length, and could be used for the swing traces. The same could be used for prolonging the lead traces. It will be seen, without further explanation, that this arrangement of traces does not violate any mechanical principle, the observance of which is considered necessary for good traction, as all traces are now normal, or

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nearly so, to the horses' shoulders, and all fall under the proper angle of traction. The only additional equipment required in the adoption of this arrangement would be a lead-bar attached by a hook to the end of the pole.

I do not think that the holding back system used in our harness can be much improved. In order to obviate the down pull on the hip straps, which always occurs when the breech body is placed horizontal on the horse, the breeching should be raised to a position just below the point of the horse's buttocks, and pitch forward on the sides, nearly in prolongation of the side straps (Figs. 4 and 5). If the breech body is horizontal, as shown in Fig. 3, it will be seen that when force is brought to bear on it through the medium of the martingale and the side straps, a component of the force is applied to the front hip straps. If the front hip straps were removed, the side straps and breech body would when under strain assume the position of the dotted line (Fig. 3). The down pull on the hip straps causes sores on the horses' rumps where the hip and back straps join.

By referring once more to Fig. 2, it is seen why the force brought to bear by the breeching in holding back can, from a mechanical standpoint, be better borne near the point of the buttocks, where the hips and thigh bones form an acute angle, than where it is more commonly applied at the point opposite the stifle joint. The stifle is one of the weakest joints in the horse's body, and is at a point where the thigh and leg bones form a reëntrant angle, when opposed to a force applied from the rear.

Since the scope of this lecture does not include harness fitting, except as relates to suggested changes in the equipment, I shall not discuss the fitting of the remaining parts of the harness. In addition to the instructions contained in the drill regulations, an excellent article on the subject by Major-General (then Major) C. P. Summerall may be found in the January-March, 1913, number of THE FIELD ARTILLERY JOURNAL. Harness fitting is also discussed in an article on

## ARTILLERY HARNESS AND ANIMAL TRACTION

"The Training of the Artillery Horse," by Colonel William P. Ennis, which appeared in the April-June, 1918, number of the same publication.

There are some officers who advocate doing away with the whip for use with artillery teams. While I have great respect for the judgment of some of the officers who hold this opinion, my experience leads me to believe that the drill regulations are correct in the assertion that "the whip is of important assistance to the field artillery driver." Most drivers doubtless prefer not to have the whip issued to them as a part of their horse equipment, as it not only requires some additional work to use it properly, but it easily becomes lost or stolen. Some of the officers who would discard the whip state that, if given to the drivers, they will abuse the horses with them. It seems to me that the same might as well be said of the spurs. The proper use of the aids is a matter of instruction and discipline. It is said that the team may be taught to work quite as well without the use of the whip as with it. Good draft means that all horses must not only be made to start the load together, but that each must do his share of the work by being kept up into the collar. In instructing recruits in handling a single horse much stress is laid on the proper use of the aids. He is taught how to gather the horse for the purpose of moving forward—that, in addition to the slight pressure on the bit, the increased pressure of the legs must be used to urge the horse forward. Now, in driving a pair it is evident that while the near horse receives the prescribed aids, the off horse, without the use of the whip, receives no aids aside from the bit. (Some drivers solve the problem by kicking the off horse in the ribs, or by using the lash of the off reins to strike the horse over the shoulders and neck.) Undoubtedly with well-trained horses the off horse will habitually move as soon as he becomes aware that his mate is moving, and, while he may not be more than a fraction of a second behind, it means, nevertheless, that the near horses, which are the heaviest loaded, habitually have to start the load. The whip should be issued to all drivers, and they should be instructed in its proper

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use. Horses should be taught not to be afraid of the whip, and it should never be used as a punishment except when necessary to correct fault. The whip is also very necessary in emergencies requiring the team to exert its full effort.

Good draft is dependent upon march discipline. Since the time allotted for this lecture does not permit of as thorough discussion of march discipline as its importance deserves, I will in closing confine myself to reading a memorandum written in 1915 for the observance of a battalion during a four-hundred-mile march. The precepts contained in these instructions are, I am sure, familiar to those of you who have had the good fortune to have learned march discipline under General Summerall.

1. The following instructions will be observed during the march of this command to \_\_\_\_\_.

2. The greatest vigilance is enjoined upon all in the care of the horses during the march and in camp.

Close supervision of all officers and chiefs of sections will be exercised at all times in the adjustment of harness and equipment, and also the proper draft of teams, in order that faults may be discovered in season to prevent injury to the horses.

Too willing horses, as well as those that are known to become easily exhausted, must be closely watched, and replaced by spare horses before they have become too exhausted to keep up with the column.

3. The batteries will alternate in leading the column for the day, and the platoons should alternate in leading the battery. Each section in the battery should take its turn in hauling the battery wagon and battery store wagon.

4. No carriages will fall out of the column except by order of an officer, in which case the vacant space will be maintained until the carriage regains its place in the battery. No increased gait will be permitted for the purpose of having a carriage regain its place in the column. A carriage which has fallen out will remain at the rear of the battery or column until the next halt, when its proper place in the column will be taken.

5. Enlisted men will not be permitted to leave the column

## ARTILLERY HARNESS AND ANIMAL TRACTION

except when absolutely necessary, and only by permission of an officer. If it becomes necessary for a driver to leave the column, a cannoneer will be detailed to take charge of his horses during his absence.

Permission will not be given during the march for men to enter any building, yard, or enclosure.

6. All canteens will be filled each morning before marching, and they will not be refilled from any source while on the march except that authorized by the commanding officer.

7. When the command "Halt!" is sounded at the head of the column during the march, all carriages will be immediately hauled well to the right side of the road, leaving at least half of the road clear for traffic.

All horses, including officers' mounts, will be held on the same side of the road as the batteries.

Collars\* will at once be unlocked and placed on the blanket immediately in front of the pommel of the saddle. The inside of the collar will be wiped clean. If the weather is hot, the horses' noses and mouths will be sponged out, water being used from the canteens, when necessary, for this purpose.

The horses' shoulders should be well massaged during each halt, the cannoneers assisting with the off horses.

All cinches will be tested by the officers at each halt, and must be so adjusted that the hand (flat) can be inserted easily between the safe of the cinch-ring and the horse.

In case the road is muddy, the martingales and side straps will be wiped clean at each halt.

It must be impressed upon the men that the halt is made for the benefit of the horse, and the entire time should be devoted by the personnel in the care of the horses, readjustment of equipment, etc.

Sufficient time will be given after the command "Attention!" is sounded, to permit of locking collars, and no collars will be put in position until "Attention!" is sounded.

Double distance will be maintained between carriages, and

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\* Steel collars were used at this time.

## THE FIELD ARTILLERY JOURNAL

increased distance between batteries, at the discretion of the battery commanders.

One feed of oats will habitually be carried in the feed bags on the march.

8. Upon arrival of the command in the vicinity of the selected camp sites, the battery commanders will be notified, and will precede their batteries a sufficient distance to receive their orders and make their dispositions for camp, so that their batteries may move directly into park without delay.

9. At the dismounting of the drivers the cannoneers should be assembled in front of the batteries, details made, and directions given at once for the location of kitchen, latrines, and officers' tents. All details will then proceed promptly to the duties assigned them, and the camp made as quickly as possible.

10. After unharnessing, all bits and collars will at once be washed clean, the collars being placed inside up on the poles for inspection. If the sun is shining, saddle blankets will be left on the horses' backs and secured by the surcingles.

11. A little hay should be fed at once, if practicable, to lessen the tendency of horses rolling or scraping off the blankets by passing to and fro under the picket line.

12. The source of water for use of the kitchens and drinking purposes will be designated by the surgeon, and water will not be taken from other sources for these purposes.

13. All latrines will be screened from view, unless tents are used, and a lantern will be kept burning at each latrine during the night.

14. Before breaking camp each day all manure and waste hay will be raked in heaps and burned, unless otherwise directed. Kitchens and latrine pits will be carefully filled. Battery commanders will make personal inspection to see that these instructions have been properly carried out.

15. Any complaints made by civilians as to the conduct of enlisted men will be promptly investigated, and the facts reported at once to the Commanding Officer.

# Divisional Artillery Strength

BY LIEUTENANT-GENERAL BALCK

(From the *Artilleristische Monatshefte*, June, 1920.\*)

[TRANSLATOR'S NOTE.—*The writer remarks in a footnote that under the present circumstances in Germany his suggestions cannot be carried out, but that he feels it desirable to discuss and draw lessons from the experience of the war. This suggests a special value that contemporary German magazine articles may have for us. The very fact that a writer is discussing a theoretical desideratum, without hope or expectation of translating it immediately into action, gives him a certain detached point of view difficult to acquire when one is working on an immediate organization problem. This is quite aside from the self-evident fact, that General Balck's opinion on a military question must command the respect of every soldier, of whatever country.*]

## PART II

IN Germany it was thought best not to lay down any rules as to the artillery armament of a sector; the strength of the hostile artillery and the general plan of operations were controlling features. For important sectors not over 4 kilometres wide the above described normal assignment of artillery was found satisfactory. On active fronts, assuming offensive operations, with long artillery preparation, a sector breadth of 4 kilometres, and one reserve division with its artillery for each two in line, a fair allowance per kilometre would be 3.5 to 5 light gun or howitzer batteries, 1.5 to 2.5 heavy howitzer batteries, and 1 to 1.5 ten-centimetre gun batteries; or, for the division front of 4 kilometres, 14 to 20 light, 6 to 10 heavy howitzer, and 4 to 6 heavy gun batteries. It is desirable to have also a reserve of guns and a good repair shop.

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\* Translated by Col. O. L. Spaulding, General Staff, U. S. Army.



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French ideas were not dissimilar, as the following quotation will show:

"All the artillery under the control of any unit (division, corps, army) is placed under the command of a single chief. Calibres are apportioned in such a way that each unit shall have full control of all guns working immediately with it, and that the higher command shall have all the guns whose sphere of action includes more than one sector. Commanders of all grades must plan for immediate use of all the batteries possible.

"As a rule, the sector or division commander will have the artillery properly belonging to his division, generally reinforced by a few battalions of the corps artillery; also the 15.5-cm. howitzers and 22-cm. mortars, and the tank defense artillery. The corps commander will have the remainder of his corps artillery, the 9.5, 10.5, 12 and 15.5-cm. guns, and sometimes a part of the heavy howitzers and mortars. The army will retain the long-range heavy artillery and the anti-aircraft guns.

"This rule is not fixed, but varies according to the circumstances. There should be no sharp dividing line between the divisions, corps and armies, but all batteries within reach, irrespective of their assignment, must assist at any threatened point.

"To this end, the army heavy artillery is divided into groups which can cover the front of two or three corps. Direct communication is established between these groups and the corps commanders, who are authorized to use the guns in case of necessity. Similar dispositions are made of the artillery belonging to the corps."

In England, the corps chief of artillery had control of the artillery of the divisions, and also of the heavy artillery, which had its own separate commander. No details as to number of guns in defense can be given.

Marshal Joffre's attack system of 1915 called for an artillery preparation lasting for days, to destroy all means of defense and gradually break down the German resistance. This required, as, for instance, in the operations in the Champagne, that very strong artillery should be brought in and heavily entrenched,

## DIVISIONAL ARTILLERY STRENGTH

so that there was no possibility of surprise. In the British spring offensive at Arras, in 1917, there were 456 light and 240 heavy guns, and 286 trench mortars, on a front of five kilometres.

Shortly before this, on February 15, 1917, the 51st Reserve Division had taken over a four-kilometre front on the heights south of Ripont, with five battalions in line and two and a half in reserve. On the assumption that there should be one heavy battery for each hundred metres of hostile trenches, and that six hours' artillery preparation would be required, the following artillery was put in line: 17 batteries field guns; previously in sector, 6; 24 batteries light howitzers; previously in sector, 3; 2 batteries 9-cm. guns; previously in sector, 2; 10 batteries 10-cm. guns; previously in sector, 1; 2 batteries 15-cm. guns; previously in sector, 2; 27 batteries heavy howitzers; previously in sector, —; 10 batteries mortars; previously in sector, 1.

In addition to this, there were 2 seacoast mortars, badly worn, and 31 heavy and 28 medium trench mortars. This was a very heavy armament, but it was thought best to be on the safe side.

The large number of field works, with dummy and alternative positions, that grew up all along the front, suggested their utilization for the purpose of surprise; to make this possible, it was proposed to abandon the idea of bomb-proof emplacements, and to use only a very short artillery preparation. This was especially advocated by General Nivelle, who was himself an artilleryman; he proposed making up for the shortness of the preparation by increased expenditure of ammunition. In Germany, after the Nivelle method of attack had become familiar, the same idea was taken up and developed; no effort was made to overpower the artillery of the defense, but only to break up the communication system and neutralize the hostile artillery with gas during the attack.

Tank attacks complicated the problem of defense greatly, and put an end to the idea that deep and well-kept wire would prevent any attack. On November 20, 1917, such an attack

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was successfully made upon a 7.5 kilometre front west of Cambrai, well fortified and provided with strong obstacles, and held by the 20th Landwehr and 54th Divisions. Only well-planned tank defense, both active and passive, can guard against this.

The artillery found a valuable auxiliary in the mine-throwers, which are placed under the artillery commander for the preparation, but must be at the disposal of the infantry during the actual attack. For this reason, they can not be made organically a part of the artillery; they act with it occasionally, but for the most part are widely separated from it. For a serious attack, it is usual to count upon one heavy mine (up to 47 kg.) or two smaller ones (12 kg.) for each running metre of the front to be attacked. Not to make the time of preparation too long, there should be one medium or heavy mine-thrower (range 1150 and 2000 m., respectively) for each 30 to 50 m., and in addition one or two light mine-throwers for each 100 m.

The question of the number of guns for a division in such an attack requires serious study. The answer is naturally affected by the possibilities of combining flank with frontal fire. The divisional front should be taken as at least two kilometres. The latest experience of large offensive battles indicates that the functions of the artillery are the following:

- (a) Engaging and neutralizing the hostile artillery and mine-throwers;
- (b) Neutralizing the defense of the enemy's trenches, or firing for destruction upon the trenches themselves;
- (c) Firing upon reserves, communications, observers' and commanders' stations, parks, balloons, and means of transport, in rear of the lines;
- (d) Rolling barrage in support of the attack;
- (e) Accompaniment of the attack by light pieces, to break down local resistance by direct fire at short range;
- (f) Protection of the infantry by standing barrage after reaching the objective;
- (g) Defense against counter-attacks, and preventing reinforcement.

## DIVISIONAL ARTILLERY STRENGTH

Many of these duties may be performed in succession, by the same batteries; but not counter-battery work and fire for destruction upon the point of attack. These must be simultaneous, and each is a task requiring full force. To engage the hostile artillery prior to the actual attack, the artillery combat instructions call for one or two mortar batteries, two or three of heavy field howitzers, and one or two of heavy guns. To these should be added, at the proper time, enough additional pieces to give a prospect of success within a reasonable period. To destroy a battery requires some 300 rounds of the heavy field howitzer, or 200 of the mortar; the average rate of fire per hour is, for the mortar 25 rounds, for the heavy field howitzer 60, and for the light field howitzer 100. Such an expenditure of time is seldom permissible; it is generally better and simpler to neutralize with gas and high explosive shell.

For gas firing, the light gun with its rapid fire is preferable to the heavier and slower piece. The estimated requirement per hectare is 100 rounds with the light field gun, 50 with the light field howitzer, 25 with the heavy howitzer, or 10 with the mortar. To maintain a gas concentration for one or two hours requires, for each square kilometre, 10 batteries of light guns, 7 of light howitzers, 17 of 10-cm. guns, 12 of heavy howitzers, or 10 of mortars. If the hostile artillery occupies an area of 2000 metres front and 800 depth, or 1.6 square kilometres, there should be assigned for this purpose, say 12 batteries of light guns (of which 6 would serve later as observation batteries), 3 of light howitzers, 2 of 10-cm. guns, and 5 of heavy howitzers (including 1 for observation later).

At the moment of assault these batteries hold down the hostile artillery with gas and high explosive. Combat planes may render good assistance here, firing upon the enemy's batteries with machine guns and bombs. Part of the batteries remain in observation for the second phase of the attack, to fire upon any hostile batteries not discovered before. The English regulations provide for "silent batteries," held in reserve to repulse an attack. This device was used by the French also; an illustration

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on a large scale is found in the operations about Montdidier and Noyon.

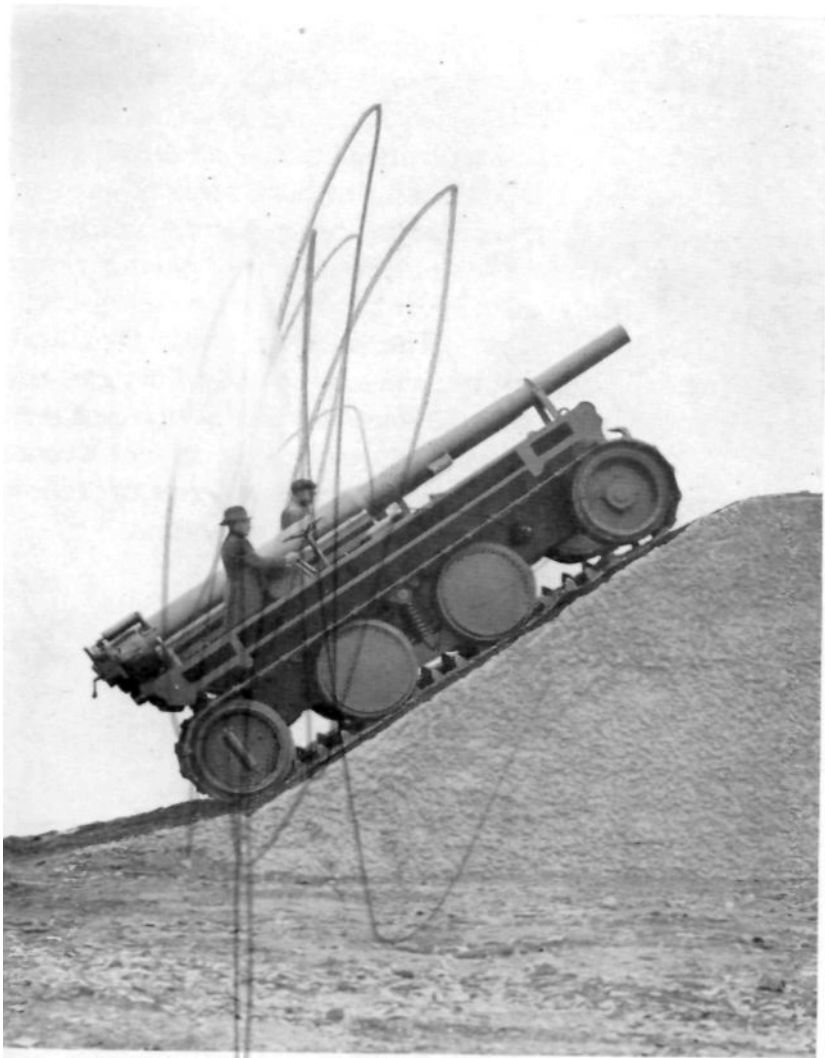
For firing upon the enemy's front lines, one howitzer battery is allowed for each 100 m. front. Positions outside the front of attack are merely neutralized by fire from the lighter calibres. A part of the preparation may be taken over by mine-throwers, allowing one medium or heavy piece to each 40 m. front. Thus, three divisional mine-thrower companies, old type, with 12 heavy and 24 medium pieces (10 per cent. in reserve), might take over 1600 m. of front, firing 280 heavy and 900 medium bombs per hour. The artillery would then have to cover, say 1200 or 1500 m., since the second lines can not be neglected, and there must be some fire in the adjacent sectors. To work out details, it would be necessary to assume a concrete situation. The artillery combat instructions give the following approximate figures for a three hours' preparation:

Battery	Trench front, m.	Rounds.
Light field howitzer .....	100	800
Heavy field howitzer, Mod. '13 .....	150	600
do. Mod. '02 .....	100	400
do. Mod. '96 .....	75	300
Mortar (3 pieces) .....	100	225

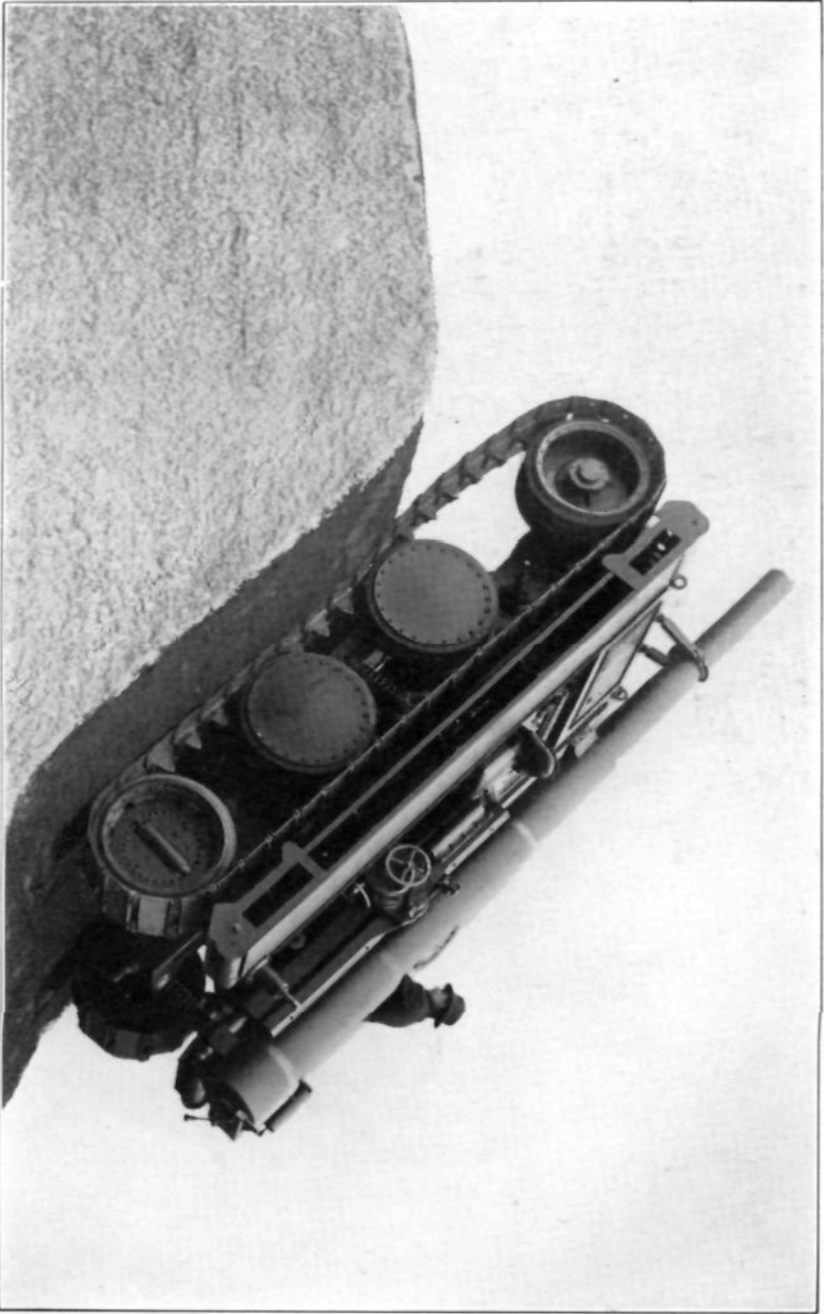
These figures include destruction of overhead cover; and also of such obstacles as are within 30 m. of the trenches, for the dispersion of the gun will take care of these. For obstacles at a greater distance, additional ammunition must be expended.

If flanking fire can be used, which is, of course, desirable for the moral effect, the ammunition required may be reduced by about a third. Whether all the lines of a position shall be fired upon at the same time, or one after another, depends upon the number of available batteries.

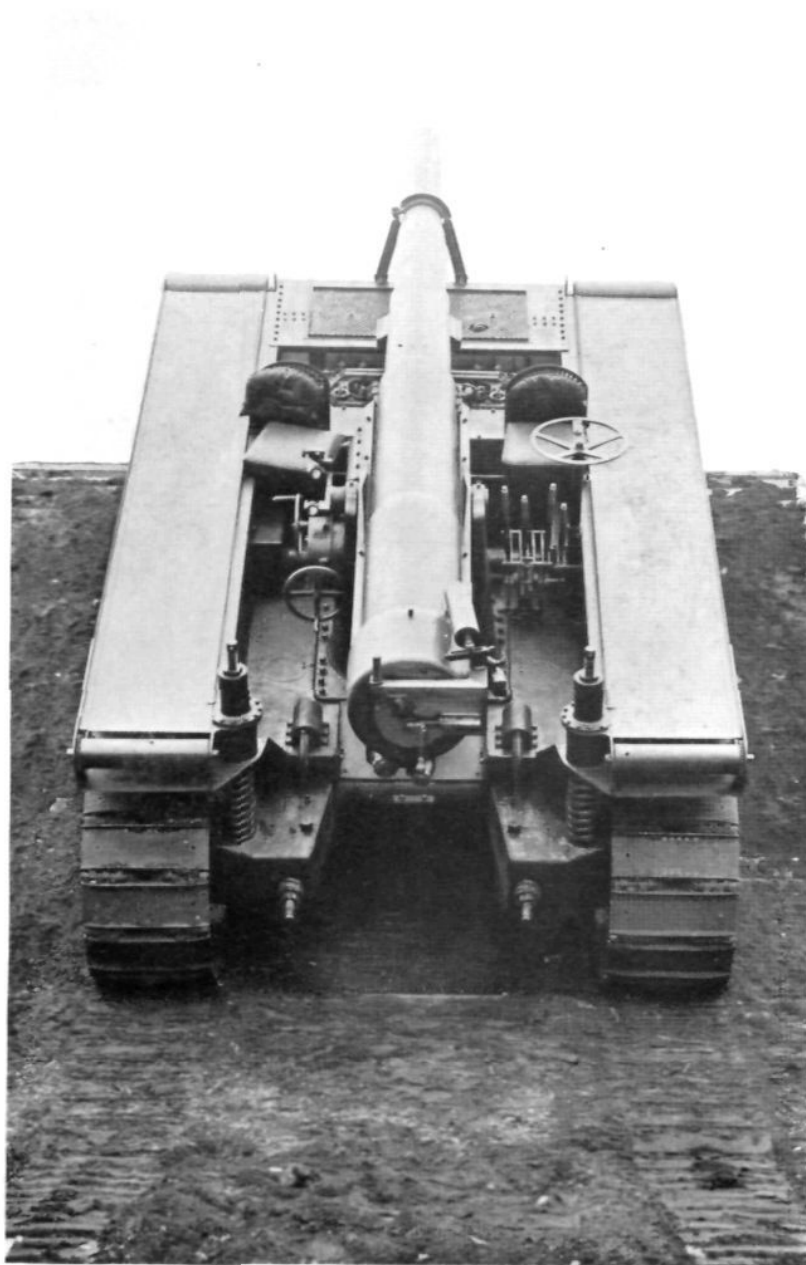
The front above assumed, then, 1200 to 1500 m., might be covered by 3 batteries of light howitzers, 7 of heavy howitzers, and 4 of mortars, 1400 m. in all. This provides merely for destruction fire upon a single position. A certain number of light



155-MM. G. P. F. GUN ON SELF-PROPELLED MOUNT (CHRISTIE)  
Going up 35° slope in reverse.



155-MM. G. P. F. GUN ON SELF-PROPELLED MOUNT (CHRISTIE)  
Going up 45° slope in reverse.



155-MM. G. P. F. GUN ON SELF-PROPELLED MOUNT (CHRISTIE)  
At rest on steep slope, demonstrating brake efficiency.





MEDIUM TANK (CHRISTIE TYPE)  
Going up and down 45° and 35° slopes.

## DIVISIONAL ARTILLERY STRENGTH

and heavy guns must be provided, to fire upon routes of approach, observation stations, and assembly points of reserves; also a few anti-aircraft guns, say 6 per division. I have already discussed the number of accompanying guns to be provided, and of batteries for accompanying fire (*Art. Mon.*, August, 1919). A suitable estimate would be 12 batteries of light guns, 6 of light howitzers, and 5 of heavy howitzers.

Everything considered, then, one might allow for a divisional front of 2 kilometres four light regiments, with 24 gun and 12 howitzer batteries, and in addition 8 heavy howitzer and 2 mortar battalions, 26 batteries in all. This would give 62 batteries of all types and calibres; and even more could readily be used as observation batteries. No such accumulation of guns and ammunition was dreamed of before the recent war. The technic for assembly, deployment, and ammunition supply had to be developed gradually.

The handling of such a mass is well illustrated by the attack on the Matz, in the operations about Noyon on June 9, 1918. The preparation began at 12.50 A.M., with a sudden burst of gas and high explosive fire upon identified batteries (which, however, had been withdrawn during the night), upon observation stations, headquarters, shelters and routes of approach. Then came an artillery preparation, with gas, from 1 to 2.30; from 2.30 to 4.10, fire for destruction upon the hostile positions alternately, the artillery being kept under fire meanwhile by long-range guns. At 4.20 a violent burst of fire gave the signal for the attack, which was preceded by a rolling barrage (first lift 300 m., then 200 m. in ten minutes) as far as the line Ecouvillers-Attèche Farm. The infantry had worked forward to within 300 m. of the enemy's trenches, passed the barrage zone well closed up, and reformed in the enemy's position for further advance; the artillery followed.

The English, in 1917, counted on using in a division sector of two kilometres front, the artillery of three divisions\* plus

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\* The English division had six batteries of field guns and two of light howitzers, each battery with six pieces.

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33 batteries. Ludendorff ("War Memories") counts on from 20 to 30 batteries per kilometre, or 40 to 60 to the division sector. As a rule, three divisions are assigned to each sector, but the infantry of the divisions in second and third lines is not used on the first day of an attack.

In position warfare, then, the question is not how many batteries there should be per thousand men, but rather how many men the infantry must have to exploit the success of the artillery fire. In manœuvre this requires some modification, for ammunition supply and subsistence for man and horse become so difficult that the number of guns must be reduced to permit carrying more ammunition. Besides, the infantry would become a mere artillery support. A regiment consisting of six gun batteries and three howitzer batteries, reinforced by a heavy battalion with two howitzer batteries and one gun battery, with two four-gun anti-aircraft batteries, should be enough for all purposes. For the heavy guns motor transport might be used; for movement off roads perhaps the motor limber would serve. There should then be an army artillery composed of all light and heavy guns not assigned to divisions.

The use of the artillery reserve in earlier wars is not to be imitated. At Solferino the Austrian artillery reserve was not in action at all. At Gitschin that of the Prussian First Army was a day's march from the field and did not arrive in time. To organize an army artillery at all seems unfortunate; but battles do not develop so rapidly now as formerly. The army artillery can probably be counted on for the second day of the action, even though the component batteries and ammunition columns vary greatly in mobility.

# Being a Tactical Study of the Field Artillery Group in Retreat.\*

BY LT.-COL. W. H. F. WEBER, C.M.G., D.S.O. PSC., R.F.A.

(In three parts; Part I, March, 1918; Part II, April, 1918; Part III, Conclusions and some Platitudes.)

[EDITOR'S NOTE.—*This study of Field Artillery in retreat contains much of interest to our Field Artillerymen, as it will call to mind some of their own difficulties in transportation and with communications, though fortunately we were never in a retreat.*

*A few notes on the latest British Field Artillery organization are given as an aid to the reader, as their organization differs materially from ours.*

*Batteries are commanded by majors, each with a captain, second in command, and have six guns, except heavy field batteries, which have only four.*

*Brigades, commanded by lieutenant-colonels, usually have three batteries, though horse artillery and howitzer brigades have only two batteries. Heavy gun batteries are not brigaded.*

*The Divisional Artillery (D.A.), commanded by a general officer, contains four brigades (one equipped with howitzers) and one heavy gun battery. Howitzer brigades are now being increased to three batteries, which will give seventy-six guns and howitzers to a division.*

*A cavalry division has two brigades, with a total of twenty-four guns.*

*In this article, the writer's Second Brigade, R.F.A., had four batteries (three guns and one howitzer).*

*The term "group" refers to a convenient grouping of batteries, varying in number, to cover an area. At first the writer had three batteries in his right group, while later he had seven.*

*The "bury" so frequently mentioned is a buried telephone cable.*

*As this study will appear in serial form, it is suggested that numbers of the JOURNAL containing the different installments of the "Study" be preserved in order that the whole may be read when leisure permits. Back numbers of the JOURNAL are not always on hand.]*

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\* Reprint from *The Journal of the Royal Artillery*, March, 1920.

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### PART III.

#### Conclusions and Some Platitudes.

IN drawing the following conclusions from Parts I and II it should be remarked that they refer to conditions where the front is continuous and opportunities for the display of brilliant initiative by a subordinate are few and far between, though the need of initiative is not less than it has been in the past. The modern great war is an affair of organization from behind, even from those parts of the belligerent countries not externally affected by the conflict; it cannot be waged without the good will of the people; success, it has been said, comes to the finest national character. For all that, when one belligerent or the other initiates an offensive, there occur on the battle-front situations calling for resolute decision which is all the harder to come by when one has become accustomed to the receipt of orders and advice from superior authority.

Unfortunately there is little originality in the conclusions; fortunately no attempt to set the military world right in a few choice phrases. But the attitude that "we have done well, let us change nothing" cannot be right; the writer, having been lucky enough to get certain experiences, before he in his turn "whither hurries hence," can only record certain impressions made on him, for what they may be worth. His remarks are confined as far as possible to his opinion on points which have been discussed in the previous chapters; they seem best grouped under the headings:

- (a) Preparations to meet a first-class offensive.
- (b) The Field Artillery in Battle.
- (c) Training in Peace.
- (d) General.

#### *A. Preparations to Meet a First-Class Offensive.*

(i) *Distribution as Affected by Communications.* Control of artillery in the defense is an affair of communications; visual is not to be trusted; pigeons may be useful from O.P.'s and at

## TACTICAL STUDY OF F. A. GROUP

times one could employ a message-rocket apparatus; the alternatives are buried lines and wireless. The enemy attacked our communications on March 21, 1918, in his preliminary bombardment, abandoning perhaps the idea of many shells per gun in favor of a larger number of guns<sup>1</sup> to fire the available ammunition on many targets. On the defensive the simplest plan would appear to be a few masses of guns with trustworthy communications to central spots in those masses; as, however, such a plan would offer opportunity to the enemy counter-battery organization, it would be wise to concentrate labor and material to ensure communication to such positions as it is believed the enemy has not located; this condition is fulfilled by really well-concealed "silent" positions, or by positions selected but not occupied until the shortest possible time before the attack; the latter alternative is especially suitable to field artillery and may solve the problem of rest and training. Developments in wireless may modify this problem.

*Reliability of communications is the decisive factor in effect produced.*

(ii) *Camouflage and the Development of Aircraft.* A premium is thus put upon camouflage—not only against the camera, but also the bombing and short-range attack to be expected with the development of aircraft.<sup>2</sup> "Silent" positions are useless unless they can be concealed—the personnel is better occupied in rest and training and labor; the idea of positions to be occupied when the assault is impending, offers much; it trends towards the covering of such positions, not with strips, but (so to speak) acres of veiling,<sup>3</sup> so that enemy aircraft would not notice a difference in the landscape when the positions were occupied. Of course, flashes would be seen through the veil, but by the time such positions have been located and reported

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<sup>1</sup>Compare Major-Genl. Sir F. R. Bingham's remark that at first the cry was "Oh! those hungry guns," whereas later it changed to "Oh! that hungry ammunition." Yet a German staff officer of high rank once said to the writer, "No matter how you try to decentralize, the question of supply of ammunition always reinduces centralization."

<sup>2</sup>Fokker is said to have invented an aeroplane controlled from the ground, the effect of which would be extreme accuracy at extreme ranges with very heavy bombs.

<sup>3</sup>The writer has heard of a field in the French area completely so covered.

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to enemy headquarters, a decision will probably have been reached in the infantry combat.

It is just possible that the development of large aircraft may in time allow of quick concentration of troops on the defense, but not until the petrol engine can be lightened. Generally speaking, the development favors the offensive, but appears to threaten the rearward services of the defenders and even the civilian population rather than the forward area. Of course, improvement in the artillery attack of enemy aircraft offers the most immediate field for assistance to the defense; failure to get one's shells anywhere near the hostile aeroplane is so terribly obvious to the upturned eyes of the troops.

(iii) *S.O.S. Policy.* The S.O.S. policy announced in July, 1918 [see Part II, Chapter VI (b)], was a confession of failure to ensure communications, but there is no doubt, when one considers the difficulty of hitting small bodies of advanced (attacking) troops, that, even under conditions favorable to the defending artillery, fire is better directed to the denial of passage to enemy supports; at the least, one will complicate matters for the enemy by making him deploy his supports and reserves. The policy of keeping the bulk of the guns on the S.O.S. line and leaving a proportion at the disposal of the officers on the spot, seems the most satisfactory one; it is a corollary of that policy that barrages behind our front line should be pre-arranged, so that at a given signal competent authority can turn on to rearward barrage-lines such lengths of artillery-frontage as seems necessary.

(iv) *Observation.* Observation on the defence must be considered, not as it often was—a chance of "sniping" movement and watching enemy flashes and machine guns—but (a) to view a large area of ground, (b) having regard to facilities for communication, and (c) with special consideration for the counterattack. Reconnaissance for observation should commence from the gun-position forwards, not from the front line back, as trench warfare falsely taught us. It should be possible even at the present stage of development to organize wireless from

## TACTICAL STUDY OF F. A. GROUP

initial O.P's; pigeons are suitable to O.P's as the reports of a trained F.O.O. are valuable to Headquarters located near the pigeon-loft as well as to the group or battery finding the party. The best conditions for defending artillery are where there is a high ridge close in front of the gun-line, from which the enemy forward area and our own front line can be seen. The modern F.O.O. must be able to range his battery, be an expert signaller, an intelligence officer, and a liaison officer.

(v) *Distribution on the Defence as Affected by Enemy Action.* The probability is that the assault will succeed in its earliest stages, that it may reach the defending gun-line (the Germans included it in their first day's objective), and that it may be accompanied by tanks. For offensive work and trench warfare, dispersion is advantageous for enfilade fire; for a defensive battle, one needs to control, which in practice means concentration in one's own area; nevertheless, defending artillery must not be too much tied by those mystic boundary-lines. A good proportion of the guns should use extreme range to allow for covering the withdrawal of forward troops and to give time for the development of the action; such guns need not be able to fire beyond the enemy front system.

The question of enemy tanks must now be considered. To attack them, we have as yet seen nothing better than a few suitable guns placed as far away from the actual trenches as possible, in sites providing a fine field of fire; the gun should have a high muzzle velocity and a special shell and be a quick-firer; the Germans organized anti-tank forts, employing anti-tank rifles and land-mines; they successfully defeated our tanks when the element of surprise was absent—to quote an example, at the "quadrilateral" N.W. of St. Quentin in September, 1918. The writer does not believe in the idea of detailing one gun per defending battery to go out against a tank attack—there is not time to do this; but it is wise to bear penetration in mind, and it is an advantage for defending batteries to have a few hundred yards field of fire in front of their muzzles,<sup>4</sup> which generally

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<sup>4</sup>The defeat of our tanks on the Flesquières Ridge on November 20, 1918, by a few German guns thus placed, offers an historic example.



## THE FIELD ARTILLERY JOURNAL

means emplacement on the forward (or inner) slope of a valley; and it seems sound to detail special mobile units from resting or reserve artillery to deal with tanks that have penetrated.

For protective purposes, instead of surrounding each battery with a few strands of wire, the bulk of the defending artillery should be behind an obstacle such as the Germans called their "artillery protective wire," from which transverse legs leading rearwards could be constructed at intervals on the principle of watertight compartments; this obstacle ought nowadays to include something in the nature of a tank-trap; the tendency of the Germans at the end of the war was to get behind a water-way, but no doubt an artificial obstacle against tanks could be devised, given the time to erect it.

(vi) *Gun-pits versus Camouflage*. The question of gun-pits versus camouflage is controversial; it is too much to say that the object of entrenchments is to save troops for the decisive moment; everyone knows that cover gives a man an ostrichlike sense of security, which induces better performance of duties, even when he knows the cover to be insecure; shelter from weather for both men *and material* must be considered; a gun-pit can give cover against splinters even if not proof against a direct hit. The troubles of a gun-pit are that it is immobile, often difficult to get out of, obvious, and dangerous to the occupants when hit, apart from the danger of the shell itself; flooring and drainage are hard to manage and there is a tendency to limit the arc of fire. Where guns are emplaced under cover which existed before, such as a stable or a house, there is no excuse for not strengthening the position by every possible means, including concrete; but such conditions cannot always be found and, to meet an expected attack, mobility and camouflage seem better suited to the characteristics of field artillery. Whether a gun stands under a net or an 8"-proof roof, each gun-emplacement requires a set of standing orders suitable to its position and the tactical situation.

(vii) *Gas*. Assuming that the offensive will obtain some initial success, and that one of its conditions is the bringing up

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into the assailant's forward area of large reserves, it would appear that the defenders are well-placed to use gas; not out of cylinders—for the cylinders would get captured or destroyed by enemy bombardment to the defender's disadvantage—but by long-range projectiles.

As regards defence against gas, every conceivable regulation was made during the war to limit casualties. The writer saw at Salisbury Plain in 1918 a gas-proof gun-pit; but at present, the best protection appears to be the respirator; if one side or the other invents some new method of inflicting casualties, it is for the scientist rather than the gunner, to invent a remedy; so many such methods have been prophesied—blinding, germs, etc.

(viii) *Trench-mortars*. T.M's appear best placed well back, in the idea of the counter-offensive,—it depends on the terrain where. It is a controversial question whether they should be "run" by the General Staff or the Artillery; there are certain obvious advantages and certain great inconveniences in the latter scheme. If they are to be run by the Field Artillery Group Commander, they form a sub-group in another echelon of defence and need a sub-group commander with the usual staff and paraphernalia for control. The arrangements which obtained in 1917 and 1918 for the provision of personnel were unsatisfactory and reacted against successful handling of a weapon so exceedingly important in trench warfare as the T.M. Development may be expected as regards the use of mobile T.M's in the offensive.

(ix) *Heavy Artillery*. Before an expected hostile offensive, even if not permanently, the relation of the Heavy Artillery units to the Field Artillery, should be clearly determined. Even if the present organization is to continue, there is no reason whatever why the group should not be called a "Mobile Artillery Group" (instead of Field ditto) and the Group Commander be a Heavy Artilleryman. It is unsound that an infantry brigadier should have to hold separate conclaves with two artillery commanders, and the "comedy of coöperative hate" must not appear upon the boards.

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(x) *Field Artillery in a Salient.* Artillery is difficult to place well where a salient is concerned; its work is much harder, it is difficult to supply and still more difficult to extricate. The ideal is to keep the bulk of the batteries not farther forward than the bottle-neck line, which will probably require guns with a long range. Any units within the salient must be specially mobile.

(xi) *Preparations for Withdrawal.* Preparations to meet a decisive attack must include preparations for retreat. The first necessity is for all ranks to be acquainted with the area through which a withdrawal might take place; the next is to prevent units clashing during the withdrawal by allotment of areas, positions and routes. Between necessity and convenience come certain preparations such as provision of (a) wire for future communications, (b) ammunition in the First Reserve positions, (c) fighting-maps, (d) shelter for headquarters. The digging of positions may do harm by disclosing them to enemy aircraft, and will very likely prove to be labor wasted. Every rearward position should be supplied with a *carnet de tir*, of which one copy should be kept by the battery most likely to occupy it, and another copy at some accessible place like Group Headquarters; it would be best if each battery made out its own fighting-map or maps instead of leaving the work to someone not personally interested in the work; the locking up of records and reconnaissance reports, etc., when those reports might be required at any moment, in headquarter and departmental offices, is a cardinal sin.<sup>5</sup> Rearward positions should be sited in contemplation of a *gradual* withdrawal, *i.e.*, in depth, each set connecting with the set in front of it, and *not* on a linear basis which provides only for the defence of certain prepared systems. The one absolute essential is reconnaissance.

### B. *The Field Artillery During a Defensive Battle*

(xii) *Conditions Necessary Properly to Support the Infantry.* There are nine conditions to fulfil in order to support the Infantry.

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<sup>5</sup>"Quand le vice se masque, il est le plus dangereux."

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- (a) Good equipment, kept in order, and enough ammunition.
- (b) Good gunnery, which means sights properly tested, ammunition well stored, and good gun-pit standing orders.
- (c) The safety and comfort of detachments with cover from shell, gas, weather, implying concealment; good wagon-lines.
- (d) Good communications.
- (e) Good observation, which means capable F.O.O's.
- (f) Good liaison, above and below; one can include under this heading good alarm arrangements; *no short shooting*.
- (g) A good system of command—not more units than one man can command with the staff at his disposal.
- (h) Good distribution, suitable to the tactical situation and considering flanks.
- (i) Mobility.

(xiii) *Zones of Responsibility*. Artillery units function best in a defensive battle on a system of zones of responsibility; if suitably allotted they can offer efficient support within those zones, but attack coming from a flank will upset the arrangements; it is better to keep the guns doing satisfactory work on their own frontages than to attempt too much fire concentration to a flank. Artillery must *watch* its own flanks.

(xiv) *A Rapid Retreat*. In case of withdrawal when at grips with the hostile infantry, it is best to leave a homogeneous detachment under a suitable officer to act as local C.R.A. to the Infantry rearguard commander; the bulk of the guns should be withdrawn to prepare a proper defence of the new line; an artillery force must be seen by its commander in position before he can efficiently use it; a local C.R.A. should have his permanent headquarters alongside the commander of whatever infantry he is supporting, but the latter officer must consider the demands of artillery communications in the choice of those headquarters. There is an awkward period of inefficiency after a battery has changed its position; everything possible should be done by means of standing orders to reduce this period to a minimum. The half-covered position remains the

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best and it is practically impossible to work otherwise than by zones, or lanes, of responsibility.

(xv) *The Personal Touch*. As personal leadership is admittedly the secret of command, and since "time spent in reconnaissance is seldom wasted," and artillery brigade-commander needs at least a side-car (so long as roads exist) to carry out his duties *in time*.

(xvi) *Ammunition Supply*. At a practice-camp in 1910, the writer saw a horse-artillery battery lose its "special" for being without ammunition when an important target appeared; the decision caused an outcry; a strike was feared, but, of course, the other batteries would not come out. Remembering our prewar training, it seems absurd to remark that, on the move, the firing-battery is inseparable; yet on 23rd March, the writer was asked to send *all* wagons away and rely upon dumps! In a moving battle dumps cease to exist, and the firing battery wagon is part and parcel of the gun-detachment; going further, the wagon-lines are an integral portion of the battery. Granting that separation between the firing-battery and the first line wagons is inevitable, responsibility for liaison rests primarily with the first-line wagons; a similar principle applies to headquarter units. It is not till one starts moving that one really feels the need of the Brigade Ammunition Column; the D.A.C. is doubtless more suitable for trench warfare.

### C. *Training in Peace*

(xvii) *Practice Camps for Gunnery and Manœuvres for Tactics*. Practical Gunnery has shown itself so much more difficult than most people imagined, that we shall probably have to devote the whole, or almost the whole, of our "practice" ammunition to that branch of training. The ammunition expended is nothing but an insurance premium. Prince Kraft's cry "to hit and again to hit" has received additional justification in a war where daylight movement was at a discount in all but exceptional periods. Short shells should be highly penalized at

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our "practice camps," and the writer humbly expresses an opinion in favor of the competitive system.

Infinitely more might be done at manœuvres as regards training for open warfare; if the umpiring were carried out with one-quarter of the care devoted to umpiring at practice camps, we should progress, and we could afford to dispense with tactical days at "practice." It is not a difficult sort of umpiring; no "casualizing"; just a judgment on the following points:

(a) Is the battery concealed? Was it exposed before coming into action?

(b) Were the initial orders efficiently given out?

(c) Is the position tactically suitable?

(d) Was the fire timely?

(e) Is the observation satisfactory?

(f) Are communications working?

(g) Is the liaison satisfactory?

A simple system of marks would help the senior artillery umpire to form a judgment, and that judgment must be weighed in the decision as to who wins. The writer knows of no other means than manœuvres to acquire "the tactical sense"; he has in his mind a battery commander, formerly an estate-agent, whose battery, in attack or defence, seemed always (and almost uncannily) able at the critical moment to perform the task demanded by an unexpected set of circumstances.

(xviii) *Heavy and Field Artillery Coöperation.* Heavy and Field Artillery must be trained to work as one Regiment. There is no intention to discuss amalgamation or to suggest alteration of armament here. Officially asked for an opinion, the writer suggested an increased Mobile Artillery Group composed of the usual field artillery, one battery of 6" Hows. or 60-prs., a Brigade Ammunition Column, and, where necessary, a Trench Mortar Battery. His whole reason was for coöperation in battle; who commands is merely a personal question; the heavier armament was to be Corps Artillery, and can claim the services of the 6" and 60-prs. The system which obtained in France—extreme centralization—grew up directly from

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trench warfare and the constant trench *offensives* of 1916 and 1917; defence and movement were not duly considered.

(xix) *Coöperation with Aircraft*. A great deal of practical training is required in the coöperation of field artillery and aircraft; field batteries never get enough practice with *trained* observers and inexperienced observers found it hard to see the small shells; intercommunication was often unsatisfactory.

(xx) *Training of the Young Officer*. A young officer should receive training:

(a) To make him more of a professional artilleryman—much increased knowledge of ballistics, and an expert armament officer, which is largely mechanics. The writer confesses to scandalous ignorance of gunnery as a subaltern, and his armament capabilities were almost limited to taking the breechblock to pieces. Borrowing from "Henry Clay,"<sup>6</sup> an artillery officer should be capable of advertising the British Artillery to foreign missions, to get orders from abroad.

(b) In staff-work; the writing of operation messages is a drill; the tendency of an untrained man on getting an order is to lock it up in his mind instead of distributing a certain amount to his subordinates; the upkeep of records was neglected—it is difficult now to discover where pre-war battery property is located and almost impossible to find out what officers have passed through batteries; the daily fire-record is an important document if accurately kept; training is dependent on study of military history, which is ultimately based on war-diaries. It does not demean a man to be able to run a good office, or to write a useful intelligence-summary.

(c) Besides being a horse-master, he should have a working knowledge of mechanical transport.

(xxi) *Training of N.C.O's*. Could we not make more use of our N.C.O's.? Generally speaking, they could not compete with most of the so-called "officer's jobs" because they were never allowed to perform them! A good N.C.O. can run a wagon-line, take an exercise, supervise a stable-hour, manage

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<sup>6</sup>"Journal of the Royal Artillery," May and June, 1919.

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his equipment, test his sights, write a letter or operation message, handle the director, give a lecture, shoot a section or do F.O.O. If they are thus trained, we can do without so many officers, like the French Artillery (where the officers do not exist in such numbers). The officer should be supervisor and advisor; for instance, the "standing" F.O.O. could be a N.C.O., while an officer comes round when suitable to supervise the observation, talk to the infantry, and carry out the usual liaison.

Something in the nature of "The Shop" Training is required to correct the haphazards of promotion within the unit; at any rate, a man should not be able to reach the Sergeant's Mess without the approval of the Regiment at large; this should not be as unfeasible a suggestion as it at first sounds.<sup>7</sup>

(xxii) *Principles of Training.* We must start our hunting-seasons with fat horses, and our wars with trained batteries. What should be the principles of training? They must vary somewhat to meet circumstances, but surely the basis should be decentralization. Nothing teaches one the need of it more than a defensive battle. It is true that a capable man gets quicker effect by running everything himself, and that it is a bitter experience to receive criticism because a subordinate has failed; it is also quite useless to argue that the critic is indifferent. Have we not seen again and again the disadvantage of a one-man show, kept alive perhaps beyond its span by a clever idler? On the other hand, a first-class supervisor is often adjudged idle even by those who should know better. Supervising demands great patience from an able man, but it is a far better use of his abilities, for in the process not only are a number of men trained to run their special jobs, but that number of minds and more are trained to think for themselves, and, further, a system has been started which will outlast many a hard trial. How to train for decentralization? The obvious method is to deal only with one's immediate subordinates, giving credit or blame by results. Much can be done with the "running account," which can be applied to equipment, harness, horses, forage, clothing,

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<sup>7</sup>Compare the Guard's Depôt at Caterham.



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barrack furniture, barrack construction; something has been done in this way, but it is positively humiliating to see the troops inconvenienced for want of some useful building, and then in the last weeks of a financial year see some silly expenditure indulged in so that there may be no balance to hand back to a Treasury which insists on regarding the Army only as the "great spending department."<sup>8</sup> A battery commander should be primarily responsible for the good shooting of his guns, and there should be more direct liaison between the ordnance authorities and the gun-line; in peace as well as war, a commander should be able so to distribute his personnel as to allow him to obtain the efficiency for which he is responsible—*i.e.*, direct liaison between "Records" or the Depôt and the Brigade-Commander. The principle under which a soldier is taught to find his food, his furniture, his equipment, etc., with no trouble at all, and by which he is in no wise penalised for waste, causes atrophy of mind and character; whereas a reasonable amount of worry in getting a good show out of the local conditions is a tonic and trains the mind to responsibility. *But*, one must guard against the encouragement thoughtlessly, but only too often given to the "greatest pincher." The writer regards the orchard-robbing by the garrison nearest to his present residence, accompanied as it is by stoning of the unfortunate proprietor, as a direct result of official teaching in France to obtain what one wants by any means to hand.

### *D. Some General Platitudes.*

(xxiii) *Surprise.* In strategy or tactics, in peace and in war, almost if not quite the most important element of success is surprise. In 1914 there was the direction of the German advance; at Neuve Chapelle the enemy apparently did not expect attack; in April, 1915, he used poison-gas; in May, 1915, there was no surprise on our front and little success—September was scarcely better. The Germans expected a British attack in 1916.

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<sup>8</sup>See articles by Lieut.-Colonel Sir John Keane, Bart., in "Nineteenth Century" Magazine and elsewhere on Public Accounts.

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Real success only occurred on or near the French front. In April, 1917, a succession of daylight raids near Arras put the enemy off his guard; in June, 1917, our miners provided the surprise; modified success in Flanders was dearly purchased without surprise by masses of men and huge expenditure of life and ammunition. At Cambrai we obtained success by a surprise tank attack in force, while the enemy got his later by a surprise "counter."

What surprise did the Germans achieve in March? First of all there was the concealment of the date which led to the cry of "Wolf," affecting a distinctly tired army; secondly, they made astute use of the weather; thirdly, they adopted new tactics—penetration at all costs, penetrators to wheel outwards widening the salient under support from machine guns and mobile trench mortars. As regards artillery? Ludendorff speaks of the creeping barrage; but we had it fully developed by the autumn of 1916, and the writer's opinion from what he saw is to the effect that the German "creeper" was not nearly so efficient as ours. Ludendorff speaks of calibration behind the line so as to open fire without registration, but we had done that at Cambrai *in imitation* of the Central Powers' effort on the Caporetto! It seems to the writer that there was nothing new in the German artillery methods except the extraordinary distribution of their bombardment and the use of long-range guns against all communications. Very effective it was, too!

Our success in the 100 Days' Battle was largely due to the constant change of front of attack<sup>9</sup> without any preliminary bombardment to give away our intentions—which had been the talk of the army two years before, only that we presumably had not the means to put it into effect.

Some surprise, some change of method, is essential to success in the offensive. It is possible also on the defence<sup>10</sup> and one can

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<sup>9</sup>This would have necessitated offensive preparations all along this front; a considered offensive policy is necessary—a sort of Offence Scheme.

<sup>10</sup>Other examples of surprise in the defence were the German booby-traps during their withdrawal in the spring of 1917, and (of far greater importance) their delay-action mines in 1918.

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get no better example than General Gouraud's battle about Rheims on July 15, 1918; such surprise makes opportunity for the counter-attack which is the object of the defence. In plain words what is the counter-attack but the exploitation of surprise?

(xxiv) *Artillery and the General Staff*. There have always been two divergent tendencies, one to let the Artillery run itself, the other to embody it in mixed Formations; a lecturer at Camberley headed his lecture "Artillery must be controlled, but the principle of control is subordinate to that of cooperation." After the Boer War we formed Divisions of all arms; just before 1914 an article in the Army Review favored Mixed Brigades, or something very like it. Trench Warfare tended towards separation from one's Infantry because such great power of control became vested in Corps Artillery offices; this tendency was increased when experience on the Somme in 1916 showed that divisional artilleries hardly ever supported their own infantry after the early phases of an offensive; it was to rectify this that divisional artilleries were reduced and Army Brigades R.F.A. created. There are doubtless advantages in allowing the Artillery to run itself, but the deciding factor appears to be that unless you have training together and close neighborhood in peace, you will not get genuine coöperation in war.

The lowest mixed formation is, we all know, the Division. Within the division, the field artillery is commanded by a C.R.A. and the same divergent ideas appear; in some divisions the Divl. Commander left the management of the field artillery to the C.R.A., while in others it was treated like an infantry brigade, to which, however, it is not similar, because it naturally gets split up in the battle. The question arises, how far should the Divisional Command retain control so as to keep a finger on the artillery pulse? In other words, having *initiated* coöperation by divisional orders, how far should the G.S. fulfil its duty to criticise the carrying out of its policy by the artillery? The subject has been discussed at some length in the R.U.S.I. Journal of August, 1919.

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Of the nine conditions of Artillery support mentioned in para. 12, *the Divisional Commander* is responsible for all but the first three. The influence of the general staff has been suggested (or referred to) several times in the course of these pages; (i) as regards priority of labor in Part I; (ii) as regards fixing of combined infantry and artillery headquarters so as to ensure liaison; (iii) as regards S.O.S. policy. In the offensive, changes at the last moment in the line of departure or first barrage line often made things dangerously difficult for the batteries; zero was sometimes fixed at too short notice. It used to be thought, probably most unjustly, that "the Division" was not always as careful about the artillery getting rest as they were about the infantry<sup>11</sup>; the arrival of the artillery to rejoin its infantry after a period of separation was not always greeted with music and bunting. Infantry and Artillery interests must clash from time to time; the clashing can usually be foreseen and discussed if the commanders meet frequently in the normal procedure of the day—which is quite a different thing to the one making a special journey to see the other, for the favorable moment can be chosen; in other words, it is in most cases highly conducive to efficient liaison if parochial difficulties can be overcome so far as to permit of the two chiefs "living" together. The divisional artillery<sup>12</sup> does no worse for a touch of the Divisional Commander's spur now and then, and the writer believes that the batteries appreciate his personal attention.

The General Staff has a good "jumping-off ground" in the genuine keenness of the artillery to support its infantry well—nor will sacrifices be grudged by the gunners to effect this; on the other hand the artillery possibly thinks that its real efforts towards coöperation have not always met with fervid response—the word "coöperation" implies mutual help. The G.S. have two great fields in which to display their influence

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<sup>11</sup>Reserve Infantry units rest and train and provide labor; Reserve Artillery units often occupied so-called "silent positions" which they dared not use. More rest than the R.F.A. got 1916–1918, must be catered for in the future.

<sup>12</sup>We are speaking now of its battle duties rather than about administrative matters.

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in the future—(i) the inculcation in both Arms in peace, by every possible method (such as attachments, lectures, classes, tactical exercises, attendance at musketry and practice camps, criticism of schemes), of the peculiarities of those Arms and of the principles of coöperation; (ii) a correct appreciation at manœuvres of the influence on the mimic battle of the artillery of either side. Only too often one sees a G.S. memorandum, a training scheme, or an operation order, so worded that it was transparently written without a thought of Artillery in the writer's mind; no Operation Order, at any rate, should be issued to the troops without some reference, however slight, to the existence of the artillery.

(xxv) *Signal Service*. It can scarcely be denied that communications are the secret of control and that control is more than ever necessary when we are trying to defeat *the will of the enemy*, as in a defensive battle; it seems to follow that we must organize accordingly. It was inconceivably long before the authorities would admit that the divisional artillery needed a special signal detachment at all, and that in the face of unanimous demand from 1908 (when divisional artilleries first blossomed into real existence) until 1912 or 1913. What is desired now is not so much increase in numbers as improvement in the average standard of efficiency—with these exceptions: (a) that a battery having a detached section and finding an O.P. party (the normal defensive procedure) required 12 trained telephonists, which is more than the establishment allows; and (b) that the F.A. Brigade signal subsection needs a wireless detachment. As regards quality, it is an education to visit a big signal office and see the men at their work during a busy hour; it is equally an education to see a lineman in the forward area mending the lines to an encouraging accompaniment of "five nines," brave to a degree, but sometimes a most inefficient signaller. A large proportion of the stuff which goes through that big signal office is not of very urgent importance, "Priority" though it be marked—while in the forward area battle is perhaps being decided by the holding or giving of some one of

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those obstacles to movement, the above-ground cables. What is the solution? Does the big signal office need all the best signallers? Should we train more artillery men or commandeer the services of more R.E.? The disadvantage of having R.E. personnel are that one introduces an outside element into the battery, with a consequent chance of disturbing the peace, and that the sapper or pioneer cannot at a moment of pressure be roped in to work the gun. Are these really serious disadvantages, or could not they be overcome? In any case what the Field Artillery wants is a certain increase in battery personnel, better-trained men, more signal discipline, and a development of wireless. To every organization such as a Group *at least one D.R.* is an absolute necessity during a retreat.

(xxvi) *Horses, Harness, and Mechanical Transport.* "Them wimmin spiles the ball" was a male dancer's historic remark; on a quiet front, the same could have been said of the mass of horses and mules which lived *and ate* from 6 to 20 miles behind the line.

Could we usefully introduce a proportion of mechanical transport into the Field Artillery? No doubt there exist countries in which it would be possible to dispense, to a large extent, with horses by the use of an ammunition-carrying tractor which draws a gun. Is there sufficient petrol to keep up such a standard? How far towards the front could mechanical transport be economically employed? to include the D.A.C., the B.A.C. (if such exists), or to the first line wagons? M.T.<sup>13</sup> can be more quickly pooled in case of need on an active front and takes up less room; on the whole it is less reliable than horses; it is usually quicker but more easily put out of action. We ought not, one would think, if trench warfare ever supervenes again, to spend such a mighty lot of money and grain on maintaining more horses than are wanted—but the writer has not the means at his disposal to justify a statement that in the end there was want of economy. The first consideration is, of course, the nature of the theatre of operations; France and Belgium were well-roaded,

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<sup>13</sup>They were, however, not always "simple and fool-proof."

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and M.T. could have done the work down to and including ammunition columns. What about Gallipoli?

Allied to this subject is the question of harness for the horses, and the metal equipment of the R.F.A. generally. Doubtless in a long war it is good discipline to have harness and other steel-work to clean, but the amount of labor devoted to what was affectionately called "eyewash" was enormous. Could not the additional units which spring into existence with a great war be equipped with some sort of oxydized or otherwise prepared metal-work which could be treated with water? *Pas magnifique, mais la guerre?* The barrack-square brightness which we had in defence of our reputations to maintain is a positive disadvantage in battle—*vide* Marshal Foch's order—and occasioned a demand for much expensive cleaning material.

(xxvii) *Organization.* A few simple modifications in organization would go far to easing the situation for artillery.

An improvement in the signal service within a F.A. Brigade was suggested in para. 24. In Part I, Chapter VIII, it was endeavored to present a case for the provision of a side-car to enable the brigade commander to carry out absolutely necessary reconnaissance in a short space of time.

A battery should start fair at the beginning of the war, mobilized with a proportion of tradesmen; a clerk, draughtsman, a tailor, a shoe-maker; this should not be difficult to arrange, though when we were trying to smarten up for the Rhine, tailors were not to be had at any price, and we were in a really bad way, those of us who were far forward.

It is to be doubted whether anyone foresaw the enormous amount of work which would be involved in an attempt to account for ammunition. The staff-captain on the D.A. Staff is, or could be, wholly occupied in attending to the comfort and other administration of the batteries, especially during a withdrawal; the brigade-major and the reconnaissance officer have their hands full of "G" work; an officer for ammunition duties, whose work was partly "G" and partly "Q" and always of a

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"priority" nature, was found necessary by many D.A's on the Western front.

(xxviii) *Equipment.* For the defending artillery engaged against a first-class offensive, especially where a salient is concerned, a long-range weapon is necessary; it would probably take the attacking infantry 3½ hours at the least to reach a defending gun-position emplaced at 7,000 ± from the assailant's front line. Both the French and Germans realized this, and put the British Field Artillery to a great disadvantage, never more felt than when we were supporting the French infantry; the lack of long range was acutely felt too at a time when the object was by intensive harassing to stave off an enemy attack (see Part II, Chapter VI). This disadvantage still existed when the armistice was signed, as it had existed all through the South African war—due perhaps to dismissal of the idea of shooting by the map, on the plea that it was of no use to be able to shoot further than one could observe.

The varieties of ammunition involved work at the gun-position which can scarcely be grasped by those unacquainted with the battlefield, and to some extent affected the morale of the artillery in the close support of their infantry—by "close support" is meant creeping barrages in the attack and S.O.S. barrage in defence. Whether we should not be wise to save labor by providing Field Artillery with only one kind of ammunition in the future, H.E. and instantaneous fuze? It is not that shrapnel was a failure—far from it, *under favorable conditions*; but difficulty and cost of manufacture *must* be considered in a modern big war, and it is to be doubted if the most enthusiastic supporter of shrapnel would ask for more than a proportion to be shrapnel, for use in creeping barrages,<sup>14</sup> defensive S.O.S. when conditions allow of good storage, and occasionally during a "moving" battle. In other things besides ammunition, the armies of the future will cry for simple and fool-proof equipment.

The introduction of labor-saving as regards metal work has

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<sup>14</sup>More than one authority favored H.E. even for the Creeping Barrage.



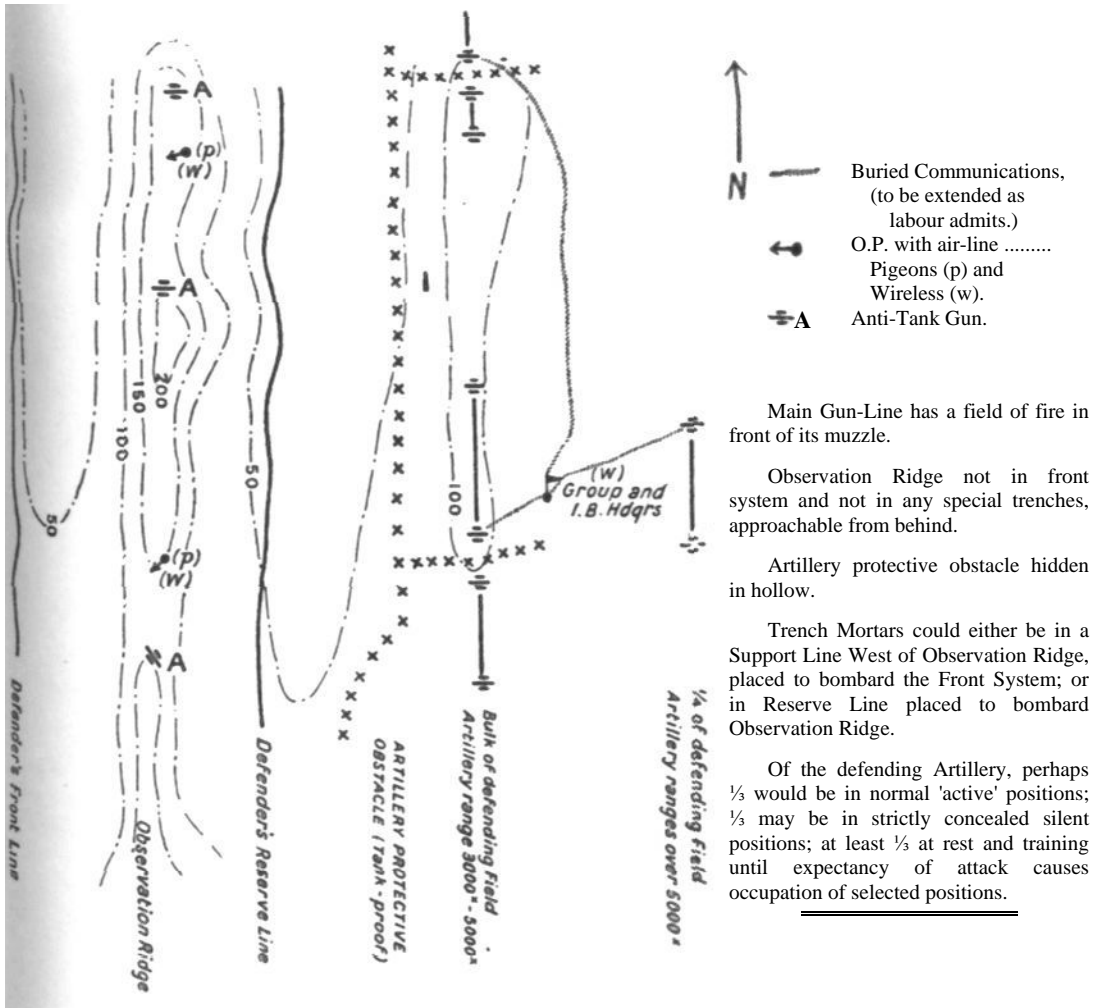
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




been suggested in para. 25; there are other labor-saving devices, too, such as the excellent aluminium "graphs" and sliding scales (not always "simple and fool-proof"), with which the German batteries, especially their howitzers, were equipped.

(xxix) *Efficiency and Tradition.* A well-trained battery starts a war efficient, but loses efficiency in proportion as it suffers casualties; on the other hand it gains experience. Between the middle of November, 1917, and the end of April, 1918, the 2nd Brigade R.F.A. lost no less than 39 officers and over 200 other ranks in battle—casualties alone; yet the writer would be hard put to it to say that the brigade was less efficient at the end of that period. This is due to the fact that personnel does not change all at once; a proportion is always left to hand over that elusive element of efficiency, a mixture of pride, vanity, and custom called "tradition." The "Tradition of the Regiment," sounds, *and is*, magnificent, but is apt to leave the junior ranks a little cold; "tradition" requires someone to take and hand it over; it is an error to suppose it begins at the top, where much else is considered; it begins at the bottom with the gunner and driver as regards his gun or his horses; it builds up and combines in a section and, later, in the battery, where it probably reaches its maximum so far as R. F. A. is concerned. No sane soldier could cast a doubt on its value as tending to efficiency. It is to be regretted that the old regular units, which there was never any intention to disband, could not have been reorganized so as to retain a certain proportion of their officers and men to hand over to a new generation the tradition they had inherited and so splendidly and gallantly maintained. Sense or sensibility?

(The end.)

## DIAGRAM TO ILLUSTRATE SECTION (A) OF PART III.



-  Buried Communications, (to be extended as labour admits.)
-  O.P. with air-line .....
-  Pigeons (p) and
-  Wireless (w).
-  Anti-Tank Gun.

Main Gun-Line has a field of fire in front of its muzzle.

Observation Ridge not in front system and not in any special trenches, approachable from behind.

Artillery protective obstacle hidden in hollow.

Trench Mortars could either be in a Support Line West of Observation Ridge, placed to bombard the Front System; or in Reserve Line placed to bombard Observation Ridge.

Of the defending Artillery, perhaps  $\frac{1}{3}$  would be in normal 'active' positions;  $\frac{1}{3}$  may be in strictly concealed silent positions; at least  $\frac{1}{3}$  at rest and training until expectancy of attack causes occupation of selected positions.

# The Number of Officers of The Regular Army and Their Distribution in Grades

BY MAJOR T. W. HAMMOND, GENERAL STAFF CORPS

1. THE Army Reorganization Act of June 4, 1920, provides in Section 4 that: "There shall be one general, as now authorized by law, until a vacancy occurs in that office, after which it shall cease to exist. On and after July 1, 1920, there shall be 21 major generals and 46 brigadier generals of the line; 599 colonels; 674 lieutenant colonels; 2245 majors; 4490 captains; 4266 first lieutenants; 2694 second lieutenants; and also the number of officers of the Medical Department and chaplains, hereinafter provided for, professors as now authorized by law, and the present military storekeeper." There is thus provided by this Act a permanent commissioned personnel for the Regular Army of 14,968 officers, exclusive of the general officers of the line, the officers of the Medical Department, chaplains, professors, and the military storekeeper. Of these 14,968 officers, 46.5 per cent. of them are in the grades of first and second lieutenant; 30 per cent. of them are in the grade of captain; and 23.5 per cent. of them are in field grades—4 per cent. being in the grade of colonel, 4.5 per cent. in the grade of lieutenant colonel, and 15 per cent. in the grade of major. The percentages of the number of officers of the Navy in the corresponding grades are: Four per cent. in the grade of captain (colonel); 7 per cent. in the grade of commander (lieutenant colonel); 14 per cent. in the grade of lieutenant commander (major); 32½ per cent. in the grade of lieutenant (captain); and 41½ in the grades of lieutenant (junior grade) and ensign (first and second lieutenants). That is, under existing law, the Army has a smaller percentage of its officers in the higher grades and a larger percentage of its officers in the lower grades than the Navy.

2. Section 1 of this Act provides for the creation in time of

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peace of the War Army—the Army of the United States—consisting of the Regular Army, the National Guard, and the Organized Reserves. The functions, or missions of these three components of the Army of the United States in times of peace and war are not definitely defined in the Act, but their missions are clearly indicated in law, and after a very careful study of the Act these missions have been determined and announced by the War Department to be as follows:

*The mission of the Regular Army is:*

- (a) To provide adequate garrisons in peace and in war for our overseas possessions.
- (b) To provide adequate peace garrisons for the Coast Defenses within the continental limits of the United States.
- (c) To provide adequate personnel for the development and training of the National Guard and the Organized Reserves.
- (d) To provide the necessary personnel for the overhead of the Army of the United States, wherein the duties are of a continuing nature.
- (e) To provide an adequate, organized, balanced, and effective expeditionary force, which shall be available for emergencies within the continental limits of the United States or elsewhere, and which will serve as a model for the organization, discipline, and training of the National Guard and the Organized Reserves.

*The mission of the National Guard is:*

- (a) In time of peace to provide an adequate, organized, and effective force, which shall be available in minor emergencies, or for employment within the limits of the United States, by the states, or by the United States.

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- (b) In time of war, or when Congress has authorized major emergencies, the use of troops in excess of those of the Regular Army, to provide an adequate, balanced, and effective component of the Army of the United States for employment by the United States without restrictions.

### *The mission of the Organized Reserves is:*

To provide a trained, organized, and balanced force which may be readily expanded into an adequate war component of the Army of the United States to meet any major emergency requiring the use of troops in excess of those of the Regular Army and the National Guard.

The mission of the Regular Army in time of peace as thus announced is no longer as it always has been heretofore—simply to organize, train, administer, equip and supply the Regular Army, provide for the overseas garrisons, act as a police force in the United States and give limited assistance to the National Guard and the civilian schools and colleges—but it is broadened to include, in addition, the very much larger and more responsible function of preparing the whole Army, including the Regular Army, National Guard, and Organized Reserves, for war. Such a mission can be carried out only by a permanent personnel of professionally trained officers and a number of enlisted men, which will vary from time to time. The law prescribes the number of officers and provides for a maximum enlisted strength. With these officers and an enlisted strength never in excess of the maximum, the complete mission of the Regular Army must be carried out. To carry this out in a way which experience has demonstrated to be effective and efficient, the law divides the Regular Army into a number of branches, and each branch is assigned by law and regulations certain specified duties and functions, and for each branch the law provides a definite number of officers and enlisted men.

3. This law was passed by Congress after a most exhaustive

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study of Army organization by the military committees of both Houses. In addition to extended hearings by both committees, many members of the committees travelled thousands of miles in Europe, visiting the battlefields and military activities of the American Expeditionary Forces, and in the United States, visiting Army camps, cantonments, flying fields, schools and war-time manufacturing plants. Perhaps at no time in the history of our country has the problem of national defense and Army organization been as thoroughly gone into by Congress as immediately following the World War, and while many lessons of that war are impressed upon our legislators, perhaps no one of them is as forcibly impressed upon them as the necessity for maintaining in time of peace a body of well trained and efficient officers. No matter how the members of those committees may disagree on matters of universal training, of industrial preparedness, and other matters connected with national defense, they are practically unanimous in agreeing that a well-trained body of professional officers is not only necessary, but, under our popular theory of a national military policy, is the very foundation of national defense, because it is the nucleus about which the whole nation must expand in time of war. A large standing army cannot be maintained in time of peace. Our battles of the future will be fought, as they have been fought in the past, by the citizen soldier; and experience has taught us that the citizen can devote but a very small fraction of his time in preparing himself for the performance of this, the most solemn duty that he is ever called upon to perform. The study and development of the art and science of war is not for him. His duty is to fight when the time comes, but he expects that when he goes to fight he will be properly organized, properly equipped, properly armed, properly supplied, and that the whole gigantic machine for war will be so well perfected, and his work and his functions so well understood by those men who devote their lives to its development, that all he will have to do is to take his place in the machine when war is declared. As a matter of fact, he expects, not only to be properly placed, but in

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general, actually to be trained for his job after the declaration of war. Under such a theory of national defense, and with such a mission to perform, there is a solemn responsibility placed upon the officers of the Regular Army. For, after all is said and done, these 17,700 officers of the Regular Army are the only persons out of all of our more than 100 millions of people in this country, and our millions in Panama, Hawaii, Porto Rico, and the Philippines, who devote their time exclusively to the study of this great problem of handling the nation in arms in time of war; and, unlike every other profession, this one which involves not only the lives of our citizens, but the security, honor, and very life of the nation itself, must be learned by study, trials, and experiments in times of peace, rather than by the actual practice of it in time of war.

4. Since the passage of the Act of June 4, 1920, the War Department General Staff and the Chiefs of the various branches of the Army have devoted much time to the study of its provisions and its possibilities for developing a military policy consistent with our national traditions and ideals, and to the best use that can be made of the personnel provided for carrying out the Regular Army mission. These studies include such matters as the basic organization of the Army of the United States, the functions of the three components of the Army of the United States, the territorial organization of the Army in peace and in war, the National Guard, the Organized Reserves, the Reserve personnel, and the tactical organization of the Division, and of all other units of a field army. These studies are not complete, and other studies are being made; but all have reached the stage where it is possible now to know that the number of Regular Army officers authorized by the Act of June 4, 1920, is sufficient, if they are properly assigned and economically used, to meet the demands of carrying out the mission of the Regular Army, and that they are distributed in grades appropriate to the duties they are to perform.

5. In reorganizing the Regular Army, and imposing upon it a mission such as this law imposes, it was not only necessary to

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determine the actual number of professional officers needed to carry out this mission, but it was also necessary to determine and fix in law such provisions regarding their promotion as to insure attracting to the Army men of character and ability. This matter was given long and serious study by both military committees. Perhaps no matter connected with Army legislation has ever been as troublesome for Congress as this problem of promotion, and, strange as it may seem, no real effort seems ever to have been made by Congress in the past to solve it in accordance with sound basic principles. A study of the subject and of the history of legislation discloses some of the reasons why Congress never before succeeded in solving this difficult problem, but it is unnecessary in this paper to discuss these reasons. This Congress, however, unlike its predecessors, determined that in reorganizing the Army this problem of promotion would be solved, and, if possible, in accordance with sound and fundamental principles. After long and careful study, it was decided to adopt as the governing principle a complete separation of promotion and organization, and a parity of promotion among the officers of the various branches. Having agreed upon this principle, two methods of attaining it are provided in the Act of June 4, 1920—the one generally known as the single list, and the other generally known as promotion after specified service in a grade. Having adopted this governing principle, and having determined upon the methods of putting it into effect, the next consideration was the rate of promotion. The rate of promotion in a military force necessarily varies from many causes. Other things being equal, however, it is obvious that it will be greatly affected by the manner of distribution in the various grades. The larger the proportion of officers of high rank, the more rapid must be the promotions through the lower grades. Generally speaking, this principle seems to have been recognized in the past only in fixing the number of officers in the various grades in the Staff Departments. In the Line the governing principle was to stick to the exact proportions of organizational requirements. The



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result has been that in the past the rate of promotion has varied widely among branches, and also that while the Staff Departments have had a fairly healthy flow of promotion, the Line has at all times been certain of stagnation, except as legislation, by increasing one or more arms, has temporarily accelerated promotion. In all such legislation, beneficial as it may have been to those already in the service or appointed immediately after, no consideration was given to the prospects of men to be appointed later. These, like their predecessors, could have no hope of reasonable promotion except as they in turn might reach it by a legislative increase in their branches. Since the beginning of the Spanish War this condition has been disguised by the frequency of legislation making larger and smaller increases, but in 1898, at the outbreak of the Spanish War, a period of twenty-eight years had elapsed with little legislation affecting promotion in the Army. In that year, taking the grade of first lieutenant, it is found that the oldest lieutenant of the Medical Corps had, in round numbers, five years of commissioned service; of the Engineers, twelve years; Cavalry, twenty years; Infantry, twenty-four years; and Artillery, thirty-one years—that is, in 1898 the senior lieutenant of the Artillery Corps had spent thirty-one years of commissioned service in the grades of first and second lieutenant. The Act of February 2, 1901, did practically nothing to remedy this condition, and the laws which have followed, including the Act of June 3, 1916, made little improvement, so that the situation which confronted Congress at the time of the passage of the Army Reorganization Bill was considered serious. It is a recognized fact that any profession must hold out some reasonable hope of advancement if it is to attract men of ability to adopt it as a career. The remedy in this case has already been suggested. An increased percentage in the upper grades, and a corresponding decrease in the lower grades, is bound to cause a more rapid flow of promotion. Of course, Congress could not create officers for the mere purpose of stimulating promotion, so a careful investigation was made to determine the duties

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which officers of the Regular Army would have to perform in order to be sure that these duties were commensurate with the grades provided in the proposed distribution.

That the conclusions reached as a result of this investigation are essentially correct is borne out by the detailed studies which have been made since the passage of the Act, as shown in the distribution table below. That the distribution adopted will insure a reasonable rate of promotion cannot be definitely proven. An actuarial solution of this problem is not possible, as a sufficiently large number of cases do not exist on which to base such a solution. The percentages adopted were arrived at after a consideration of the distribution of officers of the Line of the Army under the Act of June 3, 1916, which clearly provided too few in the field grades; of the distribution of officers of the Medical Corps under that Act, which just as clearly provided too many in the field grades; of the distribution of the officers of the Corps of Engineers under that same Act; and of the distribution of the officers of the Navy. The distribution in the Engineers and the Navy was about the same, and seemed to insure about the proper rate of promotion; so the distribution adopted in the Act is very nearly the same as that in the Navy.

Table showing a suggested distribution of the field officers of the Regular Army to the duties commensurate with their rank, in order that the Regular Army may carry out effectively and efficiently its mission as defined by the War Department in pursuance of law. This table has been prepared as a tentative working guide for those concerned in the transfer and assignment of officers.

	Colonels	Lt. Colonels and Majors
Infantry	76	440
Office Chief of Infantry		
Tactical Units		
Infantry School		
Tank Organizations and School		
Cavalry	26	100
Office Chief of Cavalry		
Tactical Units		
Cavalry School		

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	Colonels	Lt. Colonels and Majors
Field Artillery	42	155
Office Chief of Field Artillery		
Tactical Units		
F. A. Schools and Firing Centres		
Coast Artillery Corps	36	145
Office Chief of Coast Artillery		
Coast Defenses		
Tactical Units		
Coast Artillery School		
Corps of Engineers	38	110
Office Chief of Engineers		
Tactical and Technical Units		
Hqrs. Depts. and Corps Areas		
Rivers and Harbors		
Engineer School		
Signal Corps	10	65
Office Chief Signal Officer		
Tactical and Technical Units		
Hqrs. Depts. Corps Areas and Divisions		
Signal Corps Laboratories and Depots		
Wash. Alaska Cable and Telegraph System		
Signal Corps School		
Air Service	29	205
Office Chief of Air Service		
Tactical Units		
Hqrs. Depts. and Corps Areas		
Supply and Repair Depots		
Experimental and Production Plants		
Air Service Schools		
General Staff Corps	40	135
War Department General Staff		
General Staff with Troops		
Adjutant General's Department	20	78
Office of The Adjutant General		
Hqrs. Depts. Corps Areas and Divisions		
Special Posts		
Inspector General's Department	18	46
Office of the Inspector General		
Hqrs. Depts. Corps Areas and Divisions		
Ports of Embarkation		

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	Colonels	Lt. Colonels and Majors
Judge Advocate General's Department	14	63
Office of the Judge Advocate General		
Hqrs. Depts. Corps Areas and Divisions		
Quartermaster Corps	38	256
Office of the Quartermaster General		
Hqrs. Depts. Corps Areas and Divisions		
Supply and Remount Depots		
Army Posts and Stations		
Bakery Schools		
Graves Registration Service		
Finance Department	17	55
Office Chief of Finance		
Hqrs. Depts. Corps Areas and Divisions		
Finance School		
Finance Offices		
Ordnance Department	18	78
Office Chief of Ordnance		
Hqrs. Depts. Corps Areas and Divisions		
Arsenals and Proving Grounds		
Chemical Warfare Service	6	19
Office Chief of Chem. Warfare Service		
Tactical Units		
Research, Laboratories, Supply		
Schools		
Bureau of Insular Affairs	1	2
Detached Officers' List	...	...
Reserve Officers' Training Corps	30	300
National Guard	30	225
Organized Reserves	70	306
Recruiting	8	21
Disciplinary Barracks	2	4
General Service Schools	18	80
Faculties		
U. S. Military Academy	2	21
Miscellaneous Detached Duties	10	10
Total	599	2919

6. The actual distribution of officers at the present time is not the same as the distribution shown in this table. There are three principal reasons why this is so.

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In the first place, because of the system of promoting officers prior to July 1, 1920, from separate lineal lists for each branch; because of unequal legislative increases in the various branches since the Spanish-American War; and because of the different principles which governed the distribution of officers in grades on the separate lineal lists, a situation developed during the course of years which at the time of the passage of the Army Reorganization Act found the younger and less experienced officers of the Army in some branches in the higher grades, while the older and more experienced officers of the Army in other branches were still in the lower grades. When the new system of promotion was put into effect, July 1, 1920, the bulk of promotion was in those branches of the service where promotion during the past twenty years had been slowest, and the least in those branches of the service where promotion during the past twenty years had been fastest. Since promotion and organization are now two entirely separate matters we find the Cavalry, which has had the slowest promotion in the past, receiving the greatest amount of promotion on July 1st, in spite of the fact that the strength of the Cavalry was actually decreased by the Act of June 4, 1920, while the Field Artillery, which has had the fastest promotion in the past, is receiving little promotion in spite of the fact that it was practically doubled by the Act. This results in having in the Army now a large number of officers of high grade who are commissioned in the Cavalry, and a comparatively small number of officers of high grade who are commissioned in the Field Artillery. The Act of June 4, 1920, provides freedom of transfer of officers from one branch to another, and also authorizes the War Department to prescribe the organization of the various branches, so that the problem of bringing about a proper distribution of the experienced officers of the Army in the various branches of the service is one gradually to be solved by War Department regulations, formulated in accordance with the policies and principles laid down in the Act of June 4, 1920.

In the second place, the commissioned personnel of the

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Regular Army was practically disorganized by the war. Regular Army officers were assigned to all sorts of duties in the great War Army, and when that Army was demobilized these officers found themselves scattered about through the remaining military establishment without any logical arrangement in a peacetime organization, and to get them properly distributed now in accordance with the duties and functions of the Regular Army in time of peace will require a great deal of time, because of the many difficulties which still confront the War Department in such matters as completing unfinished war work, on account of lack of sufficient mileage and transportation appropriations, and because of the discomforts and personal expense involved in the frequent moving about of officers and their families.

In the third place, the National Guard and the Organized Reserves are only in the first stages of organization, and the assignment of Regular Army officers to these duties must be gradual as these forces develop.

That such proper distribution should be effected, however, in the shortest possible time is imperative for many reasons. In the first place, there is an actual shortage in the total number of officers authorized by law and required to carry out the Regular Army mission. This actual shortage can be somewhat counterbalanced by a proper and correct distribution of the officers that we actually have. In the second place, an incorrect or improper distribution of officers in the various grades means that some officers of high rank are performing duties that should be performed by officers of less experience and lower rank, and that other officers of less experience and lower rank are performing duties which should be performed by officers of more experience and higher rank. In the third place, Congress provided the number of officers in the various grades on the theory that they were to be engaged on duties appropriate to their rank. The problem of organizing the Army and distributing these officers to their various duties is left by Congress to the War Department, and the War Department should make every possible effort to bring about a proper distribution. In

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the fourth place, the officers themselves are better satisfied, perform better work, and thereby add to the efficiency of the Army as a whole, when they are assigned to duties commensurate in responsibility and importance with the rank and grade which they have. The Act of June 4, 1920, provides that officers may be transferred from one branch of the service to another on their own application, but specifically states that an officer shall not be transferred from one branch to another without his consent. The intention of Congress in this matter was that an officer should not arbitrarily be transferred from one branch, after long years of service, to another branch against his will. In other words, it was a provision dictated by a consideration of the personal and professional feelings of the officers of the Army. At the same time Congress did not intend to, and did not, take away from the President the authority to assign officers to duty in accordance with the exigencies of the service. In now bringing about a redistribution of officers, the War Department is actuated by the same identical principle. It is firmly believed that the officers of the Army, when informed of the situation which confronts the Army, will respond in the effort that all must make to correct as soon as possible the temporary illogical situation which now exists as a result of the adoption of the Single List succeeding the unfair and unscientific system of promotion which obtained in the Army up to July 1, 1920. This problem of distribution must be solved. Those who have made a study of the problem of National Defense, who realize the importance of developing a sound, sane, and conservative military policy, and who understand the relation that the Regular Army bears to the development of such a policy, believe that the Army can solve these problems in accordance with the principles and policies of existing law. Many, however, who, due to multitudinous other duties, have not given careful and detailed study to the intricate problems of national defense, do not understand the relation of the Regular Army to this problem as set forth in the latest Army legislation, and as illustrated during the World War.

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Many do not understand the special functions that the Regular Army has had to perform in mobilizing the man-power of the nation, and again in demobilizing the great War Army, created in eighteen months, and smoothly and with extraordinarily little disturbance dispersed in twelve months after the armistice; and, further, its function in disposing of the enormous assemblage of materials, equipment, and facilities that had been gathered together to conduct a major war.

The unthinking, therefore, or the uninformed might in haste commit the country to a policy of starving or depleting the Regular Army below a functioning capacity, and to an extent that, especially in the case of the commissioned personnel, could not be repaired in years of carefully studied legislation.

Realizing the danger of misunderstanding due to the present accidental, and for the time being illogical, distribution of commissioned officers in the several arms, and the importance of a proper distribution, the War Department and the Chiefs of the arms most seriously affected, are now taking steps to enlist the coöperation and support of officers of the Army in bringing about, by suitable voluntary transfers or otherwise, a redistribution to the several arms to accord with the intentions of Congress, the interests of the Army, and the interests and desires of individual officers.



## French Artillery Doctrine

How has the war affected French artillery doctrine? To answer this question is to describe the doctrine taught in the French artillery to-day, which naturally embodies the teachings of the war as regards the tactical use of artillery. What follows represents the French artillery doctrine as taught at the Centre of Tactical Artillery Studies at Metz, as shown in the field service regulations for the artillery, and, finally, from a long experience with the French artillery, during which time the occasion has arisen of hearing the opinion concerning the use of artillery from innumerable officers of that arm. The value of the French artillery is too well known to require emphasizing the interest of their doctrine.

It is logical to commence this study with a brief historical sketch of the French artillery before and during the war. The faith in their 75 as a universal weapon had the unfortunate effect of minimizing the importance of heavy artillery. As a consequence, at mobilization there were 3840 guns of 75 mm. calibre, and only 308 pieces of heavy artillery whose range and power were small compared with later developments. For the 75's there was an ammunition supply of 1300 rounds per gun; and the regulations, in view of the available amount of ammunition, anticipated a rather weak density of fire, and recognized the necessity of being satisfied with neutralization effects with a small number of projectiles. Finally, the artillery was to be used, not to *prepare* the attack of the infantry, but to *support* it.

The division with its 4 regiments of infantry had only 3 groups of 75's, or, in other words, the artillery only represented a fifth part of a division. This fact illustrates the minor importance of the artillery at that time.

During the first months of the war the following vital changes in the use of artillery were seen to be required, and the following conditions clearly realized:

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1. The necessity for closer liaison between the artillery and infantry.
2. Necessity for artillery to prepare the attack of the infantry.
3. Importance of heavy artillery.
4. Tremendous power of artillery fire.

With the stabilization of the front, the methods of the artillery change. The field artillery adopts the methods of the fortress artillery; the development of topographic methods commences, and map firing appears. Terrestrial observation becomes more common, and the telephone grows to be a most important adjunct to the artillery, with the result that it is possible for the B.C. to command his battery from a distance.

The necessity for a great density of fire becomes obvious, and the final proof of the power of artillery is given in 1916 at the battle of Verdun. The barrage appears, but as a defensive form of fire soon gives way to the counter-preparation system, which is much more effective than the defensive barrage.

At Metz no opportunity is ever lost to emphasize this fact that proved to be the great lesson of this battle, *viz.*, the great density of fire required if it is desired to produce a really effective action in the battle. The fact is recognized of "the overwhelming power of fire *when concentrated*, the destructive power of counter-battery fire, and, on the other hand, the insignificant results obtained from scattered reprisal fire, answering fire, etc., which last, if not completely abandoned, are greatly altered."<sup>1</sup>

Finally, in 1918, such progress has been made that it is possible to make surprise attacks, which, in spite of that fact, have ample artillery preparation, and which succeed.

### DISTRIBUTION OF ARTILLERY IN BATTLE

After the foregoing brief résumé of the changes in artillery doctrine during the course of the war, it will be interesting to see what is recommended concerning the distribution of artillery

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<sup>1</sup>Colonel Maitre.

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to accomplish its missions, which are defined as "opening the way for the infantry by destroying the obstacles opposing its march, *i.e.*, hostile forces and defenses (offensive action); hindering and occasionally even preventing, before they start, offensive preparations of the enemy, and contributing to the rapid reestablishment of the equilibrium of forces to the advantage of the defense (defensive action)."

The leading thought relative to the distribution and assignment of artillery to large units is this: Avoid scattering of the artillery, and favor as far as possible its mass action.

On October 25, 1918, a note published by the French G.H.Q. concerning the use of divisional artillery defined the following requisites for the artillery:

1. A close liaison between artillery and infantry, so as to coordinate the efforts of the two arms.

2. Power of the artillery in surprise actions, the massing of artillery, and concentration of fire.

In order to attain these ends there must be:

1. An organization of the artillery in groupings;
2. Distribution of fire in zones of action.

It is now laid down that the mission of direct support of the infantry is always the function of divisional artillery. The artillery duel, being to a certain extent independent of the infantry combat, should be carried out on as wide a front as possible, this front being a function of the range of the artillery available for this purpose. This defines the duty to be assigned the corps and sometimes the army artillery. Finally, firing on enemy communications is assigned to the artillery of a large unit on the principle that the farther these communications lie from the battle front, the higher is the large unit whose artillery will be assigned to this class of fire. This will consequently be another duty assigned corps and army artillery.

The quantity of artillery employed would often make the exercise of command very difficult within the divisional corps and army artillery. It consequently results from this that it is

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necessary to coördinate these organic units into groupings whose organization would obey the following rules:

"(a) Unite under the same command units having analogous missions in such a way as to facilitate the search for and the exploitation of information as well as the operation of the service of observation.

"(b) Respect organizations whose maintenance is indispensable to a proper output return from the units, *i.e.*, regiments or battalions. The nucleus or total of each grouping should be constituted by a regiment whose commanding officer has a staff and the necessary adjuncts, or should be found around such an organization.

"(c) Form the groupings with 3 or 4 battalions as a maximum, this organization assuring the best return in the matter of the transmission of orders.

"(d) Adapt the groupings to the situation of the large or small units with which they are coöperating.

"(e) Be able to lend itself with considerable flexibility to all circumstances of the combat. The distribution in groupings must never be according to a fixed rule, but must be capable of modification according to the course of events." (Field Artillery Regulations, 1919.)

In organizing the command of the artillery in accordance with the conditions just described, it is well to remember the difficulty of command which is inherent to the artillery.

The proper use of artillery requires perfect accord between all the executives involved; unlike the infantry, which, once started in an attack, does not change its mission or receive additional orders or instructions, the artillery has to change its mission and its targets constantly, change its position, change from one kind of fire to another, and change targets.

The artillery thus manœuvres constantly, and that is the reason why separating it and scattering it on the battlefield, and distributing it in weak units which escape the action of the higher commanders, are things always to be avoided. In addition to its normal missions, the artillery of each large unit is

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used to reinforce the artillery of every other large unit, according to the requirements of the situation. It is indispensable that all possible density of fire should be concentrated against a dangerous or annoying target, which, under normal conditions, would only be insufficiently fired upon. In this way divisional artillery coöperates with the corps artillery, and army artillery with the corps and divisional artillery in case of necessity.

The location of the P.C.'s. under such conditions consequently becomes a question of the utmost importance. "They must be located in such a way as to give the command of subordinate units the necessary communications with higher authority, and a proper supervision of the field of battle." With the reservation that these requirements are satisfied, it will always be advantageous to place together a P.C. of a grouping for direct support with the P.C. of the infantry supported; a P.C. of a corps artillery grouping with the P.C. of a divisional artillery; a P.C. of an army artillery grouping with the P.C. of a corps heavy artillery grouping, or with a P.C. of a corps artillery grouping.

The commanding officers of battalions and batteries ordinarily have a technical mission in the conduct of fire, and are normally with their units.

### MOVEMENTS OF THE ARTILLERY

During the period of stabilized warfare, batteries tended to lose their manœuvring ability, but, due to the effectiveness of gas bombardments and counter-battery firing, in 1917 and 1918 the artillery learned that flexibility of manœuvring was as important as flexibility of fire. The new artillery regulations are particularly elastic as regards the movements of artillery, but prescribe the reduction during battle to a minimum of changes of position. To accomplish this, the original distribution of the artillery must give a sufficient echelonment in depth; the entire field of fire and the range of the matériel must be exploited;

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and, finally, all changes of position should be of considerable extent, else they are not justified.

In laying down the new regulations, the following conditions are taken into consideration, as requiring changes from prewar regulations relative to changes of position by the artillery:

1. Emphasis on the importance of the factor of surprise.
2. The development of aviation, and the consequent ability of the enemy to observe all movements.
3. The great increase in the relative and absolute quantity of artillery which can be placed in action.
4. The various forms of warfare to be anticipated from the war of stabilized fronts to the war of movement.

### OBSERVATION

The organization of the observation service remains practically what it was at the end of the war, *i.e.*, by aeroplanes, by balloons, from terrestrial observation stations, and sound- and flash-ranging sections, which are included in this service.

Artillery observation is defined as maintaining a look-out over the field of battle, reconnaissance and study of targets, adjustment and control of fire.

There is a strong feeling that there was and is not sufficient coördination between the aerial observer and the artillery. The air service, being in charge of the aerial observation, is more interested in questions of aviation than in questions of observation.

The recommendation is heard that an aviation be created for the artillery. In other words, squadrons would be assigned exclusively to the artillery of large units exactly as they were assigned during the war to units of the general artillery reserve.

In the French Army sound- and flash-ranging sections and the telemetric sections are not part of the Artillery, but are in the Geographic Service.

The new artillery regulations prescribe that the principal usefulness of these sections would be in war on a stabilized front, but that with proper training and equipment, they can render most valuable service in a war of movement, and prescribe

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regulations for handling these sections in an advance. As far as these sections themselves are concerned, there will be at least one assigned to each army corps.

As already indicated, there is little or no change in the present regulations concerning observation from the regulations in force at the end of the war, and consequently the discussion of this subject will not be prolonged.

### COMMUNICATIONS AND LIAISON

In France there is no Signal Corps, and the so-called Military Telegraph Service is operated by the 8th Regiment of Engineers. At the end of the war there were nearly 50,000 men in this regiment, and, in addition to this, a large number of men in all units were employed on the service of communications. There is a firm belief that the future will see a great development in the importance of communications, so that even a greater proportion of personnel will be assigned to this duty. It seems probable that the French army will retain the organization they now have, and will not form a separate Signal Corps. The recommendation has, however, been made that each regiment of artillery should have a specialized signal detachment consisting of a company of about 200 men, from which one section would be assigned to each group, and a squad to each battery, the remainder being retained by the headquarters of the regiment for general purposes. There should be three distinct lines or circuits specialized as follows:

- System for the command;
- System for the artillery;
- System for general purposes.

The artillery telephone system should have centrals located close to the command telephone lines, but distinct, in order to avoid too much crowding of the line.

As regards the quantity of telegraph apparatus to be placed at the disposal of a regiment, it has been recommended that each regiment and each group be supplied with an amplifier, each regiment with a wireless station, using undamped waves,

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and, finally, each regiment with six wireless telegraph sending and receiving posts and five ground telegraph sending and receiving posts.

The maintenance of the optical signal apparatus is recommended, but not in its present form, which should be greatly improved.

The question of liaison is covered in special regulations, and simply mentioned in a general way in the artillery regulations. It is believed that during a war of movement the maintenance of liaison between artillery and infantry must generally be ensured by means of messengers on motor cycles and mounted messengers.

In designating liaison agents, the army and corps artillery, as a general rule, detach a liaison officer with the subordinate artillery units; but within the divisional artillery and the heavy corps artillery the subordinate unit detaches a liaison agent, either an officer or enlisted man, with the next higher unit.

It is expected that lateral liaison of artillery units can generally be secured by telephone. Whenever a grouping, subgrouping, or group of field artillery or heavy artillery is charged with the direct support of an infantry regiment or battalion, such artillery unit detaches an officer who is designated Chief of the Liaison Service with the commanding officer of the infantry unit.

This Chief of Liaison Service has under his orders a liaison detachment, and sometimes an observation detachment.

This officer must belong to the staff of the unit which detaches him. The detachment consists of non-commissioned officers and liaison agents, telephone operators, signalmen with the necessary material, such as telephones, flags, Very pistols, etc., and, when an observation detachment is included, the necessary trained observers.

The mission of this liaison detachment consists in informing the commanding officer of the unit from which it is detached concerning the situation and the needs of the infantry, and in transmitting information which indicates what is required of



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the artillery. Moreover, it must be able to inform the infantry commander concerning the support which the artillery it represents can give the infantry.

The chief of liaison makes all reconnaissances with the infantry commander whom he supports, and during combat remains with this officer. He takes advantage of every lull in the combat to advance or repair the direct artillery telephone line between the liaison detachment and the unit to which he belongs, and even when there is no definitely specified observation detachment under his orders, he may be called upon, during the combat, to observe or adjust the fire for his unit. The infantry commander must give the following information to the artillery liaison officer.

1. Before the attack, his plan of engagement, his orders of attack, and his mission.

2. During the attack, all information which he receives concerning the situation of his front line, the front of the enemy, and his own intentions.

The chief of liaison must know the plan of employment or the plan of action of the artillery unit from which he is detached. He must be kept in touch with the daily operations orders, and all orders supplementing or modifying the plan of employment.

### CONDUCT OF FIRE

The French artillery continues to base its instructions concerning the preparation of fire on the regulations which were well known to American artillerymen, as published in "Artillery Firing." There is but little criticism of the methods, although it has been proposed that the new firing regulations should devote more space to the preparation of fire in war of movement. However, the French artillerymen believe that the basic instruction should be on the principles used at the end of the war, and that instruction in the rapid preparation of fire for open warfare will then be a simple process, after the more difficult and technical details of the preparation of fire, using carefully prepared maps and all other data employed during the

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last years of the war, have been mastered.<sup>2</sup> As a matter of fact, the new Firing Regulations (1920) devote ample space to a discussion of rapid preparation of fire, which would be the only methods available under certain circumstances.

In the training of field artillery regiments at the present time the greatest emphasis is laid on instruction in topographical and astronomical processes, looking towards as complete an instruction in topography as can possibly be given both officers and noncommissioned officers.

The meteorological service to be used in connection with the preparation of fire is capable of improvement, so that the information from the meteorological units will be completed and transmitted quickly to the batteries.

Recommendation has been made that mobile meteorological sections for determining azimuth and velocity of the wind should be assigned to the divisional artillery and to the heavy corps artillery, and, further, that with the same end in view, kites should be furnished regiments of field artillery.

As far as the rules of fire are concerned, there is general satisfaction with the processes in force at the end of the war, although many artillerymen believe that the rules of fire in force before the war should be reintroduced into the regulations.

On the other hand, certain officers express themselves as being convinced that the artillery should develop with a view to completely eliminating fire adjustment.

The principles of the 1910 regulations, supplemented by the instructions of June, 1916, and later by the "Instructions on the defensive and offensive action of large units," have generally

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<sup>2</sup>This system of instruction seeks the same ends as that prescribed for our service—adequate instruction in both the methods of position and of open warfare.

The French teach position warfare first; but we believe that our conditions require that the first lessons of the field artilleryman should be in the war of movement, and that the greater emphasis should be laid on the methods there employed.

The French must first anticipate position warfare, for it should be borne in mind that their tactical and strategic plan of campaign is necessarily based upon their geographical position and frontier system of defense, which, organized as it is upon a chain of strong points, will sooner or later bring about stabilization.

On the other hand, we, with our larger and more thinly populated country, must first anticipate a war of movement, and it would seem logical to teach first those methods for which we expect to have the greatest need.—EDITOR.

## FRENCH ARTILLERY DOCTRINE

given complete satisfaction. A very clear and very general current of ideas highly favors the fire of a number of batteries on the same target or targets (*i.e.*, concentration of fire) and enfilade fire. It is necessary to note that, in order to be carried out rapidly, these firings require a careful topographical and technical preparation, and, as far as possible, control of fire by observation. The importance of counter-battery work must be emphasized. In the artillery regulations it should occupy the same important place that it actually occupied at the end of the war. Destruction must be sought when the time and the means are available, but it is indispensable to obtain neutralization for all offensive and defensive operations. The artillery of all the large units must cooperate in counter-battery work, under the direction of the commanding officer of the corps artillery.

Many artillerymen are of the opinion that study should be made with a view to the solution of the following problems:

1. Control by aerial observer of concentrated fire from a number of batteries.
2. Anti-aircraft fire.
3. Fire of smoke and incendiary shells.

They also believe that the defensive barrage should not be retained, but should be replaced by types of counter-preparation determined by the command in its plans for the employment of the artillery.

The offensive barrage remains useful in the form of a box barrage and a rolling barrage, which should closely precede the line of attack. This motion should be introduced in the regulations of all arms.

Demonstration firings, such as "scattered" fire, reply fire, and reprisal fire, must be reduced to a minimum, and regulated by the command in its plans for the use of the artillery or in its operations orders.

To resume, the conduct of fire has only been modified in details during the war—the modifications coming, on the one hand, from the masses of artillery used and the large quantities

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of ammunition to be expended, and, on the other hand, from the reduced professional ability of battery commanders. The only modifications which have been introduced since 1910 into the regulations particularly concern:

- (a) The importance of heavy artillery.
- (b) The capital importance of the technical preparation of fire.
- (c) The importance of concentration, and the consequent suppression of all the articles relative to the limitation in the use of ammunition.
- (d) The importance of controlling fire by aerial observation.
- (e) The necessity of neutralizing, before everything else, the hostile artillery in moments of crisis, by using in very strong measures special projectiles, and by firings to neutralize observing stations, P.C's., and telephone centrals.
- (f) The importance of fire on armored mobile targets (tanks).
- (g) The defense against airplanes and the protection of balloons.

### AMMUNITION SUPPLY

With the exception of ammunition for the aviation and for tanks, the artillery is in charge of the ammunition supply service for all guns, small arms, and automatic arms.

The ammunition delivered to the armies is distributed by them to delivery centres where it is taken in charge by the army corps which is charged with its transportation to the firing line. For this purpose the army corps uses its own organic means of transportation, and also the transportation belonging to the subordinate units involved.

Within the army corps the Commanding General of the corps artillery is responsible for the ammunition supply for the artillery units located in the zone of the corps, with the exception of the units belonging to the high-power heavy artillery, whose ammunition supply is attended to by the General Artillery Reserve.



CATERPILLAR MOUNT FOR 75-MM. GUN AND 105-MM. HOWITZER



75-MM. GUN, MODEL 1920, ON CARRIAGE NO. 1, MODEL 1920

Above: Carriage unlimbered, traversing lock engaged.

Below: Right side view; firing position 0 degrees elevation.

For description of this carriage see Ordnance Notes II, November-December (1920)

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75-MM. GUN, MODEL 1920, ON CARRIAGE NO. 1, MODEL 1920.  
Rear view 80 degrees elevation; 0 degrees traverse.

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Recommendation has been made as regards ammunition supply:

1. To assign the direction of the ammunition supply service in all echelons to the commanding officer of the artillery of that echelon. In the army and in higher echelons this would be a general staff function, however.

2. To place at the disposition of the artillery in each echelon the means of execution properly belonging to that echelon for normal requirements. In case of crisis, when these resources might become insufficient, appeal is made to the commanding officer of the next higher unit for assistance.

3. In order to give the service the maximum flexibility, it is proposed to adopt a system of ammunition supply by separated elements, *i.e.*, projectiles on the one hand, charges and fuses on the other, as well as care in supplying a single lot of powder in the case of charges for the heavy artillery.

### CONCLUSIONS

After the brief review of the developments in artillery tactics during the course of the war, and the subsequent discussion of the present-day artillery doctrine, which has been given in a very superficial way, we can conclude by quoting from an important study made in the French artillery, in which the basic requirements for the artillery in the future are covered in a very broad way.

"What surprises has the next war in store for us? What forms will it take?

"In the face of this great unknown, we must take care to be neither surprised nor disabled. We need for that:

"A service of technical studies, strongly organized, based on a corps of technical specialists belonging to the Army, and completed by a minutely prepared industrial mobilization.

"Regulations without formalism, written in a broad spirit, permitting every initiative.

"Active intelligences, flexible enough to adapt themselves

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rapidly, no matter what form the war takes, or what new devices are produced.

"Finally, and above all, we must not forget that an army is worth more for its morale than for its armament, and that the morale of the troops is only the morale of its leaders. Certainly, the poilu was heroic during the five years of war, but all the energy, all the force, all the prestige, and all the authority which was required of the officer with the troops to remedy the many little failures and keep a high morale in the units must be recognized.

"The future army, based on a very short-term service, will depend much more for its value on its cadres than the army of 1914.

"It is thus necessary above everything else to assure this framework, and to prepare the army leaders, the officers and noncommissioned officers, direct leaders of the men in the ranks, in the same way as the leaders of industry, engineers, and shop bosses are prepared.

"To this end, the first condition to be fulfilled is to attract and to retain in the army, men of intelligence, by giving them a situation which is worth while, both morally and materially."



# The Jasper-Ward Terrain Board

BY MAJOR ORLANDO WARD, FIELD ARTILLERY

[EDITOR'S NOTE.—*This terrain board has been recommended by the Field Artillery Board, Fort Sill, Oklahoma, as being an ingenious and highly developed means for the instruction of students in the conduct of fire. The Chief of Field Artillery recommends its installation in each of the Field Artillery Units of the R. O. T. C., and elsewhere in the service, where an indoor terrain board can be used.*]

MANY different types of indoor and outdoor miniature terrains and terrain boards have been used in the Field Artillery service. None of these were ideal, and many had serious disadvantages. At the suggestion of Professor Thomas M. Jasper, University of Wisconsin, a former officer of the British Artillery, I constructed with his aid an indoor terrain and smoke-puff board which I believe to be superior to any terrain board heretofore used. It has been in use at the University of Wisconsin for about one year, and has proved of great value in instructing members of the Field Artillery R. O. T. C. Unit at this University, with which I have been on duty. The effect is as realistic as that obtained from the standard outdoor smoke-bomb outfit in common use. Only one or two operators are necessary, and in assumed lateral observation the apparent displacements of shots in direction due to changes in range and deflection are correctly recorded automatically.

The board in general consists of a miniature landscape on which puffs of smoke are produced at any desired place by means of a simple smoke producer fastened to the forward arm of a pantograph. The operator is hidden from view by an upright canvas screen, forming the background of the landscape. The board can be made to any size or scale desired, but the dimensions given are those of the one initially constructed. The parts essential to the board and its operation are as follows:



*Fig. 1. View From Front of Board.*

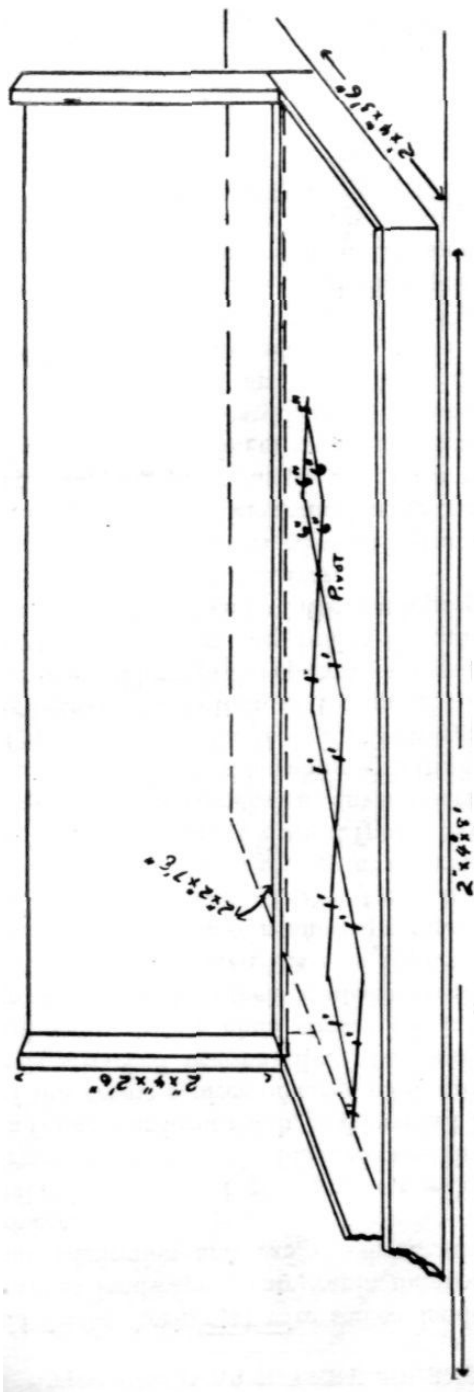


Fig II Frame.

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Table and frame, horizontal wire screen landscape, upright painted canvas landscape, pantograph, map of screen landscape, gun (deflection and range) sheet, smoke producer, flash producer.

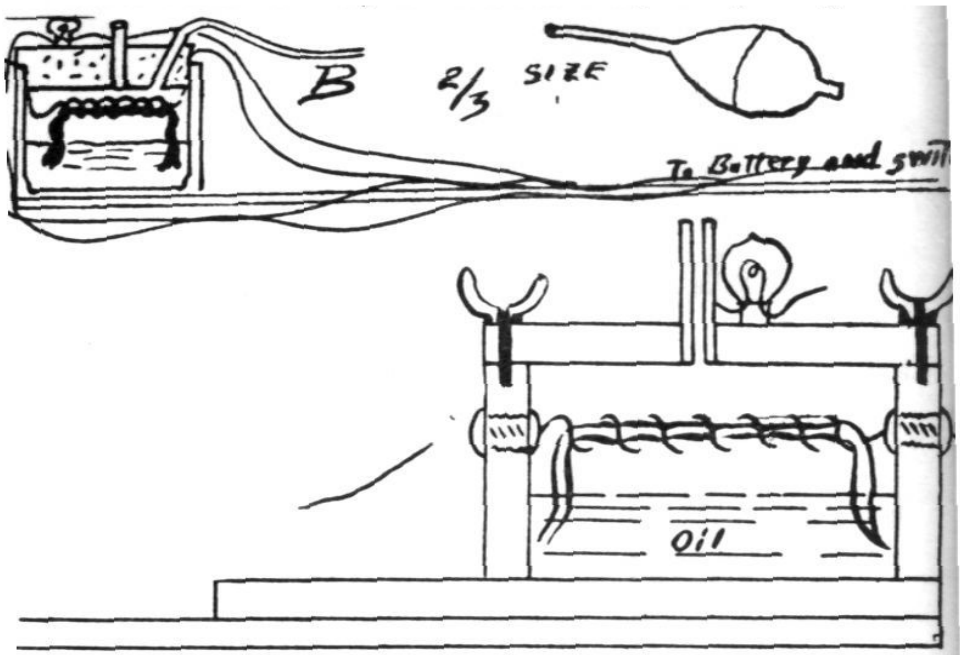
The table is three feet high, eight feet wide, and five feet deep. Around the edges of the forward two-thirds of this table is placed a frame four inches high, as shown in Fig. II. Across the top of this frame a piece of large mesh ordinary window screening is stretched horizontally. The screen is slightly bulged and dented with a blunt stick, until it represents any desired ground form. It is then painted with olive drab paint, and before this dries colored chalk is applied to obtain the coloring and representation of a landscape, especially the fields. Very small miniature houses, fences, trees, targets, etc., are placed on the screen. Across the top of the rear of the above horizontal frame is fastened a vertical frame, two and one-half feet high, over which is stretched a canvas screen painted with a landscape harmonizing and blending with the horizontal foreground. The rear third of the table is left clear, and a space of two inches between the bottom of the upright screen and the table is left open. Through this space a pantograph is operated by an operator hidden from view behind the canvas landscape. He watches the forward end of the pantograph, if desired, through a peep-hole cut in the canvas.

A pantograph may be described as an instrument consisting of one or more jointed parallelograms having one or more sides produced for copying plans, maps, etc., on a reduced or enlarged scale. One intersection of the arm is a fixed pivot. The pantograph used with this board is made of oak strips one inch wide, one-quarter inch thick, and of the lengths shown in Fig. III, hinged by eyelets. It is pivoted at a point on the table under the centre of the vertical screen (A, Fig. III). The end Y, which carries the smoke and flash producer, can be placed under any desired point of the screen landscape by moving the index end, X. A small hole bored in the end of this arm is very satisfactory as an index.



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A sheet of paper, about eighteen by thirty-two inches, is tacked or pasted on the rear portion of the table, with its centre under X when Y is under the centre of the horizontal landscape. On this sheet a reduced map of the landscape is made for the X end of the pantograph by placing the smoke producer under various critical points of the landscape and

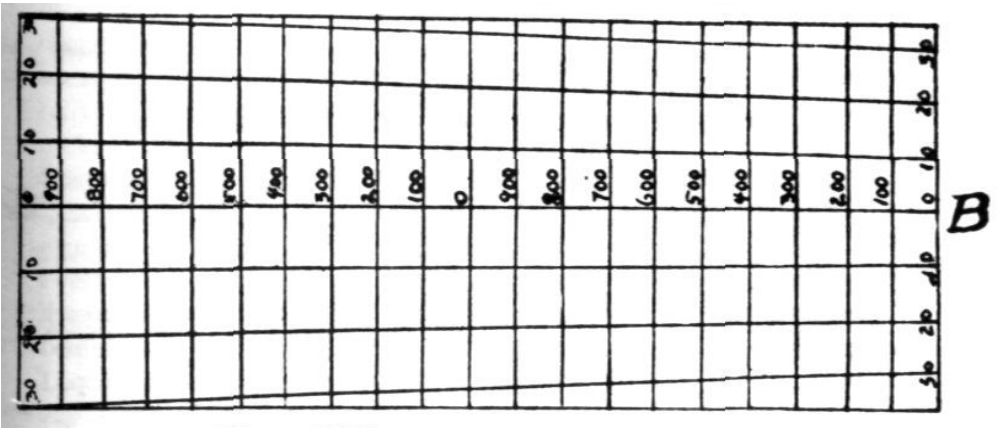


*Fig. IV Smoke Producer*

plotting the corresponding points under X. The map is then drawn in. This may be facilitated if desired by laying off temporary grid squares on the landscape by stretching strings across the top of the frame and reproducing these grids on the map first. This operator's map is, of course, inverted and reversed, and is "oriented" for him as he faces it at the rear of the table. Its scale depends on the ratio of the two parts of the pantograph, and in this case the R. F. of the map is one-fourth.

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The gun sheet consists of a chart on a transparent sheet (Fig. V). The range lines (theoretically arcs) are drawn perpendicular to the central deflection line A B at regular intervals, each representing a range change of 100 yards. Any depth of interval may be used, provided it is sufficient to take care of the lost motion bound to occur in the use of the pantograph. It is recommended, however, that it be determined by the arbitrary scale assigned to the screen landscape in depth. In this case it was assumed that one inch represented fifty yards, or two inches



*Fig. V Gun Sheet.*

represented one hundred yards. On the map this scale becomes one-fourth inch = 50 yards, or one-half inch = 100 yards, and the range lines were drawn one-half inch apart. The terrain board being 42 inches in depth, a gun sheet covering 2000 yards marked in two series of 0 to 1000 yards will cover any case of assumed range. The pantograph should be constructed carefully enough so that the lost motion will not produce an error greater than the probable error of the gun at the longer ranges. The deflection lines may also be drawn with any arbitrary interval, but, in order that the corrections in deflection will correspond with the actual mil scale at the observing point directly in front of the board, the deflection lines must be drawn

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on the gun sheet at intervals from the central line AB, according to the distance of the observing point from the board. For instance, if it has been decided to place the observing point 20 feet (240 inches) from the board, one mil will subtend .24 of an inch on the terrain, and ten mils will subtend 2.4 inches. This becomes  $\frac{1}{4} \times 2.4$  inches on the map, or .6 of an inch, and the deflection lines are drawn with that interval representing ten mils each. If the observing point is forty feet from the board, these intervals will represent five mils each, etc. As the range scale of the gun sheet described covers 2000 yards in range, corresponding to 40 inches in depth, on the terrain board, the deflection lines may be made to radiate from an assumed gun position by being drawn between points .6 of an inch apart at the zero end of the sheet in range, and .65 of an inch apart at the other. This is slightly in error, but is correct for all practical purposes.

The smoke producer is fastened on top of the forward arm of the pantograph (Y, Fig. III). It is constructed as follows and as shown in Fig. IV: A small porcelain jar with a cork stopper may be used, but the best results have been obtained with a tight wooden box, inside dimensions,  $1\frac{1}{4}$  inches deep, 1 inch wide, and 2 inches long, which has a detachable top. A brass screw seat is placed in each end  $\frac{3}{4}$  of an inch from the bottom of the box. To each of these is connected on the outside the end of an insulated copper wire running with plenty of slack down the pantograph, thence through a spring switch to a ten-volt battery. To the inside terminals are connected the two ends of a piece of iron wire which has sufficient resistance to become red hot when the switch is closed, and which is wound around a hemp wick. The ends of this wick dip into paraffine or recoil oil, or, better still, a mixture of the two, filling a portion of the box below the terminals. By closing the circuit the resistance in the coil causes it to become red hot, and the wick gives off a dense white smoke. In the top of the box is placed a small smokestack ( $\frac{1}{16}$  of an inch diameter of the hole), high enough so as to just miss touching the wire screen as the



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smoke producer is moved about. A piece of rubber tubing of about  $\frac{1}{8}$  of an inch in diameter is inserted through a hole in the box at any point above the level of the oil. To the other end of this tubing is attached a hand or atomizer bulb. The tubing must be long enough so that the bulb may be operated near the switch irrespective of the position of the smoke producer. By a quick squeeze of the bulb the smoke accumulated in the box, after closing the switch for a brief interval, is shot up through the screen in a puff, giving with a little practice and a correct density of smoke the effect of either an air or graze burst when viewed from the observing point through an observing instrument. Air-burst effect can be facilitated by placing a mirror at the back of the screen slightly tilted forward. The mirror should be placed in line with the target and observation station, and be wide enough to take care of the terrain covered in a problem. With a piece of iron wire in the smoke producer, which will become red hot instantly the switch is closed, and with the proper oil, a smoke puff will be emitted upon closing the switch without the use of the bulb, provided the rubber tube is removed and the hole closed. The board must be protected from drafts of air. A small electric bulb is attached to the top of the box next to the smokestack with wire connections through a separate spring switch to a one- or two-cell battery. A flash can thus be given with each smoke puff.

In the use of this terrain board the observer places himself at the proper distance in front of the board. His horizontal line of sight should be about four inches above the front edge of the board. Field glasses, B. C. telescopes, or other observing instruments are used to produce field conditions, limit the field of view, and cut out room surroundings. A firing problem is given him, including a target, and the relative location and distances of the aiming point, battery and target with reference to the observing point. The operator behind the screen places the gun sheet on the map so that the intersection of the centre deflection line (A B, Fig. V) and the line representing the range (assumed after the initial range command is given by the

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student) is on the target, or right or left portion of the target. The gun sheet must also be placed so that the line AB is pointing approximately in the direction of the assumed gun position (straight to the front in case of axial observation). The assumed position of the guns can thus be changed at will by merely rotating the gun sheet. The observer gives his commands, which are written on a blackboard, and the observer plots the shots on the gun sheet and gives the initial bursts on the terrain. The observer then proceeds to adjust his fire by appropriate commands, and the operator makes the proper changes in range and direction by means of the gun sheet and pantograph. When a satisfactory adjustment has been obtained, the operator announces the assumed range, the problem is discussed and errors pointed out. Salvos can be used, as the pantograph can readily be moved for each burst, and the puff delivered within three seconds. It will be noted that in lateral observation the combined use of the gun sheet and pantograph automatically records the apparent displacements of shots in direction due to change in range or deflection.

# Operations of the Horse Battalion of the (German) 15th Field Artillery, Northern France, 1914

LIEUT. COL. A. SEEGER.\*

From *The Artilleristische Monatshefte*, July-August, '20.

THE 27th of September brought us more hard work. French territorial troops were appearing everywhere, generally without much artillery, and it was necessary to get rid of them, and clear the road to Bapaume, which place changed hands frequently at that time, after slight skirmishes. The 14th Reserve Corps, from Baden and Würtemberg, was coming up by forced marches from Cambrai, to occupy Bapaume and then move on to Albert; but that place did not fall into our hands until the great offensive of 1918. In 1914, at the end of September, the Swabian divisions could accomplish nothing, the enemy growing constantly stronger; division after division from the Aisne front was being brought to the left flank of the French and English, which was in the air.

On this day, the 27th, we rode over the battlefield of Le Transloy, where two days before there had been heavy fighting between our Jägers and General Pau's advanced troops. These engagements had always resulted in our favor; the French troops were of the older classes, not habituated to serious fighting, and suffered heavily when they came in contact with our picked men, who commanded my admiration every time I saw them in action by their bravery, coolness, and skill in the use of ground. These smart green riflemen shot remarkably well. I went out with two of them to a little group of trees in front, to get a look at the country; two men of a French patrol appeared, nearly a kilometre off. Our two men consulted a moment; "Range, 800-900; one clip rapid fire." Both Frenchmen fell and did not get up again. It was a pleasure to work with such troops.

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\* Translated by Colonel O. L. Spaulding, General Staff, U. S. Army.

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On this battlefield several hundred French dead were buried on the evening of the 28th, and there were still more uncollected. In front of the churchyard lay, as if posted as a sentinel, a handsome young French captain, sword in hand. The shadow of death hung over the whole village, which was still burning from the bombardment. The troops took quarters in such buildings as were still standing, which gave a good idea of the wealth of the country; none had to bivouac.

That afternoon I saw several dead lying in a field, and was just riding on, when I heard someone call me in French, in a weak voice. It was a badly wounded sergeant, with a broken leg; he had lain there thirty-six hours without assistance. He showed great gratitude when I promised to send a surgeon, but I answered that I was doing only my duty. Now, when we have learned through four long years of war, how cruelly our wounded were treated, I can quite understand that our common Christian duty was looked upon by some of the enemy as a surprising exception to the rule of ill-treating helpless men.

The next morning we were assigned to cover the flank of the advance guards of the Württembergers, along the line of the Ancre about Miraumont, a country which later became famous. At daybreak our cavalry crossed the Bapaume-Albert road, and we had a moment to greet our friends from back in Swabia, and assure them that we were supporting them to the best of our ability. Such unexpected meetings on the battlefield stick for a long time in one's memory.

Just at this moment there came the message from our advance, very natural under the circumstances, that our patrols had been fired upon by infantry from the village of Pys, only three kilometres from the main road. These hostile troops, apparently a much surprised battalion, were retiring in all haste to the west. Then came the order, "Artillery to the front, and fire upon the retreating enemy." I put my 2nd Battery into position close beside the road, where the troops of the 27th Reserve Division were halted, and opened fire about 1600 m. beyond the village; but when I tried to lay a wire to the church

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tower there, we were again fired upon, and there was nothing to do but turn our fire in that direction, especially at the church tower, where observers usually take station. It gives one a peculiar feeling, to fire upon a village, lying peacefully in the morning sun, knowing that innocent people will probably lose their lives; but it was so ordered, and the situation required it. It might have been better if our strong cavalry had surrounded and rushed the village, and thus captured the enemy who later got away; but we did not know what was in there; a few cool, resolute men might have changed the whole situation.

It took some time to find this small target; but finally we got two hits on the tower, then limbered up to take a more advanced position, where we could see the enemy and continue the pursuit by fire. We came into action again near the village upon which we had just been firing, and sent a few shots into the valley of the Ancre after two companies which were falling back in great haste. Some of them had gotten into Beauregard Farm, where there seemed to be a considerable force, so we took that as a target. The range was only 2400 m., and every shot could be clearly observed.

Our Jägers, with fixed bayonets, were already advancing from Miraumont, in the valley, against the farm, when our first shots fell there, doing great execution, as I myself saw a quarter of an hour later. I ordered the fire stopped and galloped ahead, to see the attack of the Jägers and to put in another battery there. Passing through Miraumont I stopped at an inn to get a glass of wine as a stirrup-cup. As I took out my purse to pay the young man, who had very cheerfully handed me the wine out of a window, a hostile shell came from some unknown direction, passed close to me, and tore the young man to pieces. The upper part of his body fell out of the window into the street—a horrible sight, not easily forgotten.

I rode on into the farm, and found it already in the possession of our Jägers, who were disarming some fifty territorials and taking away their one machine gun. The old chaps seemed pleased to get off so easily, and were making no resistance. The

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damage done by our few shells had had its effect upon them; a barn was burning, and in the dwelling house one shell had struck the front wall, and one fallen in the kitchen. The few inhabitants, who had just been getting their breakfast, were standing about pale and trembling, although fortunately none had been hurt. There were some wounded men in the cellar, which I at once searched, with a few men, to remove weapons and prevent any further resistance. Things looked bad enough there. The captain of the company that had been in Pys lay there on a mattress, shot through the body; he handed me his sword, and asked for mercy. He was an old, gray-haired man, a wine merchant from Paris; beside him lay his first sergeant, another elderly man, a notary, with a gunshot wound in the leg. I took from him a revolver, an old model that must have seen service in the war of '70; both these trophies I took with me. We did what we could to relieve the sufferings of the wounded, and sent a surgeon as soon as possible. The prisoners placed themselves under my protection, and, before being sent to the rear, asked permission to send letters home, which was gladly granted. I collected the letters and took them along, for which the prisoners expressed themselves as very thankful. Whether these ever reached their addresses I very much doubt; our field postal service was very good, but could hardly be held responsible if they were not delivered. One facetious Jäger suggested, in his homely Thuringian dialect, that someone might run after the rest of the French and give them the letters, so that they would get through quicker! Thus showing that our division still retained its sense of humor, as I have often had occasion to observe, even in the most dangerous situations.

Meanwhile my 2nd Battery had gone down to Miraumont, and was going into position near the churchyard—a place which previous experience ought to have taught us to avoid. Four weeks earlier, on August 26th, we had seen what happened to our sister battalion, the 12th, with the Saxon cavalry division, in the battles before Epinal; it went into action carelessly near the churchyard at Domptail, and suffered very heavy losses in a

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few minutes. Such conspicuous points ought always to be avoided, even in masked positions. To-day, September 28th, almost the same thing happened to us.

Being detained at Beauregard Farm, I arrived too late to change the battery position. It was fully masked, but hardly had it opened fire upon the hostile columns, which were still in full retreat, when a hail of shells fell upon it, forcing the men to take cover and interrupting the fire for a long time. As I personally noted, it was impossible for the enemy to see the flashes of the guns; and at this period of the war no one was using any system of flash- or sound-ranging. It was another case of his excellent intelligence service. It is possible that the underground telephone system was still intact, since the war had not reached this neighborhood before; if, as we had often found, there were hostile artillery observers left in the village, disguised or merely concealed, they would have had no difficulty in directing their fire from a position, so to speak, behind our backs.

I have mentioned this subject in previous papers; and everyone in my battalion, especially those who may see these lines, will testify to the correctness of the statements. After this, we avoided churchyards, which we had no difficulty in doing, since in this rapid manœuvre we generally had all the room we wanted. Such a position facilitates the burial of the dead, but this seems hardly a sufficient reason for placing the troops in jeopardy. If, as is possible, the fire in this case was conducted from some other advanced position, which must necessarily have been far out on our flank, the observers did their work splendidly. Perhaps both methods were habitually used simultaneously. In any case, I have no hesitation in repeating here that the enemy's artillery observation and conduct of fire were of a very high grade; at the same time, of course, one should not forget the advantage that they had in fighting in their own country.

On the evening of this memorable day we were assigned quarters in Le Barcq, a few kilometres southwest of Bapaume, which was finally and definitely in our hands. Our trains, left

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behind at Gueuedecourt, had had a hard time of it; numerous hostile airplanes had taken them as a target, for on account of the size of their bivouac it had been hard to conceal it. The bombs began to fall just as the wagons had been parked, teams secured, and forage was being issued, and we lost many of our best men and horses. From this time on, we were never safe from these birds, and we had to develop entirely new methods of marching.

In this day's bombardment a bomb fell close to the stable sergeant of my 2nd Battery, and killed several men; the sergeant was so badly wounded that he was not expected to live more than a few hours. He was fully conscious, and understood his condition thoroughly. Although in great pain, he kept his self-control, and set a splendid example, showing that the sense of duty of the good old army was still alive. Unable to move, he asked the train commander to take some letters out of his pocket and send them to the post office; his battery commander had given them to him that morning, with strict orders to send them at once. Since he was to die, he wanted to carry out his last orders! The skill and care of our surgeons finally saved the life of this brave sergeant, although he was badly crippled; and it was my pleasant duty to obtain the Iron Cross for him.

The enemy being so near and the situation so obscure, the troops were ordered to be in readiness for instant service during the night, and local guard duty received special attention. Our cavalry division covered so much ground that distribution of orders was very slow and difficult; besides, it often took all night to make the dispositions for the morning. Consequently, we generally received at night only orders as to time and place of assembly in the morning. In my battalion I insisted strongly upon punctuality, and admitted no excuses for any avoidable delay. The result was that we were in excellent standing at division headquarters, and the division commander, who was always on time himself, did not fail to express his appreciation. I have always found that a little praise at the right time does more good to the troops than eternal fault-finding.



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On the morning of the 29th we were fighting near Achiet-le-Grand, on the railway from Albert to Arras, spread out on a broad front and engaging strong hostile forces which were just arriving. We had fine targets at 6000 metres, but could not reach them, and had to wait until the enemy came within better range, when he generally disappeared. A good long-range gun and an accurate rangefinder, and plenty of ammunition at hand for instant use, and we could have done great execution. As it was, my men were constantly digging trenches to sink the trails, which cost an enormous amount of labor, since we changed position so frequently. I established an observation station for myself in the church tower at Bihucourt; in so doing, I may say, we did not make the amateur's mistake of opening the windows to show the enemy that there was someone there. We cut holes in the shutters, and masked all other openings. These precautions became a matter of course later, but many of our young cavalry officers had not yet learned the lesson then.

Further ahead, in Achiet-le-Grand, there was an incident that probably was due to this same sort of carelessness. A squadron of the 15th Dragoons had entered the town, and was to reconnoitre toward Achiet-le-Petit, which was still occupied, and which was only about two kilometres from my station. The squadron commander went up to the church tower, and must have attracted the enemy's attention; for when he came down to give orders for establishing a telephone line there, two shells burst with surprising accuracy at the foot of the tower, and killed the captain himself as well as several men and horses.

We could not push any farther west, in spite of the constantly repeated orders from above to get into the enemy's rear and roll him up. As was illustrated later at Lens, the higher commanders very readily fell into the error of thinking that we could push the wall down with our heads; that the enemy would let a few weak cavalry regiments drive him back, just at the time when he was putting forth his whole strength and bringing in fresh troops to stop us. Whenever we came upon regular

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hostile infantry, we were generally stopped, for our cavalry did not like to advance with nothing but carbines. It generally came to a standing fire fight and cannonade against infantry, and against artillery, too, when it was encountered. It was all little incidents of the great "race to the sea," as Stegeman so aptly called the general strategic situation. Here and there our enterprising cavalry brigades would gain a little ground westward, but generally could not hold it; we would go into quarters for the night, and in the morning find the enemy in villages where our men had been the night before.

Late in the evening of the 29th, we got orders to send a squadron of the 15th Dragoons and a few Hussars to occupy Gomiecourt, which was reported by patrols to be clear of the enemy. One of my batteries was to support the dismounted advance. The cavalry, assisted by a platoon of Jägers, got into the edge of the town, and things seemed to be quiet for the night.

At dusk we were assembled for orders in Sapignies, on the Bapaume-Arras road. General von der Marwitz, the army cavalry commander, was with us as a guest. He and his chief of staff were both "pushers," and added a little emphasis to every order for advance that came from above. Out of regard for my tired horses I had asked for special consideration for my battalion that night; and the division commander, who was always very approachable, had consented. I now asked for quarters near at hand, even if they had to be pretty well to the front. He asked if I would take the responsibility of remaining here in Sapignies and Behagnies, covered by two companies of Jägers. I answered at once, "Certainly; I feel perfectly safe up here with the Jägers, even if the enemy is so close." I told my staff triumphantly that we might take quarters right where we were, in the nearest buildings; the cavalry received orders for evening marches as long as 15 kilometres. We were perfectly happy; we felt that we could make ourselves safe and comfortable under the protection of the Jägers, and rest as in Abraham's bosom. The cavalry looked with envy at my billeting parties beginning their work; for however fine a fight one

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may have had, and however cheerfully he has died for his country, comfortable quarters for the night are not to be despised. But man proposes——! Suddenly a wild fusillade broke out in Gomiecourt, and showed no signs of moderating. A few dragoons came back on the run, and said that the enemy had attacked the two squadrons and almost wiped out one of them, and that fierce street fighting was going on. From the noise, this seemed very probable. Then the hostile artillery fired a few shells into the village, so as to endanger their own troops if such a fight was really going on. This did not seem reasonable; but still such things do happen, in spite of the regulations about coöperation between infantry and artillery. The situation was certainly obscure; it might be serious, or it might not. But in any case, I was worried about my convenient quarters in Sapignies and Behagnies; for we were pretty sure to get a change; I seemed to hear the voice of the General Staff officer, "The artillery must get back, of course."

And so it was. Instead of staying where we were, we had to march back, 15 kilometres in rear of Bapaume. We were given quarters in Beaumetz-les-Cambrai, for all the places farther forward were occupied by the 14th Reserve Corps. So after all we had our usual luck; the cavalry opening the way for the infantry, and then after a hard day's work marching far to the rear for quarters. But the worst thing about this march was, that it was entirely unnecessary. We learned the next morning that the report about the squadron of dragoons had been grossly exaggerated; the loss was only a few men, and after the evening shooting match the enemy had left the village entirely, while we had done the same thing—an incident not unusual in military history. The whole thing only goes to show what small causes may have large results, if one accepts a single unsupported report and acts upon it.

The next morning we were expecting to remain where we were. But during the night we got another alarm, and had to march at once. Our neighboring division, the Guard Cavalry, sent word to us that it was surrounded in the villages just north

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of those we have been speaking of; and that there might be a catastrophe if someone could not cut them out. All the orders were sent accordingly; and we looked for another big day, saving a whole division from an overwhelming enemy. But when we reached our assembly point near Bapaume, the ghost was laid again, and our gloomy forebodings as to the fate of the Guard were dissipated; an officer from the Potsdam Hussars rode in, and informed us that the situation was improved, and that the Guard had gotten out of its difficulties. We could get nothing more definite, and the whole thing seemed to have been a false alarm.

Since we still knew nothing about Gomiecourt, and since I had orders to take position there or thereabouts, I decided to take my staff and make a reconnaissance in force; we wanted to see for ourselves, for we were losing confidence in the reports of the dragoons. Since we had to pass over open country, and did not want to be recognized as an artillery reconnaissance party, we borrowed from one of the squadrons a lot of captured French lances, which are of wood, very light, and shorter than our tubular steel shafts. I gave one of these to each of my party, officers and men, took one myself, and we rode out in small groups, two or three together, by different routes, toward the village marked with the question-mark. No shots were fired; and we soon succeeded in entering the village from different sides, supported by a few Uhlans. Then my lancer patrols galloped back to the division headquarters at Sapignies and reported Gomiecourt clear of the enemy—and got praise for our enterprise, and blame for our foolhardiness.

This is not the time or the place to describe all the firing positions that we took, during these days of desultory fighting over a wide area. We did not do so very much firing; there were plenty of targets, but it was clear that the enemy's attacks were not serious—that he was thinking less of gaining ground than of holding us back, while the fighting was heavy about the important road centre of Albert, farther south. We could generally tell early in the day whether our own force, like the

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enemy's, intended a mere demonstration, or planned a serious attack. In the former case we generally had infantry or Jägers with us; in the latter, the cavalry had to play a lone hand, while the artillery assigned to it observed the field and fired as required. The necessary mobility did not always suit us, for the Drill Regulations are right in saying that "every change of position reduces the fire effect."

October 1st was our last day of fighting in this country, which afterward suffered so much in the Somme operations of 1916. What the later years of the war did to this beautiful country is well known from the pictures in the war histories of the different regiments that fought there, especially the photographs of the 26th (1st Württemberg) Division. The ground is entirely unrecognizable; only the ruins of a church tower here and there remain to mark the localities.

North of us there was fighting about Arras, which was too hard a nut for us to crack, and which, like Verdun, Nancy, Epinal, Amiens, etc., held out to the end of the war. Even in the great offensive of 1918 we could not take this important place, which had gradually grown into a fortress. The French will always take a special pride in its defense; like Ypres, it was shot to bits, but its luck seemed to hold nevertheless.

At this time, the end of September and the first of October, it was the Guard that was trying to rush the place, making costly attacks strongly supported by artillery; only to find out, however, that the most determined attacks by the best of troops must fail if met by equally determined and well-prepared defense. On October 1st—a bright, clear day, just the thing for the enemy's airplanes—we were in action near Courcelles-le-Comte and Ervillers, on the railway between Achiet-le-Petit and Arras. The first planes of the day were greeted by wild bursts of carbine fire from some of the cavalry squadrons; this sort of shooting never did any good, and was soon forbidden by the division, for the planes flew too high. They were dropping bundles of arrows, but made few hits. Those that did hit were dangerous, however; I saw one that had penetrated a saddle

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and gone so deep into the horse's back that it was removed only with great difficulty; and men hit in the head were generally killed.

For a whole week we had been fighting to hold Bapaume, and had had many interesting experiences. We had done a good deal of marching, and had learned much about artillery which proved valuable later. We had developed our observation system greatly; had secured more and more wire, and a few additional instruments, chiefly from our excellent information sector. We had to observe such large areas, and the enemy scattered his infantry about so thinly that the targets were generally unimportant and at long range; we thus came to appreciate the value of plenty of observation stations, even though it did cost a great deal of labor to establish and move them. Napoleon says, of the commencement of a battle, "On s'engage partout et puis on voit." Nowadays in the artillery we should prefer to reverse this process—see first, and then decide when there is a target worth while. This should always be the guiding principle of the artillery; not the idea that became so popular with many during the war, of shooting whether there was a target or not. One who has to count rounds of ammunition can not afford this luxury; besides, the infantry soon loses confidence when it finds out that the artillery is shooting at random and not performing its real duty.

I have always opposed shooting at a whole landscape because there might be some of the enemy there; I prefer not to open fire until one has some sort of idea where he really is. But this was very hard to find out in 1914, for we had very few airplanes; especially were we deficient in artillery observation planes, which we later had in abundance.

On October 2nd our division got together, for the first time, in a march column on one road. It was much smaller than when we took the field, with 7000 horses; still it was an impressive mass, and had acquired one new cavalry regiment, the 16th Uhlans. We assembled at Vaux-Vraucourt, northeast of Bapaume, and started at a free trot, leaving Arras on our left, northward toward Douai, in search of new adventures.

## DISCUSSIONS

### A Candidate for the Position of Patron Saint of Artillery

BY MAJOR JOSEPH MILLS HANSON, F. A. O. R. C.; FORMERLY  
CAPTAIN F. A., A. E. F.

[EDITOR'S NOTE.—*In the following letter Major Hanson presents a candidate for the position occupied by Saint Barbara, and supports his contentions with some very interesting historical data. In a subsequent issue of THE JOURNAL we will give the French version of Sainte Barbe.*]

EDITOR, "THE FIELD ARTILLERY JOURNAL," WASHINGTON, D. C.

Yankton, South Dakota,

February 1, 1921.

DEAR SIR: Upon opening the issue of THE FIELD ARTILLERY JOURNAL for November–December, 1920, the eyes of the writer fell at once upon the charming frontispiece, a reproduction of Palma Vecchio's ideal portrait of Saint Barbara, and he then read with much interest the article following, in which is told the story of "Saint Barbara, Patron Saint of Artillery." This noble lady of the early Christian era was undoubtedly a fine character, and her sufferings for the sake of her religion were amply sufficient to entitle her to the halo of a saint.

Nevertheless, the writer cannot but feel that the claim of Saint Barbara to the title of "Patron Saint of Artillery," venerable though it be, is founded upon exceedingly unsubstantial grounds. Tradition merely says that, after her cruel father had decapitated her for refusing to abjure Christianity, fire, accompanied by thunder and lightning, fell upon him and consumed him utterly. And for this reason, and no other, Saint Barbara has become the patroness of artillery; not because she ever did anything with artillery, which did not come into practical

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existence until a thousand years after her era,\* but because of an event which is reputed to have occurred following her demise!

In view of the fact that in this rôle Saint Barbara has been receiving the homage of artillerymen since the Middle Ages, it would probably be futile to present a more appropriate candidate for the position at this late day. But the writer cannot refrain from drawing attention to the existence of such a candidate, nor from pointing out a few of the reasons why she ought to be installed in the smoke-clouds above batteries in action in place of the virtuous but, to the artilleryman, uninspiring Saint Barbara.

This candidate, though for centuries past revered as a saint in the hearts of the people, is, in point of fact, the newest of the saints by ecclesiastical enactment. Yet she is, beyond doubt, the most intimately beloved of all the saints in France, in America and, one dares almost believe, in England also, because she was so supremely human as well as divine. To hundreds of thousands of Americans in France during the Great War she was the only saint who stood out endowed with gracious and vivid personality among the hundreds whose statues throng the cathedrals and churches of that ancient land. I refer, of course, to Saint Jeanne d'Arc, the Maid of Orleans. And be it known that to the artilleryman this sanctified warrior maiden stands in closer relation than to the members of any other branch of the armed forces of land or sea, because of the sober historical fact that her high military genius was particularly marked in the handling of artillery.

Lest doubt be felt on this score, authorities may be quoted and incidents given. In his "Fifteen Decisive Battles of the

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\* The writer evidently refers only to the present type of artillery weapon, in which projectiles are propelled by gunpowder. But the Artillery refuses so to limit its field. Should a new propellant be introduced, it will naturally become a tool of the artillerist; similarly, a catapult or a ballista is an artillery weapon. Not to such obscure beginnings, the Romans of the late republic possessed a strong and well-organized artillery—even a field artillery, though more particularly siege and fortress. The siege of Marseille by one of Cæsar's officers is a good example of the use of this arm.—EDITOR.



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World," Sir Edward S. Creasy, writing of the ninth of these decisive battles, which was "Joan of Arc's Victory at Orleans," remarks that;

"It has been observed by Hume that this is the first siege in which any important use appears to have been made of artillery. And even at Orleans both besiegers and besieged seem to have employed their cannons more as instruments of destruction against their enemy's *men* than as engines of demolition against their enemy's walls and works."

That Jeanne, from the first, set store by her guns, and wanted them with her whenever possible, is shown by the statement of the old chronicler, Hall, regarding her first entry into Orleans. After showing that the besieging English were negligent in guarding the approaches to the city, he continues;

"whiche negligence the citzens shut in perceiving, sent word thereof to the French capitaines, which with Pucelle (Jeanne d'Arc) in the dedde tyme of the nighte, and in a greate rayne and thundere, with all their vitaille and artillery entered into the citie."

In his brief biography, "Joan d'Arc," published by M. Philippe d'Estailleux-Chanteraine in 1918, and founded entirely upon the voluminous documents still existing which came down from the time of the Maid, the author says that on May 6, 1429, when Jeanne led her forces to the attack on the Augustines Bastille, the outwork of the Tournelles which guarded the great bridge crossing the Loire River into Orleans, she first occupied a small island in the Loire close to the Augustines. Here she "established her artillery, and, supported by a heavy fire from the guns, she crossed the arm of the river with her troops and made a violent attack on the English entrenchments." That fire may not have been a rolling barrage, but it was a pretty good mediæval forerunner of one; and, thanks to her wise dispositions, Jeanne captured the enemy's works after a desperate conflict.

One of the ablest soldiers as well as one of the most loyal lieutenants who accompanied the Maid on her campaigns was

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the Duke d'Alençon. Concerning her military abilities he testified, under oath, years after her martyrdom:

"She was most expert in war, as much in carrying the lance as in mustering a force and ordering the ranks, and in laying the guns. All marvelled how cautiously and with what foresight she went to work, as if she had been a captain with twenty or thirty years of experience."

Whatever may have been the previous practice in employing artillery against the enemy's men rather than against his works, Jeanne d'Arc speedily discovered a better use for the guns. Probably the most notable instances of her reliance upon even the primitive artillery of that day, and her instinctive perception of its uses and possibilities, occurred during the operations before Jargeau, a fortified town on the Loire, about ten miles east of Orleans, which she, in company with the Duke d'Alençon, attacked early in June, 1429. In his work, "The Maid of France," perhaps the most painstaking and exhaustive biography of Jeanne d'Arc ever written in English, Mr. Andrew Lang says, in part, of these operations:

"Jeanne was, in a sense, the chief officer of artillery, that is, in so far as the Orleans burgesses sent to *her* the utensils for the siege works. We have already seen the evidence of d'Alençon as to Jeanne's skill in working artillery. The heavy guns and field-pieces sent from Orleans by water filled five sloops, manned by forty oarsmen, while twenty-four horses were needed to drag the chariot of the huge gun of position, resembling Mons Meg now in Edinburgh Castle. Ropes and scaling-ladders were also sent from Orleans. . . .

"Next day, June 12th, the artillery duel began, and the great gun sent from Orleans, *le Bergere* or *Bergerie*, ruined one of the towers in the wall. . . . The terms of surrender were refused by Suffolk (the Duke of Suffolk, commanding the English garrison), and the French heralds cried, 'To the assault! *Avant, gentil Duc, a l'assault!*' said Jeanne to d'Alençon. He hesitated; he doubted the practicability of the breach. 'Doubt not! The hour is come when God pleases! God helps those who help themselves. Ah, *gentil Duc*, are you afraid? Do you not know that I promised your wife to bring you home safe and sound?' . . .

"The assault began, the skirmishers advancing; while Jeanne said to the Duke, 'Change your position! That gun,' pointing to a piece of ordnance on the wall, 'will kill you!' And it did kill a gentleman who later found himself at the same spot.

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"After launching the first swarm of assailants with the scaling-ladders, d'Alençon and the Maid rushed into the breach, while Suffolk called out that he wished to speak with d'Alençon; but it was too late. The Maid was climbing a scaling-ladder, standard in hand, when a stone crashed through the flag and struck her *chapelaine*—a light helmet with no vizor. She was smitten to the earth, and sprang up, crying, '*Amis, amis, sus, sus!*' On, friends, on! The Lord has judged the English. Have good heart! Within an hour we take them!"

"In an instant the town was taken; the English fled to the bridges; over a thousand men were slain in the pursuit,' says d'Alençon. Suffolk himself was captured."

In the above fight we find instances of concentration of artillery on the decisive point, preparation fire and the artillery duel, fire for destruction, and accurate observation of the direction and objectives of enemy fire.

Within a few days after Jargeau, Jeanne captured other English strongholds along the Loire; the bridge towers of Meung and the chateau of Beaugency, by similar methods, bringing up the guns and battering the walls until the enemy either surrendered or was overwhelmed in assault. With the swift and relentless energy of a Sheridan she swept her adversaries from the entire line of the Loire, crowning her whirlwind campaign with the complete rout of the army of relief, which was retiring on Paris under Sir John Fastolf, in the dashing cavalry attack at Patay on June 18, 1429.

In such a rapid engagement as the one last mentioned, the unwieldy field guns of the period could not be used. But whenever there was opportunity, the Maid utilized to the fullest extent the powers of the artillery. On the march to Rheims, while conducting the Dauphin thither to have him crowned, she took the city of Troyes without bloodshed by promptly bringing up her guns and placing them in intrenched batteries ready to open a bombardment and cover an assault, which so alarmed the defenders of the place that they surrendered without a fight. Even when, after completing her avowed mission by getting Charles VII crowned at Rheims, she continued to fight the battles of her country with boundless energy, but with little

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royal support, and pitifully inadequate troops and supplies, she gained one brilliant victory at St. Pierre le Moustier, early in November, 1429, when, as previously, she breached the walls by artillery fire, and then took the place by storm.

It is to be remembered that in the numerous battles in which Jeanne d'Arc employed her heavy ordnance to the best advantage, she was not following precedent, but rather establishing it. Artillery was still in its earliest infancy, and the service of guns was then, and for a long time thereafter, a trade, and not a branch of the military profession; artisans of the guild of cannoneers, not soldiers, handling the pieces and firing them. That under such circumstances Jeanne d'Arc could come so near to realizing the true rôle of artillery, as it was to be gradually evolved during the centuries following her time, is one of the clearest evidences of her genius.

It may be doubted whether artillerymen of the present day would give much thought to any saint, even their patroness, Saint Barbara, in the course of professional existence in peace or war. But is it not likely that they would be more often moved to such edifying thoughts "as the caissons go rolling along," if these thoughts were to be directed, by official sanction, to the inspiring figure of the "straight young soldier, confident gallant, strong"—Saint Jeanne d'Arc, the artillerist immortal, who, we may believe, welcomes with an especial tenderness the souls of the artillerymen who go from battle for their country to her celestial land?

### A Letter

[EDITOR'S NOTE.—*The following letter, received by the Chief of Field Artillery, was given to the editor of THE JOURNAL with the request that it be published. The subject matter of this letter the Chief of Field Artillery considers timely and of interest. Undoubtedly there is a strong disposition throughout the service generally to add to equipment. There is a strong desire also to hold equipment down to a minimum. This letter is accordingly given to the Field Artillery*

## DISCUSSIONS

*generally with a view to obtaining the opinion of Field Artillery officers. It is hoped that these officers will not hesitate to send their views to THE JOURNAL, where they will be published in the department of "Discussions."]*

### TENTATIVE TABLES OF ORGANIZATION AND EQUIPMENT FOR FIELD ARTILLERY

#### TO THE CHIEF OF FIELD ARTILLERY

1. Recently I have received the tentative tables of organization and equipment for the units of a brigade of Divisional Field Artillery.

2. These tables are for peace strength, and so subject to changes for war service. Nevertheless, they accentuate a rapidly growing tendency to an exceedingly heavy overhead load per gun, which must, in my opinion, be opposed, or the efficiency of the division gun much reduced. To efficiently man all the activities and agencies indicated in these tables, I estimate between 1700 and 1800 men will be required, or approximately 75 men per gun. There are two necessary vehicles in a regiment of field artillery, a carriage for the gun, and carriage for the ammunition. These are the essentials, and every additional type of vehicle or apparatus must prove that it, beyond all doubt, is essential or should be omitted.

3. We have been informed that the World War has not revolutionized field artillery; on the other hand, we are told that it has proven the excellence of our Drill and Service Regulations, and that the various phases of the World War, so far as field artillery is concerned, were an elaboration of principles laid down in that excellent book. If that is correct, then these tables are wrong. For no regiment of field artillery can by any possible amount of training function as laid down in these regulations with the mass of vehicles and auxiliaries now made a part of it.

At the outbreak of war in 1917 there were assigned to a regiment of field artillery approximately 115 vehicles; 72 were

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ammunition-carrying caissons. These new tables show the astounding total of 184, of which only 48 are caissons carrying ammunition, an increase of over 300 per cent. in what may be termed auxiliary vehicles, and a decrease of 33 1/3 per cent. of what may be called basic vehicles for want of a better name. Let me not be misunderstood. Cars, motor, D. S. or D. T.; cars, reconnaissance; bicycles; motorcycles; carts, ration; carts, water; carts *galore* are all desirable and extremely useful at times. So would be an electric generator set for lights; a portable knock-down house for the officers' mess; a foot-warmer for the colonel; a mattress for each soldier; or a spare horse for each one in draft; but we cannot afford the manpower, and the higher command is not going to give us the road space for such a grand assemblage of rolling stock. The issue of motor vehicles in a horsed outfit is wrong in principle, from any point of view. *The regimental commander cannot be with his regiment on the march* and use an automobile. I can think of no single act a regimental commander might do more likely to affect adversely the morale of his command—officers and men included—than to go mud-splashing by them in his car, D. S. or D. T., on a bad day. When he really needs motor transportation, he will be able to convince his Brigade Commander and get a motorcycle from him. On reconnaissance with the Brigade Commander, that officer has sufficient transportation for all who should accompany him. The transportation of gasoline, tires, spare parts, etc., for motor vehicles apparently has not been considered. I urge with all the energy I possess, that all motor transportation, of whatever nature, be absolutely and completely divorced from any part of the equipment of a Field Artillery regiment, horsed.

In a regiment under these tables we find: Carts, ration, 2-mule, 10; carts, water, 2-mule, 10; kitchens, rolling, 4-mules, 10. Shades of the old field range and canvas watering bucket! Thirty special vehicles to do what six escort wagons can do with a great deal more ease! Does any one imagine a Division Commander worthy of the name is going to permit his road space

## DISCUSSIONS

to be taken up with such vehicles when he has real work to do? We may get away with it on practice marches and in manœuvre camps. In active service I do not believe so. The compiler of these tables has wisely left "road space" blank on the tables. No man can safely say what the road space of such column under service conditions would be. May we never find out.

Part of the equipment is 16 anti-aircraft machine guns and 56 automatic rifles. These can not be blithely added without any place for transportation or personnel to man them. An anti-aircraft machine gun must have an anti-aircraft mount, and an anti-aircraft mount must have a trailer or one of the ubiquitous carts. I am now required to keep in each battery 32 men trained in the use of the automatic rifle, and 20 other men trained in the use of the machine gun. Our batteries must be protected from aircraft. Yet I submit to you that, when the judgment comes after the next war, when our artillery has had to stand on its own feet, from the beginning, our record will not be written on the number of aircraft brought down, or the number of close attacks repelled without the assistance of the infantry, but in the answer to that one vital question: Did it "deliver an effective and overpowering fire upon any designated part of the enemy's position?" Let the machine gunner stick to his machine gun; the grenadier to his grenade; the RR artilleryman to his railroad; and the field artilleryman to his cannon.

That the elimination of all these semi-essentials will meet with much protest is certain. For every officer will be able to cite some instance when some one or another of these vehicles was a life-saver to him. It is for those responsible to decide whether or not these instances are frequent enough or important enough to justify their use at all times. Certain I am, that if we decide all are necessary, then to save its face, the Field Artillery must resort to the six-gun battery.

# CURRENT FIELD ARTILLERY NOTES

## Organization of Command in the Artillery, French Army\*

### PEACE ORGANIZATION

BY a Presidential Decree of August 18, 1920, important changes have been made in the organization of the command of the French Artillery, which may be condensed as follows:

(1) Artillery assigned to a division is now under the orders of the division commander, through the intermediary of the C.O. of the divisional artillery. Divisional artillery, up to the time of this decree, was brigaded under the orders of the general commanding corps artillery.

(2) Artillery of a division is now commanded by a general officer or a colonel. Prior to the decree there was no legal provision relative to the commander of an artillery brigade belonging to a division.

(3) Regiments of 75 portés, belonging to the General Artillery Reserve in war time, are assigned to divisional artillery in time of peace.

\* \* \* \* \*

The translation of the order follows:

In each of the 20 Army Corps of the Interior, the command of the artillery is organized on the following basis:

(a) A general officer commands the artillery of the army corps. He has under his direct orders:

All artillery personnel not belonging to infantry and cavalry divisions;

The troops assigned to the wagon trains;

The regional parks and eventually the intermediate depôts of the general reserve located in his territory.

This general officer is charged with the *direction* and *inspection* of the technical instruction of the divisional artillery troops

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\* Translation from Military Intelligence Division, General Staff.



## CURRENT F. A. NOTES

of his area, and also of the batteries of horse artillery assigned to the cavalry divisions.

(b) The divisional artillery regiments and certain regiments of the General Artillery Reserve are placed under the orders of the generals commanding the infantry divisions, through the intermediary of the commanding officers of the divisional artillery.

[WRITER'S NOTE.—The certain regiments of the General Artillery Reserve which are assigned to the infantry divisions are regiments of 75-mm. guns carried on trucks, *i.e.*, the 75 portés. A later report will give the new assignment of the artillery regiments to divisions as a result of this order.]

(c) The batteries of horse artillery assigned to the cavalry divisions are placed under the orders of the generals commanding these divisions.

A Brigadier-General in Algiers, a Brigadier-General in Morocco, and a Colonel of Artillery in Tunis, exercise respectively under the superior authority of the Commanding General of the 19th Army Corps, of the General Commissioner of the French Republic, or of the General commanding the division of occupation, the command of all the artillery troops, artillery parks, and of troops assigned to wagon trains, stationed in those areas.

\* \* \* \* \*

The commanding officer of the Corps artillery or of the artillery of a military circumscription (Paris-Lyon-Strasbourg, etc.) may be a Major-General or a Brigadier-General. In certain corps regions or in the military circumspections, a brigadier-general may be charged with exercising, under the direction of the Major-General Commanding the Corps artillery, or the artillery of the military circumscription, the command of the artillery regiments not assigned to divisions stationed in their respective areas.

In the military circumscription of Paris, a Major-General commands the artillery of the circumscriptions. This command

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includes all artillery troops, all wagon-train troops, and all artillery parks located in the area.

This general officer is assisted by a Brigadier-General, who commands the regiments of automobile artillery stationed in this area.

The divisional artillery regiments stationed in the area of the Paris circumscription depend:

(1) On the Military Governor of Paris, through the intermediary of the commanding officer of the divisional artillery, for everything concerning the general discipline and routine garrison duty.

(2) On the commanding general of the division and on the commanding general of the corps artillery, through the intermediary of the commanding officer of the divisional artillery, for everything concerning instruction, mobilization, interior discipline, personnel, and administration of the regiment.

In the military circumscription of Lyon, the command of the artillery is exercised by the commanding general of the 14th Corps.

All troops and all services of the artillery in Corsica are under the direct orders of the commanding officer of Corsica.

\* \* \* \* \*

The command of divisional artillery is exercised by:

(1) A general officer or a colonel, assisted by a staff, when the divisional artillery is reinforced by a regiment of the General Artillery Reserve.

(2) By the colonel commanding the regiment of divisional artillery when the divisional artillery is reduced to this single regiment.

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The general officers commanding the corps artillery or the artillery of the military circumscription exercise the same authority over the elements of artillery and of the train, belonging to their command, as the general officers commanding an infantry division.

They correspond directly with the general commanding the

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corps. The commanding officer of the artillery in Tunis has the same authority as a brigadier-general of infantry.

The brigadier-generals commanding artillery brigades not belonging to a division, and the general officers or colonels in command of divisional artillery including more than one regiment, have the same authority, for purposes of command, as a brigadier-general of infantry.

### **Creation of General Inspection for the Artillery, French Army\***

A Ministerial Decree was published on September 10, 1920, creating a general inspection for the artillery. The complete details of this organization appear in the following translation of this order.

Art. I—A general inspection for the artillery is hereby organized. This inspection is assigned to a Major-General originally of the artillery, who may be a member of the Superior War Council. In case he does not belong to that body, he has the rank of a Lieutenant-General, and he is heard by the Superior War Council in a consulting capacity.

Art. II—The Inspector-General of Artillery keeps the Minister of War permanently informed concerning the general situation of the artillery, its needs, and the progress which should be realized.

Art. III—He is responsible for assuring complete unity of views in everything concerning the application and the dissemination of the special artillery regulations in all artillery organizations and schools. To this end he inspects all artillery organizations and all artillery schools.

Art. IV—He submits to the Minister all propositions relative:

- (1) To the direction to give to the studies and experiments of the technical artillery services, in conformity with the views of the high command;
- (2) To the organization, questions of personnel, the use of

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\* Translation from Military Intelligence Division, General Staff.

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different matériels, and to the general methods of instruction in the artillery.

For this purpose two general officers are assigned to him as assistants, who are:

(1) The General Inspector of Technical Artillery Studies and Experiments, whose duties, fixed by the decree of April 5, 1912, are maintained.

This general officer is responsible to the Inspector-General of Artillery for the study of important questions of a technical order, such as program of matériel, studies and experiments with new matériel, new munitions.

On the other hand, the Inspector-General of Technical Studies and Experiments keeps the Inspector-General of Artillery directly informed concerning the studies and experiments which he is carrying out under his orders and under the orders of the Minister, and whose purpose is the perfecting or the transformation of existing matériel and ammunition.

(2) A general officer, originally of the Artillery, charged with the questions of personnel, organization, use of matériel, and instruction.

The two assistants must keep in touch with the two sections of the service. They accompany the Inspector-General at the meetings of the Superior War Council, in order to furnish the Members of this Council with all necessary information.

Art. V—The Inspector-General has a Staff composed of three field officers and two subaltern officers. In addition, the Inspector-General of Artillery convenes as many missions as he considers necessary, in order to treat various technical artillery questions. These commissions are composed of members selected for their ability in the various parts of the War Department, and from the scientific and industrial world.

Art. VI—The Inspector-General of Artillery receives all reports and studies necessary for his files. He is also informed by the Direction of Artillery of all measures taken with a view to applying the laws, decrees, and regulations, etc., concerning the artillery.

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Art. VII—The Inspector-General of Artillery is called upon to give his estimate to the Minister concerning all artillery officers recommended for promotion to general officers, or for promotion to the high grades in the Legion of Honor.

Art. VIII—All reports from the Inspector-General of Artillery are addressed to the Minister. In addition, he forwards one copy to:

- (1) The Field Marshal, Vice-President of the Superior War Council;
- (2) To the 3rd Bureau of the General Staff;
- (3) To the Direction of Artillery.

Art. IX—All orders contrary to the present decree are hereby rescinded, notably that of April 5, 1912, creating the technical inspection of siege and fortress artillery, a technical inspection of coast artillery, and the inspection of field artillery fire, and also that of November 7, 1917, creating two general inspections and two inspections for the instruction of the artillery.

### **Artillery Fire Control**

SPARTACO TARGA, COLONEL OF ARTILLERY. "RIV. DI ARTIG. E GENIO," JULY–AUG., 1920\*

[3800 WORDS]

The use of artillery has always been a complicated problem, but especially so since the developments of the recent war. It seems clear, however, that the distinction between warfare of position and warfare of manœuvre is not one of substance, but is merely a matter of the time and facilities available. In the one case there is centralization: in the other, decentralization.

But whatever the mechanism, the essential is that the fire of the artillery shall be distributed—not dispersed—in accordance with the general scheme of the commander, the nature of the

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\* Synopsis Translation made for National Service and International Military Digest, by Colonel O. L. Spaulding, General Staff, U. S. Army.

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ground, and the tactical situation; and that it shall be possible to concentrate it upon any desired point or line, to meet any movement of the enemy, or to conform to those of our own troops. The control should be such as to accomplish this with the least possible waste of energy, matériel, or ammunition. And in order that this control may be effective, the service of the batteries must be perfected, by accurate preparation of fire and by careful study of targets.

Economy requires that fire shall be opened or continued only to accomplish a definite material or moral effect, and that each class of weapon shall be used for the purpose to which it is best adapted.

Selection of gun and projectile depends chiefly upon availability; but the kind, rate, and accuracy of the fire are largely matters of judgment and of ingenuity in the use of what is at hand. Thus, in permanent positions, when all the services of observation and information are in full operation, it is possible to prepare beforehand all data likely to be required; in manœuvre, these services are much curtailed, and batteries must fire from hastily occupied positions, with little in the way of maps to guide them. The control system must be prepared to operate promptly and simply, without undue reliance upon forms, and so to develop naturally with the arrival of additional equipment.

The essential things are:

- (1) Definite formulation of the purposes to be accomplished;
- (2) Proper posting of the batteries;
- (3) Selection of methods and rates of fire such that the personnel shall not be overworked, causing inaccuracy;
- (4) Apportionment of normal and contingent zones according to tactical relations;
- (5) Due attention to the services of observation and communication;
- (6) Attention to all ballistic elements affecting accuracy of fire;

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(7) Dispositions for having the batteries always ready to fire on short notice;

(8) Adjustment and registration without attracting unnecessary attention.

The control system thus established has to deal with the combined action of numerous batteries working together for a common purpose. The action of several may be concentrated upon one target, or distributed along a line so as to form a stationary or movable curtain of fire. The firing of gas will be dealt with separately.

Concentration must be instant and accurate, and by guns suited to the target; otherwise they are worse than useless. They require somewhat elaborate preparation; if, in rapid manœuvre, it is impracticable to make this complete, at least it should be considered and the work begun. Then, as the lines approach stabilization, it can be completed, so as to give, at any moment, the maximum of accuracy under the circumstances. The duty of the superior command is to identify and classify the targets, fix a definite method of indicating them, and give complete orders for opening fire; of the batteries, to calculate and record the firing data and make the necessary corrections at the instant of firing. The firing should be supervised, and errors traced, if possible.

The effect of the curtain of fire depends upon its depth and density, the accuracy of fire, and its intimate coördination with the infantry. It requires, in even greater degree, the same care in preparation as a concentration.

Gas is of two general classes: persistent and non-persistent. The latter is used to fire upon points which cannot be reached effectively by other projectiles, or to cover a large area for a certain time; and to work on the enemy's moral and physical endurance, by forcing the continued use of masks, etc. The effect of gas depends upon the weather and the nature of the ground; it is desirable to make a study of ground forms and prevailing winds, so as to know upon what lines to fire to reach

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any desired area. The fire should come as a surprise, and be very intense for a short time. To get full effect, this initial fire should be succeeded by others, less intense, at intervals. The duration to exhaust the normal German mask with two filters was taken as three hours.

Firing with persistent gases is generally by concentration on a small area.

In all cases, firing gas upon a vaguely defined area or in slight density is a pure waste of energy and ammunition.

### **Mlle. Soixante-Quinze**

(MARCH, 1918)

Oh, a mistress fit for a soldier's love  
Is the graceful 75;  
As neat and slim and as strong and trim  
As ever a girl alive.

Where the steel-blue sheen of her mail is seen  
And the light of her flashing glance,  
In the broken spray of the roaring fray,  
Is the soul of embattled France.

Her love is true as the heaven's blue,  
She will fight for her love till death;  
Her hate is a flame no foe can tame,  
That slays with the lightning's breath.

For the sun of day turns fogged and gray,  
And night is a reeling hell,  
When she swings the flail of the shrapnel's hail  
Or looses the bursting shell.

From high Lorraine to the Somme and Aisne  
She has held at bay the Hun,  
That with broken strength he may pay, at length,  
For the sins that his race has done;



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For Alsace, torn from the mother land,  
Ravished and mocked and chained;  
For Belgium, nailed to the martyr's cross  
For holding her faith unstained.

Thou Maid who came, like a beacon flame,  
In thy people's darkest hour,  
Who made them thrill with patriot will  
By the spell of thy mystic power;

Who gav'st them heart to speed the dart  
From arquebus and bow,  
Give us to drive, with the 75,  
Our bolts on a baser foe,

That we who have come from Freedom's home,  
Across the western wave,  
Such blows shall give that France may live  
As once for us she gave.

May our good guns play with a stinging spray  
On the Prussian ranks of war,  
And smite them yet as did Lafayette  
The hireling Huns of yore!

May we aim again at a tyrant's men,  
As straight and swift a blow,  
As at Yorktown came, with smoke and flame,  
From the guns of Rochambeau!

Oh, a mistress fit for our soldier love  
Is the soixante-quinze, our boast,  
Our hope and pride, like a new-won bride,  
But the dread of the Kaiser's host!

—JOSEPH MILLS HANSON,  
Captain, F. A.

("The Stars and Stripes," Paris, March, 1918.)

## BOOK REVIEWS

THE STRATEGY OF THE WESTERN FRONT (1914-1918). By Lt.-Col. H. H. Sargent, U. S. Army, Retired. A. C. McClurg & Co., Chicago, Ill.

Colonel Sargent, as a military author, needs no introduction to the officers of our Army. His earlier books, "Napoleon Bonaparte's First Campaign," "The Campaign of Marengo," "The Campaign of Santiago de Cuba," which appeared some years ago, established his place as a military critic.

In the present volume he seeks to determine, on the one hand, where sound principles of strategy were employed, with the consequent results thereby attained, and, on the other hand, where these principles were violated, and the extent of the disasters resulting to the side which so violated them. Colonel Sargent, in support of his statements, quotes quite freely from that great master of strategy, Napoleon.

The present book is written in simple, non-technical language, and is easily understandable by the non-military reader. Occasionally statements which might appear not quite clear to such a reader are illustrated by diagrams, thus making the reading perfectly clear and easy.

Like all works on the strategy of a past war, the book is more or less in the nature of a *post-mortem*, and speculates as to what might have been. This is always an interesting subject, and is one in which opinions will always differ. Nevertheless, the present book is replete with logical deductions, and the views of the author are certainly entitled to great consideration.

While the title of the book might indicate that only the Western Front is considered, and while actually most of the book deals exclusively with that front, yet as the war was going on in other parts of the world, and as progress and results obtained in these other territories had direct influence on the Western Front, they also are considered by the author.

Colonel Sargent has written a very readable and interesting book, and this volume should take its place beside his other works on the shelves of the Military Library, and particularly the library of an officer of the Army.

THE MAINTENANCE OF PEACE. By S. C. Vestal. E. P. Putnam's Sons, New York, N. Y.

As set forth in the Preface, this text is devoted to an exposition of the proper methods of maintaining domestic and international peace, as deduced from an analytical study of the pertinent parts of history.

## BOOK REVIEWS

Domestic peace is treated with particular reference to the United States and the Western Hemisphere. International peace is treated in the broadest sense, and covers all cases, from two contiguous states in any continent which are on the verge of war to a situation where all nations of the civilized world are seemingly about to become embroiled.

The conclusions reached in this work are based on a truly remarkable research into history, the writings and teachings of the world's greatest statesmen, and a clear logic. Reading is believing, and one is bound to be thrilled with the virile, live-and-let-live policies advocated. These policies are directly in line with the teachings of the founders of our nation and our Constitution, and in reading we see those devoted and clear-thinking patriots struggling to give us that government which has so far safely weathered the storm. Some part of our wonder as to their political wisdom is done away with when we realize how they knew and interpreted history, and a supreme and crushing contempt arises—greater in that it is now clearly understood—toward those puppet statesmen who would betray their country by furnishing Danegeld either in substance or in the safety of their nation.

The satisfaction of thoroughly understanding the workings of the Balance of Power, and what the Monroe Doctrine really means to the United States, is accorded to those who are fortunate enough to pick up this book; for no one will put it down after reading the first page.

The portrayal of history is fascinating; the intricacies of European politics are laid bare; and the world's climax of political crime, the Prussian assault on civilization, is left naked and horrid.

Let us hope that all those responsible for the safety of our nation either know and will profit by history and its teachings, or will put a little thoughtful study on this text.

**MILITARY CORRESPONDENCE REPORTS AND ORDERS.** By Colonel Lucius H. Holt, U. S. A., Head of Department of English, West Point. Frederick A. Stokes Company, publishers. New York, N. Y. Price, \$1.75 net.

From a general treatment of military communications, Colonel Holt takes up each individual type of correspondence: Official Correspondence—the exact forms, directions as to folding and inclosures, examples; Business Correspondence—how official military forms are adapted to routine business communications; Social Correspondence—familiar letters, invitations and replies; the Official Report; Field Messages; Orders—Routine and Combat, Problems in Routine Orders. Carefully prepared appendices give Forms for Field Orders, Administrative Orders and Annexes; Sample Orders and Tables Selected from

## THE FIELD ARTILLERY JOURNAL

Problems and Conferences of the School of the Line, 1919-1920, and a full list of Abbreviations. Five sample tables are given, including a comprehensive Entraining Table, a March and Relief Table, and a March and Camp Table.

The book has been adopted as a text-book at the Military Academy for use with the classes in English in the department of English and History.

It covers the subjects of which it treats thoroughly, and is an excellent reference book for the officer's library. It is particularly recommended to those officers who have recently joined the service.

# Index to Current Field Artillery Literature

Compiled from monthly list of military information carded from books, periodicals, and other sources furnished by the War College Division, General Staff.

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- AIRSHIPS.—Germany: German giant monoplane. Fully describing machine carrying 18 passengers, baggage, 2 pilots and mechanic. (*The Times, Weekly Edition*, October 29, 1920, p. 365.)
- ARMIES.—France: The military forces of France. Dealing with the problems of recruiting, organization, and mobilization of all branches in general. By Gen. Thevenet. (*Revue Militaire Generale*, September, 1920, p. 577.)
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- ANDERSON, W. H.—Outline of the development of the British Army up to the commencement of the Great War, 1914. London, Hugh Rees. 1920. 56 p.
- ARTILLERY DRILL AND TACTICS.—European War. Correspondence re "Artillery at Anzac in the Gallipoli Campaign, April-December, 1915." (*Journal of the Royal Artillery*, November, 1920, p. 395.)
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- GONDRY, LT.—French and English artillery technical vocabulary. Paris, Henri Charles-Lavauzelle. 1918. 133 p.
- EUROPEAN WAR.—Italy: Some tactical and strategic considerations of the Italian campaign in 1917-18. By Lieut. Gen. the Earl of Cavan. (*The Indian Military Record*, November 1, 1920, p. 252.)
- FIELD ARTILLERY.—Germany: The German and French field artillery at the beginning of the war. By Maj. Gen. Isbert, retired, German Army. (*Field Artillery Journal*, September-October, 1920, p. 527.)
- FRANCE.—Foreign relations. The military strength of France. France hostile to league; views of France's critics; what France feared; France and the Rhine; intriguing with Hungary. By Sisley Huddleston. (*New York Times Current History*, December, 1920, p. 373.)
- GALLIPOLI.—Artillery at Anzac in the Gallipoli campaign, April-December, 1915. (*Journal of the Royal Artillery*, November, 1920, p. 395.)
- GUNS.—Germany: The German long-range gun. Detailed description of bombardment of Paris, distribution of shells, description of guns used and their emplacement. By Lieut. Col. H. W. Miller, Ordnance Department. (*Journal of the United States Artillery*, May, 1920, p. 439.)
- HISTORY OF ARMY ARTILLERY PARK, FIRST ARMY, A. E. F., FRANCE.—Oakland, Cal., Bennett & Morehouse. 1919. 73 p.
- INFANTRY GUNS.—Infantry guns—wheels or pack? The advantages and disadvantages of both wheel and pack method of transporting infantry guns. By Bt. Lieut. Col. G. P. MacClellan, D. S. O., R. A. (*The Journal of the Royal Artillery*, November, 1920, p. 392.)
- MACHINE-GUN DRILL AND TACTICS.—Infantry machine guns—the attack. By Capt. J. A. Doe, Infantry. (*Infantry Journal*, December, 1920, p. 456.)
- MACHINE GUN DRILL AND TACTICS.—Ordnance Department. Handbook of the anti-aircraft machine-gun trailer, model 1918. N. p., n. p., 1918.
- POLAND, CAMPAIGN IN.—La bataille de la Vistula. A diary of a French officer, describing the campaign in Poland and the Battle of the Vistula. (*Revue De Paris*, November 1, 1920, p. 35.)

## THE FIELD ARTILLERY JOURNAL

- STRATEGY.—European war. Some aspects of great campaigns. Strategy as used by Germans from immediately after the Battle of the Marne, 1914, to November 12, 1914. By Maj. R. G. Cherry, M. C., R. F. A. (*Journal of the Royal Artillery*, November, 1920, p. 379.)
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