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The Field Artillery Journal

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The United States Field Artillery Association

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EXECUTIVE COUNCIL

Brigadier-General M. M. Macomb, U. S. Army.

Captain Oliver L. Spaulding, jr., 5th Field Artillery, U. S. Army.

Captain Fox Conner, General Staff, U. S. Army.

Captain John F. O'Ryan, 1st Battery, National Guard, State of New York.

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The Field Artillery Journal

Vol. 1 **JANUARY-MARCH, 1911** **No. 1**

THE UNITED STATES FIELD ARTILLERY ASSOCIATION

Soon after the separation, in 1997, of the field artillery from the coast artillery, the question of the organization of a field artillery association and of the publication of a magazine in the interest of that arm of the service began to receive attention, and during the next three years there was considerable correspondence on and discussion of the subject. By the first of June, 1910, the correspondence had shown so much interest among field artillery men in the formation of an association and so many had expressed an earnest desire for and their willingness to support a field artillery journal, that it seemed evident that an organization could be made a success. A number of officers of the field artillery of the regular army and the organized militia were assembled at Fort Riley, Kansas, to participate in a school of instruction, and on June 7, 1910, a meeting of these officers was held to take the subject under consideration. At that meeting an organization was formed and a constitution adopted. The constitution contains the following provisions:

The Association shall consist of (1) active members and (2) associate members.

The following shall be eligible to active membership:

Commissioned officers on the active lists of the field artillery of the regular army and of the organized militia of the several states, territories and District of Columbia; provided, that officers of the regular army when separated from the field artillery, by promotion or detail in staff departments, shall not thereby lose their status as active members.

The following shall be eligible to associate membership:

(a) Commissioned officers on the retired lists of the regular army and of the organized militia of the several states, territories and District of Columbia.

(b) Those, who, as commissioned officers, either regular, militia or volunteer, have served with batteries or larger units of field artillery in time of war.

(c) Commissioned officers of the regular army and of the organized militia of the several states, territories and District of Columbia, not now belonging to the field artillery, who have served at least one year as commissioned officers in field artillery.

(d) General officers of the regular army, except as provided in Section 2 of this Article, and of the organized militia of the several states, territories and District of Columbia.

(e) All commissioned officers and former officers of the United States Army, Navy and Marin e Corps, and of the organized militia in good standing, not included in the classification hereinabove set forth.

(f) Those in civil life, whose applications are approved by the Executive Council hereina fter provided for.

Any person eligible, under the foregoing article, to membership, may become a member by making written application to the Secretary and paying the first year's dues. The decision of the Executive Council as to eligibility of an applicant shall be final.

Any member may withdraw from the Association at any time by tendering his resignation in writing, but such resignation shall not take effect until such member has paid all indebtedness due the Association at the time of such resignation.

Any member may be dropped for cause by a majority vote of the Executive Council; but no member shall be so dropped without first previously notifying him, in writing, at his last known post-office address, of the proposal to so drop him, and waiting a reasonable time for his reply.

A member dropped under the foregoing section may be reinstated by a majority vote of the Executive Council, and by paying all sums, if any, due the Association.

Active members only shall be entitled to vote.

The annual dues of the Association shall be fixed by the Executive Council, but shall not exceed $4 per annum.

The Executive Council shall be composed of five active members, three of whom shall be officers of the regular army, and two officers of the organized militia, to be elected biennially for a term of two years by a majority vote, in person or by written proxy of the active members. The Council shall hold its meetings at the headquarters of the Association, which shall be in the city of Washington.

The Executive Council shall appoint the following officers of the Association:

1. A President, to be selected from its own members, and who shall be an officer of the regular army.
2. A Vice-President, to be selected from among the active members of the Association.
3. A Secretary-Editor, to be selected from its own members, or other active members of the Association, and who shall be an officer of the regular army.
4. A Treasurer, to be selected from among the active members, and who shall be an officer stationed or residing in Washington, D. C.

These officers shall hold office at the pleasure of the Executive Council, and shall perform the duties usually and customarily performed by like officers in civil associations.

At the same meeting the Executive Council was elected, as follows:

Brigadier-General M. M. Macomb, U. S. Army.
Captain Oliver L. Spaulding, Jr., 5th Field Artillery, U. S. Army.
Captain Fox Conner, General Staff, U. S. Army.
Captain John F. O'Ryan, 1st Battery, National Guard, State of New York.
Captain Robert H. Tyndall, Battery A, National Guard, State of Indiana.

At a meeting of the Executive Council, held in Washington, D. C., November 3, 1910, the organization of the Association was completed and the following officers elected:

PRESIDENT: Brigadier-General M. M. Macomb, U. S. Army.
VICE-PRESIDENT: Lieut enant-Colonel E. St. J. Greble, General Staff, U. S. Army.
SECRETARY-EDITOR: Captain Wm. J. Snow, 6th Field Artillery, U. S. Army.
TREASURER: Captain Wm. J. Snow, 6th Field Artillery, U. S. Army.

The Council passed resolutions fixing the subscription price of the magazine at $4 a year, and life membership and subscription at $100, and providing that there shall be no annual dues, a paid subscription to the magazine for at least one year being substituted therefor.

The present management has undertaken the work of publishing THE FIELD ARTILLERY JOURNAL with confidence in the ultimate success of the enterprise; but not in the belief that success can be accomplished by the efforts of the management alone, for if any considerable degree of success is achieved it will only be by the united efforts of practially everyone directly connected with the field artillery in the United States. Assurances of support have been received from nearly all of the field artillery men in the regular army and from many of those in the organized militia; but even among these there are a number who have not yet subscribed. We have received a number of subscriptions from officers of other arms, and the management bespeaks the good offices and help of each individual reader of the magazine, not only on behalf of the field artillery, but generally "for the good of the service."

HOW CAN THE EFFICIENCY OF FIELD BATTERIES OF THE ORGANIZED MILITIA BE INCREASED?

By * * * * * *

The recent report of the Chief of Staff of the Army contains the following:

"MILITIA

"The field artillery is specially in need of this assistance from the National Government. Because of the absence of this assistance the instruction of this arm is far from satisfactory. Indeed, speaking in a general way, we may say that it is, with the exception of a few batteries, practically uninstructed in field duty and wholly unprepared for service. The gravity of this situation becomes evident when it is remembered that in both the regular army and the militia the field artillery falls far below its proper proportion with respect to the other arms."

"MOBILE ARMY

"Field Artillery—The existing deficiency in the field artillery constitutes one of the greatest menaces to our country in case of war. * * * * * * Under the heading 'Militia' the condition of militia field artillery has been stated. It is, with the exception of a few good batteries, very unsatisfactory."

These remarks of an officer in a position to know whereof he speaks disclose a serious situation, and at once suggest the question. "Is there any remedy for this, and, if so, what is it?"

The writer of this article has heard some officers of the regular army (fortunately not many) state that militia batteries can never be made effective. But he does not share this opinion. Rather, the writer believes that the American can accomplish anything within reason, and that to be an efficient field artilleryman comes within this category; that it is merely necessary to provide the American with time and facilities and he will accomplish his object. But the writer does not believe that the American, any more than the man of any other nationality, can accomplish the impossible. And yet it looks as though, under the present conditions, this is exactly the task we have set for the militia field artilleryman.

To determine the remedy to correct a general defect, we must analyze the latter into its specific elements, and then we are in a position to apply specific remedies, to be definite in our statements and, accordingly, an attempt is made in the following pages to carry out this procedure. This will involve at least a hasty glance at the subject in its entirety, from which we pass to details.

Relation Between Field Artilley and Infantry

The old aphorism, "the infantry is the Army," is still true, but fire action has, in recent years, so developed that unaided infantry can no longer advance.

The volume and range fire from the magazine rifle, the use of smokeless powder, and the evolution of the rapid-fire, indirect laying, shielded field gun, have so modified battlefield conditions that movements in the open of infantry in close order have become practically impossible, and the old battlefield pictures of troops maneuvering on the field gave place in the last war (the far east) to an "empty battlefield."

Nowadays, troops in the presence of each other burrow like moles to escape observation and to secure protection from fire. If we assume for a moment the action of advancing infantry, which is necessarily more or less exposed, against intrenched infantry, neither side being assisted by artillery, we find that, theoretically, the loss on each side should be in proportion to the amount of surface exposed, or about as 5 to 1. Practically, it has been found that the ratio is much greater. For, in reality, a man under cover can hardly be reached by the flat trajectory of the small-arm; to do so requires an accuracy of fire which infantry cannot hope to attain under the conditions and emotions of the battlefield. It therefore becomes necessary for the advancing force to receive further assistance than its own rifles to enable it to hold down the fire of the defenders. This is accomplished by the artillery, which, by bursting shrapnel in the air near the enemy's trenches, reaches the personnel behind the trenches, thus preventing these men from rising to fire. Either side being provided with artillery, the other side must also be so provided, for only artillery can effectively combat artillery; the infantry bullet is harmless against artillery shields, even if it reaches them in the concealed positions which are now recognized as the rule throughout the world. Holding down the enemy's infantry and artillery fire by our artillery enables our own infantry to advance. In addition, only the heavier projectiles of the artillery can remove or destroy material obstacles in the way of our advancing infantry. The result of these conditions is a greater dependence of the infantry on its artillery.

In addition to the material result which the artillery thus accomplishes, this arm is well known to furnish the greatest possible moral support to the infantry. This fact is recognized by all authorities, and with the greater nervous tension on the infantry, due to modern warfare conditions, the need for moral support has also

increased; again, the more untrained the infantry, the greater the need for moral support. Hence, while the field artillery is always auxiliary to the infantry, it has become a *vital, essential,* and *indispensable* adjunct. Such a thing as a large force of infantry without artillery has now become inconceivable; it would not be worth placing in the field!

The union between infantry and artillery is so close that in all modern armies the two arms are closely associated in time of peace as well as in war, and the drill regulations of each arm contain copious references to the action of the other arm. In Germany, when "the line" is spoken of, infantry and artillery are meant, all other troops being regarded as auxiliary but these two being always classed together. This intimate relation between infantry and field artillery is not generally understood in the United States.

Field Artillery in Foreign Armies

The increasing importance attached to field artillery in foreign armies is shown by the following statement of the number of field (light, horse, and mountain) batteries maintained in 1909. The figures are from Von Loebell's reports, and only the *active standing army* is considered.

Germany	has over	570 batteries
France	has	631 batteries
Russia	has	549 batteries
Austro-Hungary	has	325 batteries

As an indication of the strength in field artillery of minor powers, the following is given (the figures are for the year 1909):

Brazil	64 batteries
Bulgaria	90 batteries
Belgium	34 batteries
Chili	22 batteries
Sweden	54 batteries

The United States has but 36 batteries in its standing army.

From another source of information, believed to be even more correct than the foregoing, it is learned that the following is the number of guns maintained in the standing army in peace of each of the countries mentioned:

France	2,936
Germany	3,866
Austria	1,854
Russia	4,432
England (in regular army)	1,170
" (in territorial army)	1,000

Italy	1,470
Mexico	176
Japan	954 light
"	220 heavy
United States	144, including mountain, light, horse, and heavy.

No comment would seem to be necessary as to our inadequate number of guns.

Classification of Guns

Not only has the proportion of artillery to other arms considered necessary with the army been greatly increased in recent years, but there has also been a corresponding development of classes of artillery in order, so to speak, to obtain a tool adapted to each class of work. Briefly stated, field artillery is of the following classes:

1. Mountain, light, or horse artillery.
2. Heavy field artillery.

In each class there is both a gun and howitzer, the latter intended by its curved fire to supplement the direct fire of its corresponding gun. These classes of artillery are part of the mobile army. They exist in time of peace, are horsed and equipped at all times, possess enough mobility to accompany an army, and according to all authorities may be expected to be present on every battlefield.

After heavy artillery comes seige artillery, or position artillery, this being a class which is brought up to the front for particular occasions, is not permanently horsed, requires special platforms or anchorages, and is handled by fortress artillerymen. These fortress artillerymen, a class not existing in the United States, garrison the land frontier forts, which are equipped with much lighter guns than our coast forts.

Another special class of artillery that is being developed is for the attack of balloons. But all aeronautical matters can well be left in abeyance until more pressing needs are provided for in the United States.

Our own Ordnance Department, is keeping abreast of developments of artillery abroad; has designed for the United States field artillery the following guns:

1. 3-inch mountain gun, throwing a fifteen-pound projectile, and to be carried by pack transportation.

2. 3-inch field artillery, light, throwing a fifteen-pound projectile, and with about 4,000 pounds behind the horses. This gun is

3. An intermediate gun, throwing a thirty-pound projectile, and with about 5,000 pounds behind the horses.

4. A howitzer of the same caliber and firing a projectile of the same weight, and with about 4,000 pounds behind the horses.

5. A 4.7-inch heavy field gun, throwing a sixty-pound projectile, and with about 8,000 pounds behind the horses.

6. A light howitzer, of the same caliber and throwing a projectile of the same weight, and with about 5,000 pounds behind the horses.

7. A heavy field howitzer, 6-inch caliber, throwing a 120-pound projectile, and with about 8,000 pounds behind the horses.

With the exception of the thirty-pound gun and howitzer, there is no question but that all of the above calibers are essential and should now be in commission.

It is understood that a heavier gun than any of the above is being designed for siege purposes but to which branch of the artillery—field or coast—it will be assigned is unknown to the writer.

Of all of the above mentioned field artillery guns and howitzers, there are actually in service at the present time only the 3-inch light gun. It is understood that the mountain gun will soon be placed in service and also the 4.7-inch gun, but the latter only at the cost of withdrawing a corresponding number of 3-inch guns.

It is important that all of these types of guns and howitzers be placed in service in order that their drill regulations may be prepared and that troops may become more or less familiar with the use of this ordnance before actually taking the field. The importance of these guns and howitzers to the mobile army is not generally understood in the United States.

Shortage of Field Artilley in the United States

The thirty regiments of regular infantry will form three and one-third divisions, requiring under the Field Service Regulations six and two-thirds regiments of light and mountain artillery; there are in existence five regiments of this artillery.

The fifteen regiments of cavalry will supply cavalry for the divisions mentioned above, and also enough for a cavalry division requiring one regiment of horse artillery; there is one regiment of horse artillery in existence.

The three and one-third infantry divisions will require three and one-third battalions of heavy field artillery; there are none in

existence. Of the ten regiments of field artillery that are now required, therefore, for divisions which may be formed from existing infantry and cavalry, we have but six in existence. There are enough militia infantry regiments to form about sixteen divisions requiring thirty-two regiments, or 192 batteries of light and mountain artillery; there are in existence fifty-one batteries. These divisions would require sixteen battalions of heavy field artillery; there are none in existence.

The regular army, therefore, contains about one-half as much artillery as is needed for the regular infantry and cavalry, and the militia contains about one-fifth or one-sixth as much artillery as it needs for existing infantry.

Bearing in mind the close relationship existing between infantry and field artillery, it may be said that the fighting value of unaided or inadequately supported infantry increases in direct proportion to the number of regiments *only* up to a certain point; beyond this each added regiment of the infantry adds a lessening proportion of increased strength. The forces of the United States have long since passed the point of maximum value, and, with our poorly proportioned army (both regular and militia, considered together or separately), we have now reached the point where the strength of the army can be most effectively increased by favoring in effort and money organizations of field artillery rather than of other arms. In other words, our critical shortage of field artillery should lead us to strain every point to bring what we have to the highest attainable efficiency and then to create more of this arm.

Efficiency of Present Militia Batteries

Of the fifty-one batteries of the militia now in existence (last report Chief of Division of Militia Affairs), only forty-four are equipped with the 3-inch rapid-fire guns. Of these forty-four batteries, very few have any real or potential efficiency in them under present conditions. As an illustration of the character of the average militia battery, the following extracts from the inspection reports of the last inspection of seventeen batteries are given:

1. Recruited from element of doubtful character.
2. Efficiency as field artillery almost nullified.
3. About sixty-five per cent consists of recruits of about four months' service.
4. Present efficiency is very low and fire discipline very indifferent.
5. Efficiency low; service of pieces slow and fire discipline indifferent.
6. Fire control and direction very poor.
7. Average knowledge of guns and service not high.

8. Battery demoralized.
9. Privates not thoroughly informed as to duties of cannoneers.
10. Men possess fair knowledge of standing gun drill, but officers are in need of much instruction, particularly conduct of fire.
11. Could not as field artillery be expected to go anywhere.
12. At present know little about field artillery.
13. Battery as a whole inefficient and lacks interest.
14. Very slow at drill; not efficient, captain lacks knowledge of drill regulations.
15. Not at present efficient.
16. Command is far from field service efficiency.
17. Officers not up to requirements in instrumental work and handling firing data.

The inefficient condition of state batteries is not generally appreciated by state authorities.

Hasty Improvisation

The relation of field artillery to the other arms, its importance to them, and the internal difficulties in organizing, equipping and handling it, have never been understood or appreciated in the United States. There still exists to some extent the opinion that this arm can be improvised or hastily created upon the outbreak of war. This opinion, always ill-founded, is absolutely wrong to-day.

Misunderstanding as to the field artillery in the Civil War led General Hunt, Chief of Artillery in the Army of the Potomas, in his final report, dated June 5, 1865, to state:

"I do not hesitate to state that the field artillery of this army (Potomae), although not inferior to any in our service, has been from one-third to one-half less efficient than it ought to have been, while it has cost from one-third to one-half more money than there was any necessity for."

But artillery conditions in that war were simple as compared to present requirements. The guns were mostly smooth-bore, the range was short, the laying appliances were extremely simple, and the principal work in fighting the guns consisted merely in getting them on the line and then firing almost point blank. There were no matematical computations of firing data; there was no shrapnel fire to adjust in three directions; there was no sheaf of fire to manipulate there were no delicate, accurate instrumental scales to set, bubbles to center, etc., as there now are. Such targets as could be reached were at short range and quite visible; consequently no elaborate training in observation and communication was necessary for the personnel.

At the present time, both in the War Department and in the militia of the several states, field artillery is theoretically on the same footing as other arms. In the militia, a company is largely regarded as a company, whether under the designation of company, troop, or

battery. As a matter of fact, the field artillery is worse off than the other arms, because there is an actual hostility among the states against the arm, partially due to lack of understanding and partially to the cost of maintaining it.

The result is, that we are drifting along the same way as before the Civil War; but the consequences of such drifting will be more disastrous in the next war, for the requirements to obtain efficiency in field artillery are now much greater than they were then. It is now absolutely out of the question to obtain efficient field artillery by hasty improvisation. It will be long after our existing infantry and auxiliary arms, other than field artillery, have taken the field before any artillery support can be obtained from batteries organized or created at the outbreak of war. That we are now sadly lacking in artillery for our existing infantry and cavalry has already been pointed out.

Proof of the statement that a long time is now required to obtain efficient field artillery is seen in the recent war in the far east. The Russians had a gun that overmatched the Japanese in every respect—range, flatness of trajectory, rapidity of fire, and weight of projectile—yet it was not until after the first year of the war that the Russian artillery could cope with the Japanese or furnish its infantry the support the Japanese gun furnished its infantry from the very first battle. This was due simply to the fact that the Russians were unfamiliar with their gun, it being a new one issued to them at the outbreak of the war and one with which they had never practiced. And in this connection two things must be borne in mind: First, the Russians were already organized, possessing artillery knowledge, and not ignorant untrained men as would be the case in hastily raised batteries in the United States; and second, the gun it took the Russians months and months to learn even in war was far more simple than the present rapid-fire gun with which all nations are now equipped. The Russians, themselves, since the war, have adopted the true rapid-fire gun the use of which is based on radically different principles from that of its predecessors and requires an immensely increased amount of training to utilize its inherent powers.

The amount of training required to obtain an effective firing battery is not generally understood in the United States.

Resume

An attempt has been made in the foregoing pages to briefly present the field artillery situation in the United States. It may be summed up as follows:

1. Considering only existing regiments of infantry, there is about one-sixth enough field artillery to support these regiments.
2. This shortage of field artillery would in real war very largely negative the efficiency of the infantry.
3. In failing to make adequate artillery provision, we are pursuing a policy diametrically opposed to the rest of the civilized world, or rather, we are neglecting to have a policy.
4. The absolute dependency of large masses of infantry upon its artillery is not generally understood in the United States.
5. There will appear against us in any large war special classes of ordnance with which we cannot cope unless we previously get into service the same classes of ordnance, now being manufactured by our Ordnance Department.
6. Of the existing militia field artillery, a large part has practically no efficiency at present.
7. The artillery deficiency cannot be overcome by hastily improvising batteries when the emergency arises.

In the preceding remarks, no attempt has been made to entertain certain other important field artillery considerations from which we suffered during the Civil War, such as higher organization and ammunition supply, but attention has been concentrated on our present policy of maintaining an inadequate quota of this arm.

Specific Defects in Militia Batteries

By passing now from a consideration of our generally deplorable condition to the specific defects in existing units of the organized militia, we can determine the cause of these defects and hence the remedies to be applied.

Of the two actions in battle, shock and fire, the latter long ago became the predominating one. Field artillery is the highest development of fire action. It applies machine and mechanical action more than any other arm. It has no action except fire. But it cannot fire until it gets into its firing position. To get there it must be able to march. Marching is the combined work of men and horses.

Untrained horses may have to be used in war; but an untrained driver on an untrained horse is a poor combination for moving a heavy load. At present drivers are untrained, due to lack of horses with which driving can be learned. But before a man can drive well, which involves managing two horses, he must be a sufficiently good rider to be able to devote his undivided attention to his pair

without the necessity of devoting attention to his riding. Hence, before he can learn to drive he must learn to ride. There is no known way of learning to ride except by mounting a horse, and, as states make practically no provision for horses, the drivers are as a rule poor riders.

Again, when pairs of horses are combined into a six-horse team, the difficulty of management is further increased. It is not generally appreciated in the service, much less in the United States at large, that a great deal of training is necessary to make a good artillery driver out of a good rider or other horseman. Moreover, in the marching and maneuvering of artillery, there enters not only the skill of the individual drivers, but in addition the noncommissioned officers and the officers must possess knowledge as to the management of the horses. This knowledge is not possessed at the present time, nor can it be acquired without the presence of horses.

It is true that at maneuvers, militia batteries, as a rule, manage, ultimately, with their untrained men and horses, to get into position; but it is equally true that usually this is done too slowly and too confusedly to be of use in campaign. And the only reason they are able to do this even in peace is on account of having empty ammunition chests. Filling the caisson with ammunition as in campaign adds 90 per cent to its weight, and under this latter condition the average militia battery could neither maintain its place in a marching column nor get into its firing position. All of these deficiencies are manifestly due to lack of horses.

Working horses can be maintained in condition only by properly fitted and adjusted harness; but to learn to fit and adjust harness requires horses. Furthermore, horses can be maintained in serviceable condition in the field only by proper care; but without horses in time of peace the proper care of them will not be learned. It is safe to assume that if the men have not learned in peace how to care for horses, the latter will receive scant attention in campaign, with the result that the battery will soon be immobilized.

Hence, the first class of deficiencies is:

(a) Poor riding.
(b) Poor driving.
(c) Poor management of six-horse teams.
(d) Ignorance as to fitting and adusting harness and saddles.
(e) Ignorance as to stable duty and care of horses.

The remedy is, to have in the battery sufficient horses for instruction purposes. In the very few brilliant exceptions, where the battery maintains a nucleus of horses, the defects herein stated do

not exist to any appreciable degree, conclusively proving that militia batteries can acquire and apply the necessary knowledge connected with the horse part of the battery if given the requisite facilities.

And it must be borne in mind that if we include horses in the facilities we must include men to care for them. The number of men need not be great (anywhere from five to twenty), but they should be permanently enlisted in the battery, should care for the horses and be proficient in all matters properly partaining to the duties of an enlisted man; they could thus also act as instructors and would form a nucleus of trained men that would make its influence felt in leavening the mass of other men that might at any time be taken into the battery.

Hence, the first need can be summed up by saying it is a nucleus of trained men and horses.

It is frequently assumed that of the two essential features of field artillery (the horse or marchinng part and the gun or firing part) the former at present is, for the militia, the weaker end in efficiency. Actually this is not the case. Militia batteries are no more efficient in delivering an effective fire than in marching; in fact, they are probably less efficient. Efficiency in firing is wholly the work of the personnel, commissioned and enlisted; and, with the notable exception of a very few batteries, there is now a total lack of adequate instruction in this work. As a rule, the officers have not sufficient knowledge of reconnaissance to reconnoiter an approach and select a suitable position and install the battery therein for firing. This is important, for if struck by fire when limbered the battery is practically helpless, as it cannot, as can infantry, conceal itself by lying down in a fold of the ground. To assist the captain, there are provided by the Drill Regulations "Information and Communication details." These are at present untrained; generally they have never even been appointed. Some officers do not even know the firing commands, many do not know how to compute firing data, and very few are able to manipulate the sheaf of fire. Some of these defects in officers are due to lack of instruction. In some cases they are due to lack of elementary education, the officer being unable to use a simple formula involving algebraic signs.

But, aside from the question of efficiency of the officers of a battery, they cannot deliver an effective fire without properly instructed enlisted personnel. That a battery is a firing machine is the conception of the present rapid-fire gun. The machine sows a selected area with shrapnel balls by turning a rafale on it, the density of balls per square yard being adapted to the situation existing;

the desired result accomplished, the sheaf of fire is shifted to another target. This conception is essential, for troops now present only fleeting targets. The idea is entirely opposed to the old one (which was suitable to older types of ordnance) of an aggregate of individual guns keeping up a continuous bombardment. Rapidity and accuracy in the setting of instruments is essential to the working of the firing machine. These requisites do not, as a rule, exist at present. Occasionally a battery is found that has accuracy, but it is thought that not over three batteries in the United States combine accuracy with rapidity. To secure this combination, the Drill Regulations subdivide the work of loading and laying so that each man has only one or two things to do; but, necessarily, this subdivision of labor makes each man dependent upon every other. Nowhere is the necessity for cooperation so vital as in the field artillery. One man failing to do his part will delay or negative one gun—that is, 25 per cent of the battery. Hence the necessity for a high degree of training in the individual man of the gun squad. In addition, the captain adjusts his fire by corrections based on observations of rounds just fired. If the gun detachment is inaccurate in its work, the firing is erratic, the captain never gets his fire adjusted, and, therefore, it will never be effective; hence, the net result will be merely a waste of ammunition—and waste of a round of ammunition in field artillery is very different from a waste of one round of small-arms ammunition.

Batteries capable of delivering an effective fire adapted to the tactical situation are vital to the infantry; a battery incapable of delivering such a fire will be at best merely a useless expense and an annoyance, and may be an actual impediment and source of weakness requiring assistance from other arms to extricate it or possibly save it from capture. A battery can be capable of delivering an effective fire only when each individual enlisted man in it is thoroughly trained, when the entire personnel is trained to work together, and when the captain is a master in handling the machine thus created and in skillfully manipulating the sheaf of fire delivered by the machine. Failure in any part of these requisites causes the machine to break down, and the very rapidity of fire of the gun will result within a few minutes in wasting the entire ammunition carried, for all the ammunition carried with a battery at war strength can be fired away in about half an hour.

The proper training of the personnel in all that relates to fire can be accomplished in militia batteries, but it requires facilities and opportunities, time and money. These requisites do not at present exist, and hence the untrained condition of the personnel.

These requisities are considered below:

(a) Facilities and opportunities for drill and practice.

As stated in the last report of the Chief of Division of Militia Affairs, instruction commences with that of the armory and passes up through the state encampment to the culmination in combined maneuvers. But at present, according to inspection reports, (see report Chief of Division of Militia Affairs), the armories are, as a rule, inadequate and poorly adapted for the purpose. The armory, or foundation part of the scheme, being defective, naturally the whole structure falls to the ground. An armory should be large enough to permit placing the four guns in line for instruction in the firing battery, and as most of the drilling is done at night the armory should be so lighted that the scales and bubbles on sights, etc., can be easily read. In addition, there should be a clear space in rear of the gun for the erection of aiming points, and space enough in front for firing sub-caliber cartrides, with a suitable back stop. The armory should also contain a riding ring, or there should be one available and conveniently located. Assuming that suitable armories have been erected in which the appropriate elementary indoor instruction for both officers and men has been held, both mounted and dismounted, the state encampments would afford facilities for carrying this instruction to the next higher degree; but these should be artillery encampments, in order that the batteries may receive necessary instruction in the technique of artillery and not be required to participate in combined problems for which they *are at present wholly unready* and which divert them from vastly more necessary work. State troops armed with the small-arm go into camp annually and hold target practice, and in addition the law provides each regiment and separate battalion with an inspector of small-arm practice; yet, for the field artillery, which has no action except fire, there is no such requirement, and no provision for firing instructors. *It is an absolute impossibility to obtain fire efficiency in the field artillery under these conditions*. Batteries should be required to hold target practice *as soon as* they have reached such a degree of development as will render such firing instructive to them. Many have not yet reached this stage, and many never will unless more encouragement is given in the future than in the past.

Finally, as has already been indicated, the field artillery officer requires a high degree of training, and to assist him in this respect the special elementary summer school established at Fort Riley last June should be maintained until each and every militia officer outgrows it. After that, they should attend the proposed School of Fire

at Fort Sill, under provisions and regulations that need not be considered now.

Of immediate assistance toward securing a better standard and in preparing the batteries for their summer encampment and for target practice, would be the detail to each battery so desiring it of a noncommissioned officer from the regular field artillery. This simple act would require no legislation, would involve but slight expense, and is believed to be desired by numerous battery commanders. This noncommissioned officer should be used entirely as an instructor, and not as a laborer, clerk, or caretaker of the armory. Classes should be ordered to Fort Riley (which seems to be our field artillery center of information) for a special course of instruction prior to being detailed to militia batteries, and should be given a course of instruction relating exclusively to field artillery and calculated to make them of the maximum value to the militia of that arm; and finally, the men should be obtained by increasing the number of noncommissioned officers in certain regular batteries, which can now be done under the law. This would work no hardship on regular batteries.

But the capacity of a noncommissioned officer is limited, and, therefore, his instruction should be supplemented by that of regular field artillery officers. While ultimately there should be one such officer to each group of from three to six batteries, at present details should be limited, because of shortage of officers, to one to each of the Departments of the Lakes and the Gulf and two to the Department of the East. The first contains 10, the second 5, and the third 19 batteries, the first and third together comprising over one-half the militia field artillery of the United States.

The second detail (Department of the Gulf) is recommended on account of the very backward condition of the batteries stationed therein. It is not believed that four officers could be assigned to any other duty in which their services would be of equal value to the United States. But they should be carefully selected, and should be almost continuously at one battery or another. They can do but little good if merely stationed at Department Headquarters. Personal contact and instruct are needed, not written communications. It is idle to think that field artillery will ever be made efficient without supplying competent instructors to the national guard.

(b) Time and money.

Although it is not generally recognized, it is a fact that *much* more can be done even with the present lack of facilities than is being done toward securing efficiency. There is a great deal of instruction

that can be given without enlarging the present armories or requiring horses. Reference is had to the training of officers in computing firing data and manipulating the sheaf, and to the instruction of the specialists (information and communication details). It is merely necessary for these men to go out in the country a few miles, taking with them such instruments and appliances as can be carried by hand. A ride on the trolley will generally take them into the open country where they can secure the desired practice. But this work will have to be done in the daytime, and most of the personnel are engaged during that time in making a living. If these men could be gotten out for one or two afternoons a week, a course that would double or treble the present efficiency of the whole organization in a short time could be laid out. But the men cannot in general be expected to be absent from their daily vocations unless they are at least *partially* compensated for their loss. This necessary training cannot be secured in an armory at night. Granting, therefore, that to secure efficiency a certain amount of instruction must be given in the daytime, and that daytime instruction cannot be secured without compensation, the question arises, where is the money to come from? The number of field artillery officers in any state is so small as compared with the infantry and other officers, and the demand from all sources for money is so great, that the field artillery cannot make its voice heard. Were the infantry thoroughly conversant with the absolute necessity for field artillery support, the infantry would itself insist on more adequate training of the field artillery. But only a large engagement in actual campaign will make the question of support understood. Then there will be a demand from one end of the land to the other for artillery. Field artillery officers generally complain that they cannot get enough money to even approximately enable them to secure efficiency. It is a notable fact that one battery of the middle Atlantic states, which secures a large annual sum of money and has special opportunities in the management of its finances, compares very favorably with the regular artillery. The only solution, then, is a special and distinct appropriation for field artillery. This will have to come from either the states, individually, or from the United States, or partly from each. But to get the states themselves to make a distinct field artillery appropriation is regarded as hopeless. There would be too much opposition, and to sufficiently educate public sentiment in each state would be the work of years during which the field artillery would remain in its present inefficient condition. Moreover, there is at the present time a feeling that this is a distinctly national arm, unsuited

to state police purpose, and that it is not right to ask the state for liberal appropriations for it. Whether this sentiment is right or wrong, it exists and must be reckoned with. Therefore, the only remedy is for the federal government to make such an appropriation.

The second class of deficiencies, therefore, is:

1. Inadequately trained enlisted personnel in firing duties.
2. Untrained condition of enlisted specialists.
3. Untrained condition of officers in using specialists.
4. Untrained condition of officers in handling firing battery.
5. Untrained condition of officers in computing firing data; in some cases insufficient elementary education to learn the work.
6. Inadequate armory facilities for instruction.
7. Lack of target practice.
8. Lack of instructors, noncommissioned and commissioned.
9. Lack of daylight instruction.
10. Lack of financial support.

And all of these could be remedied by a sufficient appropriation and by the detail of a few officers and men of the regular field artillery.

Conclusion

The steps to be taken to secure greater efficiency in batteries of the organized militia, mentioned in the order of ease with which they can be taken and the advantages that would accrue, are:

1. Continuing to hold annually the elementary instruction camp for officers at Fort Riley, Kansas.

2. Detailing a class of field artillery sergeants, similar to that prescribed in General Orders, No. 60, War Department, series of 1909, by increasing the strength of certain batteries in the United States field artillery, the class to consist of about 35 men, to report at Fort Riley, Kansas, for a course of instruction somewhat similar to that prescribed by Circular, No. 29, War Department, series of 1909, but *specially* designed to meet the needs of the field artillery. Upon completion of the course the men would be assigned to such batteries as governors of states may request.

3. Detail of a suitable field artillery officer of the regular army for duty in each of the Departments of the Lakes and the Gulf and two to the Department of the East, under suitable instructions to the commanders thereof. These officers should be traveling instructors, the matter of dates and details to be arranged by correspondence between the department commander and the governors of states concerned; the number of officers so detailed to be increased later, as circumstances demand and conditions require, and all officers

so detailed to be in touch with the central militia authorities in Washington.

4. Provision for the attendance of militia field artillery officers at the proposed School of Fire at Fort Sill, under such restrictions as the War Department may impose, such for instance as the states defraying a part or all of the cost of such officer's attendance; and admission to the school might be extended to only those officers who, by previous examination at the Fort Riley instruction camp, are found to be sufficiently advanced to profit by the course at Fort Sill.

5. The passage by Congress of an appropriation act for the specific purpose of developing the field artillery of the organized militia, the appropriation to be expended, not according to Congressional representation under the provisions of Section 1661. Revised Statutes, as amended, or upon any other basis of numbers, but to be expended as the Secretary of War may see fit, upon the basis of obtaining efficiency. Participation in this fund should be held out as a reward for incentive. It is believed that to allow all batteries to participate in this fund as a matter of right would be a mistake and would not secure the best progress; but the opposite policy of progressively allotting just so much to any battery whenever it or its state accomplishes a certain result as determined by examinations and inspections by the United States, would act as an incentive and secure true progress toward efficiency.

It is thought that in no way other than as herein indicated can the general apathy now existing be removed. Only by radical action can the field artillery ever be made efficient. The sooner the deplorable situation now existing is realized and appropriate steps taken to relieve it, the sooner shall we avert the disaster we are not inviting. We should either spend enough money on national guard batteries to get some real efficiency out of them, or else stop spending on them entirely money for which we would get practically no *real* return in the field. We are now either spending too much or not enough on the field artillery.

[The writer of this article has evidently devoted considerable time and thought to the subject, and it seems to be an excellent analysis of the situation with respect to the field artillery of the organized militia. Officers of the army and of the militia, without regard to the arm of the service to which they belong, are requested to express their views on the subject for publication in THE JOURNAL.—THE EDITOR.]

FIELD ARTILLERY TELEPHONE, MODEL 1910

BY FIRST LIEUTENANT DAWSON OLMSTEAD
FIFTH FIELD ARTILLERY, U. S. A.

It is generally conceded that the success of present field artillery methods may be attributed to an efficient system for indirect laying. We may go a step further by saying that the success of any efficient system for indirect laying depends greatly upon the service of information, which includes the transmission of firing data, commands, reports, etc.

For the transmission of information, the following means are employed: Megaphones, orderlies, visual signals and telephones.

While each of the above named means will, no doubt, often suffice for the transmission of information, the telephone appears best qualified for use in the great majority of cases. We may then say that the successful employment of modern field artillery depends to a measure, at least, upon a reliable telephone and its efficient use.

FIGURE 1

In order to afford a good system of telephonic communication to the field artillery, the telephone employed must possess in addition to the usual electrical requisites of any good telephone, certain

characteristics that will insure a reliable instrument under the adverse conditions of transportation and climate met with in the field.

The instrument shown in figures 1 and 2 was designed under the direction of the Chief Signal Officer of the Army and the Field Artillery Board especially for field artillery use with this idea in view, and a short explanation of the principal features involved may be of interest.

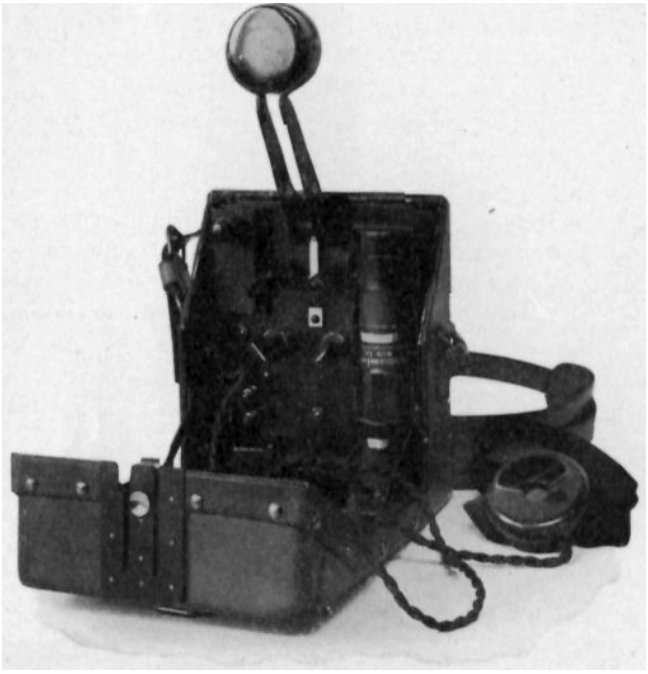

FIGURE 2

The field artillery telephone, model 1910, is a local battery instrument made up and assembled as follows:

The principal parts are mounted upon a fibre base and connected electrically by copper strips counter-sunk on the reverse side of the base plate.

The base plate with assembled parts mounted thereon is secured in a case by three attaching bolts provided with holding nuts.

Figure 4 shows the circuits of this instrument.

The calling device consists of a vibrator tongue mounted upon an armature at one end of the induction coil and is operated by a push button. A metal cap fits over the upper end of induction coil completely covering vibrator, thereby protecting it from dirt, grass

and other particles that tend to destroy the adjustment of the vibrator.

The transmitter, receiver and induction coil are of the usual local battery types, the transmitter being moisture proof.

The transmitter is secured by two brass arms about 4 inches in length which pivot to the base plate in such a manner that when the telephone is to be used, the transmitter can be swung out of the containing case to a position about 4 inches above the case.

The battery employed is composed of two small tubular dry cells of commerical type, superimposed and covered by a stiff paper cover. This cartridge battery is held in place by a brass toggle lever device which is operated by a thumb piece. There is a spiral spring for making contact at bottom of battery and a brass cap for making connection at top of battery. This device permits the current to be drawn from battery without the use of wire connection.

The containing case is made of pressed aluminum 3-32 inch thick covered with pressed fair leather riveted to the metal. The case measures 8×7½×4 inches over all and the instrument with battery and connecting cords and plug weighs 6¼ pounds.

Below the induction coil is a spring jack covered with brass. A double conductor cord is furnished with each instrument, the opposite ends terminating in a plug and two U-tips respectively.

The following points relative to the instrument seem worthy of notice:

There are no wires to work loose.

The operator is permitted the use of both hands for using field glasses, megaphone or taking notes while operating the telephone. (Frontispiece and Fig. 3.)

The instrument is thought to be adapted to withstand rough usage and tropical climates.

The transmitter arms admit of sufficient adjustment for convenience in speaking, permitting operator to bring transmitter as near the mouth as conditions require.

The plug and jack connection does away with the use of binding posts and greatly facilitates connecting up the instrument in the field.

In addition to the telephone, an oak case containing six spare batteries will be furnished with each battery, battalion and regimental signal equipment. Each case will contain six dry batteries of the Ever Ready commercial type, thereby insuring a liberal supply of extra batteries.

One tool consisting of a screwdriver and socket wrench is supplied with each telephone and secured in the case. All parts composing

FIGURE 3

the telephone are capable of quick removal for repairs or inspection by means of this tool.

Upon the front and inside of aluminum case, a wiring diagram (Fig. 4) and the following instructions covering the use of the telephone are inserted beneath a celluloid cover:

FIELD ARTILLERY TELEPHONE, MODEL 1910.
WIRING DIAGRAM.

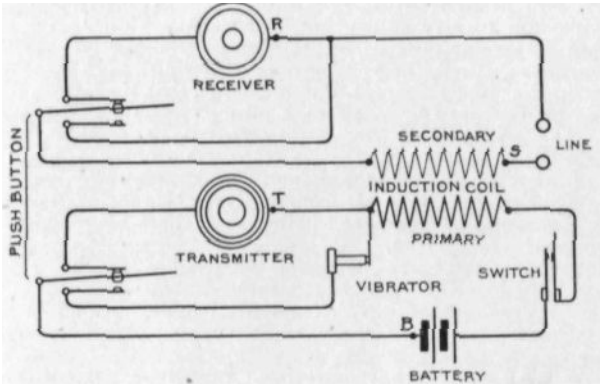

FIGURE 4

I. GENERAL INSTRUCTIONS:

1. To use this instrument: Open case, insert plug in jack, and make line connections. Remove receiver from case, attach it to head, and rotate transmitter to speaking position. Telephone may now be used with case either opened or closed.

NOTE: Rotating transmitter to speaking position closes battery circuit, and rotating transmitter back to traveling position opens battery circuit.

2. Calls: Whenever more than two stations are on one line, a distinctive call should be assigned to each station.

3. To Call: Press the button, giving appropriate call for station wanted, and await reply.

4. To Answer Call: Reply promptly, giving name of station, e. g., "A" Battery.

NOTE: When answering calls, do not press your call button, but reply by word of mouth.

5. Receiver and transmitter will not be opened except by direction of an officer. If doubt exists as to method and means for necessary repairs, authority to turn in to S. C. Depot for this work should be requested.

9. See that all screws and nuts are kept tight. A special tool is furnished with the instrument for this purpose.

II. TESTS:

1. The noncommissioned officer responsible for the care and operation of *this telephone* should test it at such times as may be necessary to insure efficient telephone service when called for, and promptly report any trouble that cannot be remedied.

NOTE: In following tests, transmitter should be rotated to speaking position.

2. To Test Battery: Connect points R and B with telephone tool. If speaking battery is strong, sparks will be seen upon breaking the circuit. An ample supply of batteries should be kept on hand at all times.

3. To Test Buzzer: Press call button and a buzzing sound will be heard if buzzer be in adjustment.

4. To Adjust Buzzer: The buzzer is adjusted by means of two screws, the upper screw adjusts the air gap (the distance between the vibrating spring and the iron core of the coil), and the lower screw carries the current to the vibrating spring. First set the upper screw, then turn lower screw until by pressing call button a strong buzz is heard. If no results are obtained, try another setting of the upper screw and again turn the lower screw in and out. Proceed in this manner until desired adjustment is obtained. If battery is strong and the above fails to give adjustment, clean contacts on buzzer by running a smooth file or fine sand paper between lower screw and spring. When adjustment is secured, the locking nuts with which both adjusting screws are provided should be carefully tightened so that the adjustment secured may not be destroyed by subsequent jolting.

5. To Test Speaking Circuit: Connect points marked R and S with telephone tool. Blowing or tapping at transmitter will be distinctly heard in the receiver if the telephone is in working order.

6. To Test Receiver: Disconnect receiver and touch terminal cord tips to opposite poles of a good battery. A sharp click should be heard if receiver is operative.

NOTE: If 2 and 6 are successful, but 5 is unsuccessful, trouble exists either in loose connections or in transmitter.

7. To Test Connections: Tighten all loose nuts and screws. Remove telephone from case and examine copper strips on reverse side of base plate.

NOTE: To remove telephone from case, take out battery, and unscrew nuts from the three holding screws with telephone tool. Raise the telephone out of case.

8. To Test Transmitter: If 5 shows speaking circuit out of order and test shows battery, receiver and connections to be in order, place telephone tool across the transmitter arms. If a sharp click is heard in receiver, the transmitter is open circuited.

9. To Test the Line: Telephones which have been tested and found operative being connected to both ends of the line and operator at one station being unable to get distant station, proceed as follows:

(a) A grounded line; raise transmitter, and if a click is heard in the receiver the line is probably grounded, as a click indicates a complete circuit; if no click is heard, the circuit is open, which may be caused by very poor connections or a severed line. If ground connections are good, the line guards should immediately hasten over the line repairing any damage to insulation or splicing any breaks in the line that can be located.

NOTE.—Water poured around the ground rod will make a better ground.

(b) A metallic circuit, i. e., twin conductor wire; make same test as in (a), if a click be heard, the line is probably short circuited, which may be caused by damage to the insulation, thereby short circuiting the two conductors; if no clicks be heard, the line is open. In either case, the line guards should be sent over line to locate trouble and make necessary repairs.

10. Most trouble is due to batteries, loose connections, or defective cords. In all cases, look first for these three defects.

[The plates for the illustrations used in this article are furnished through the courtesy of the Chief Signal Officer of the Army.—EDITOR.]

THE CARE AND TRAINING OF ARTILLERY REMOUNTS

BY CAPTAIN WM. J. SNOW, SIXTH FIELD ARTILLERY, U. S. ARMY.

General Orders, No. 188, War Department, October 14, 1910, reads in part as follows:

"1. Under normal peace conditions the total number of horses actually required as remounts for the Army should not exceed 10 per centum of the maximum authorized allowance of horses for each organization. Requisitions for horses for the cavalry and field artillery, riding horses for the mounted orderlies of the infantry, engineers, members of the Hospital Corps required to be mounted, the Signal Corps, schools and staff colleges, and Indian scouts will not exceed in any one fiscal year 10 per centum of the maximum authorized allowance of horses for the organizations for which they are intended, except when specially authorized by the Secretary of War.

"2. So far as practicable, horses will be furnished from the remount depots. Should this source of supply not be sufficient, the remainder will be supplied by purchase, as heretofore. Requisitions for horses should be submitted annually and forwarded through regular channels in time to reach the office of the Quartermaster General on or before March 1 of each year. Issues of horses from remount depots will be made as soon as practicable after the receipt of requisitions.

"3. As the young horses furnished from the remount depots will generally have been handled only with a view of making them gentle and accustoming them to weight carrying and preparing them to receive their military training, they should, upon receipt at posts or by organizations to which they are assigned, receive a careful course of training under the supervision of a graduate of the Mounted Service School whenever it is possible to obtain one, otherwise under a carefully selected and competent officer, before being placed in the ranks for regular military duties as troop and battery horses. Such training will continue as long as is necessary to qualify the horses thoroughly for the ranks, generally not less than one year. If the horses thus turned in are under five years old they should have only moderate field service; six years old, full field service. In this training the fundamental principles laid down in the service manuals or taught at the Mounted Service School will be followed."

From this it is evident that the horses to be supplied to the army will hereafter as far as practicable be young untrained ones, and that they are to "receive a careful course of training" after being assigned to organizations. The order further indicates that horses are expected to last ten years in the service.

Sooner or later horses must be issued to mounted organizations of the organized militia as well as of the regular army. In view, therefore, of the foregoing conditions, it is thought that the following notes may be of interest to field artillery men both of the regular army and the organized militia. No claim is made that these notes are complete, or even that they set forth the best method of

training; but it is thought that they will at least be of assistance to those officers who have charge of remounts.

For assistance in preparing this article, thanks are due Captain W. C. Short, Thirteenth Cavalry, and First Lieutenant Gordon Johnston, Seventh Cavalry, respectively Assistant Commandant and Senior Instructor in Equitation and Horse Training at the Mounted Service School, Fort Riley, Kansas.

Care of Remounts

Immediately upon their arrival horses should be inspected by a veterinarian, previous to taking them to the battery stables or corrals, any suspicious cases of infectious or contagious disease being at once thoroughly isolated. All the other remounts, even though showing no signs of disease, should be kept together in the most isolated part of the stable to prevent the spread of any incipient but undetected disease to the older battery horses.

Each remount should, if practicable, have a stall to himself; should be protected from liability to colds caused by drafts or exposure; and all remounts should be very carefully watched, as they are liable to develop shipping fever and distemper. Their digestion is ordinarily disarranged, and they should be placed on a diet. Horses in civil life are fed three times daily, and as far as practicable the practice should be followed in the service. For the newly received remount a suitable diet would be: Morning, 3 quarts of oats; noon, 3 quarts of oats; night, 5 quarts of bran mash, made with cold water in summer and warm water in winter.

When the digestive system becomes normal, as judged by the droppings, the bran mash may be reduced in frequency to twice a week, but the number of mashes should be again increased whenever the digestive system shows the necessity therefor. As the mashes are diminished the oats ration may be increased, so that ultimately it would be about 4 quarts in the morning, 3 at noon, and 5 at night. The horses should have their allowance of hay, and all the good clear water they desire, at least before each feeding.

The following additional rules should be observed with the remounts:

None of the remount utensils, such as currycombs, brushes, blankets, bridles, buckets, watering-troughs, etc., should be used with the older battery horses.

Take the temperature of each animal, morning and evening. If in excess of 101 degrees, report the fact to the veterinarian.

Keep the horses warm, erring on the safe side, with blankets.

Keep a lump of salt in each stall.

Graze the horses, if practicable.

Lead the horses daily, equipped with a watering bridle, for a few days; at the end of a week, any latent sickness should have developed, and the well horses will be rested and in condition to begin training. But, even after the first week or so has passed, the horses should, during the entire period of acclimation and adaptation to military life, covering several months, be carefully watched. During any period of debility they should receive such exercise, not work, as may be beneficial.

If at any time during the training the horse gets out of condition or develops blemishes or unsoundness, his training should be immediately lessened to such an amount as is suitable to his condition. Especially should the young horse (under five and one-half years of age) be so used as to avoid developing slight blemishes which may later ruin him.

New horses should not be turned into corrals with old ones until after becoming accustomed to the new surroundings and being in good health and vigor.

Training of Remounts—Preliminary Remarks

The training of a remount should be appropriate to the work he will have to do when taken up for full duty in service. The character of the work to be done by an artillery horse is not the same as that to be done by a cavalry horse; therefore, training appropriate to one is not the best training for the other. This fact, sometimes lost sight of in the army, should be constantly borne in mind. It is not proper to simply regard all horses as service mounts and give them identical training; still less is it proper to take up the artillery horse for full duty without giving him any preparatory training, trusting that he will somehow pick up the training he should have. No commander would think of doing this with a recruit, and neither should he do so with a horse.

The principal work of an artillery horse is draft, and not saddle; but any reasonable training for saddle that he gets will help him in his draft, just as any military training a recruit may receive will help him, whether the training be in his own arm of the service or not, but his best and necessary training must be in his own arm of the service, and so it is with the artillery horse. His saddle training is auxiliary to his draft training, and from the first attention should

be directed toward securing a maximum development of his load-pulling qualities.

The artillery horse occupies an intermediate position between the saddle horse and the draft horse, pure and simple; his work partakes of the nature of each, but he belongs in a distinct class by himself. He, like the cavalry horse, works under the saddle, and therefore must have saddle training; but, unlike the cavalry horse he must not jump, seldom makes abrupt changes of direction at fast gaits, does not need to work on two tracks, etc. In other words, he is less highly trained to obey leg action than is the cavalry horse and, conversely, he gets less assistance from the rider's legs than does the cavalry horse. Consequently, he must be more highly trained for obedience to rein indications.

Again, since about half the horses in a battery carry riders, the animals cannot be regarded as simply draft horses. The average farm or city truck horse hauls a much heavier load than an artillery horse, but he hauls it at a walk; the average carriage horse travels much longer distances at a faster sustained gait than an artillery horse, but his load is lighter. In other words, the draft conditions in the artillery are different from those in civil life.

The demands on the artillery horse are great. He must be a fair saddle horse, under difficult conditions, since he is incumbered by harness, is coupled up with five other horses, and draws a considerable load, all of which affects his movements. He must also be a good draft horse while still acting as a saddle horse and carrying his driver, or as an off horse receiving but little assistance from the driver. He must do his work over broken and difficult terrain of the most varied sort. And, finally, he must be this saddle and draft animal at all gaits.

The demands upon an artillery horse being thus great and of special character, it is evident that they can be met only by systematic training along appropriate lines. The foregoing remarks apply to every horse in a battery, even in a horse battery, for every horse ordinarily used under the saddle must be prepared to take his place in a team in an emergency.

The training, therefore, comprises three periods:

1. Training for saddle.
2. Training for draft.
3. Training for combination of the above.

The first and second periods may be carried on concurrently but independently.

General Principles

As the elementary training of recruits in horsemanship must be accomplished with the aid of trained horses, so must the breaking of untrained animals to saddle and to harness be done by good riders and drivers. The future usefulness of the remounts depends largely upon their elementary training. In any mounted unit the combination of inexperienced men and untrained animals should be inadmissible. Therefore, the interest of the service demands that there shall be developed in each battery a number of men as horse-trainers, not only for the efficiency of the unit itself but also to provide the means for the rapid development of new units. Such men must not only be good riders and drivers, but also good horsemen, familiar with the care, handling, and training of horses. The disposition of the man communicates itself to the horse and reacts favorably or unfavorably as the case may be. Coolness, firmness, good temper, good judgment, and, above all, patience, are the attributes necessary to a successful trainer.

In garrison, horses should receive a thorough training; in the field, they receive such as circumstances permit. But in either case, it must be constantly borne in mind that draft and not saddle qualifications are of paramount importance.

A horse learns by constant repetition of a lesson coupled with the hope of reward and fear of punishment. The latter must be awarded only with great judgment, the trainer exercising infinite patience in his work. The usual rewards are caresses, either by the voice or touch, a toothsome bit of food (oats, grass, etc.), rests succeeding obedience, dropping reins, relaxing pressure of the legs, dismounting, etc. Persistence in the use of the aids, employment of the spur, harsh tones of the voice, and finally the exceptional use of the whip, are the usual punishments. No definite rules can be laid down. The instructor must be guided by his experience and best judgment, bearing in mind that faults of execution must be rectified with gentleness and patience. Nervous, high-strung horses should never be physically punished.

Most of the movements hereafter described must for a long time be repeated in the same order until the horse is confirmed in his knowledge of the effects of the aids and of the bit by constant repetition. In this way, laborious obedience finally becomes intuitive habit.

Analysis shows that all the desired movements of the horse at all gaits may be obtained by combinations of four elementary actions directed by the rider: (1) to move forward upon pressure

of the legs, (2) to diminish the speed or move backward upon tension of the rains, (3) to control the forehand by the reins, and (4) to control the haunches by the rider's legs. When purchased, the horse usually understands the tension of the reins only; the other three actions are rarely understood at the time.

The length of the training necessarily varies with the age of the horse at date of arrival, his previous training, skill of the trainer, and special conditions facilitating or retarding the work.

High spirts in the horse generally indicate good physical condition and lack of sufficient exercise or work. This indication must not be mistaken for viciousness nor subjugated by violent means. Only unsatisfactory results will follow training when horses are not worked enough. Upon such manifestations the horse should at once be given sufficient exercise in some form, or work on the longe, before proceeding further with his training. The opposite extreme of overwork, resulting in dullness, must also be avoided. The number of hours of daily work should be very gradually increased, and the hours of daily drill should be divided into several short periods.

Longeing

Training on the longe is useful both for saddle and for draft. It is a convenient means for exercise, calming nervousness, teaching obedience, suppling the horse, and the best means for imparting balance and sure-footedness. It teaches the young horse to go ahead and to turn. It may be used to teach him to carry his equipment, whether saddle or harness.

The cavesson is placed on the horse's head so that the nose-band will rest in the middle of the lower third of the face inside the cheek-straps of the halter or bridle, and should be buckled fairly tight, so that the nose-band will have almost no play, either sidewise or up-and-down. Care should be taken that the jowel-strap is buckled tight enough to avoid all chance of the outer cheek-strap pulling into the eye. The throat-latch should be loose enough to allow the horse to breathe freely. The longe should be a rope about forty feet long attached to the nose-ring of the cavesson. In teaching the horse to longe, select a smooth place of soft ground where a circle with a diameter of about forty feet can be obtained. Coil the longe in the left hand, leading the horse with the halter shank or the reins of the watering bridle in the right hand, and walk around the circle to the left several times, thus showing the horse the road he is to follow. Then tie up the halter shank around the horse's neck, being

sure to leave no loop hanging, through which the horse could put his foot. An assistant then takes the horse, holding the nose-band of the halter or the cheek-strap of the bridle in the right hand and the rope of the longe about three feet from the cavesson in the left hand. The trainer, with the longe in his left hand, moves about twelve feet toward the center of the circle and somewhat in rear of the assistant at the horse's head, and then clucks to the horse, the assistant at the horse's head leading him forward on the circumference of the circle. The trainer walks on a smaller circle and keeps in a position to the left rear oblique of the horse, thus urging the horse forward. As the horse shows willingness to go forward, the assistant may remove his right hand and slip his left further along the longe and eventually let go entirely and go out of the circle behind the horse. Until the horse is confirmed in going around, the assistant must return to the horse's head and begin all over again at any time the animal ceases to go around.

When the horse does well at either a walk or a trot without the assistance, the animal should be halted and rewarded, either with petting or with a little grain.

The horse is halted by a slight whip cracker motion of the longe, and the command "Whoa," given with decision. If he does not obey promptly at the snap of the longe and the command, give a strong pull on the longe, thus throwing the haunches with a quick movement off the circle and bringing the horse to a standstill.

The horse being at the walk, to increase the gait to the trot command "Trot," in a sharp tone, at the same time walking toward the horse, threatening him with the loose end of the longe or a whip. To bring the horse from the trot to the walk, command "Walk," in a soothing tone, and shake the longe horizontally or resort to a sharp snap of the longe if the horse does not promptly obey.

The horse will soon learn to go out on the circle as soon as given sufficient slack of the rope. When he is halted on the circle he will soon learn to come to the trainer by the command "Come," accompanied by a pull on the longe.

To avoid accidents, the longe should always be coiled and the slack taken up whenever the horse comes nearer to the trainer.

When the horse has become proficient in going to the left, the training should commence in the same manner to the right.

An untrained horse should not be required to go on a small circle until he is suppled enough to do it without great effort. When

the horse goes around with effort and leans on the longe, more rope should be paid out and the circle made larger.

One side of the horse is usually "stiffer" than the other, just as most people have less skill with the left than with the right hand and arm. The stiff side of the horse is easily discovered on the longe by the greater difficulty he shows in going around with the stiff side toward the center of the circle. The greater part of the exercise on the longe should be directed toward suppling the stiff side, until both sides are equally supple.

The principal gaits at which a horse should be exercised on the longe are the walk and the trot, and especially should an untrained horse not be required to gallop on a small circle.

Carrying the Saddle and Harness

When the horse, equipped with only the bridle, works freely in either direction on the longe, he should then be longed with a saddle on. Remove the stirrups and straps and put on the saddle leaving the cinch comparatively loose but not so much so as to involve any possibility of the saddle turning. After the horse has been longed for some minutes, the cinch may be tightened. When the horse has thus become accustomed to carrying the saddle, put on the stirrups and let them dangle. When accustomed to this, gradually accustom him to the harness in the same way, but avoid allowing the metal collar to bruise his shoulder by continually striking it.

Mounting

When the horse has become accustomed to carrying the saddle and harness, he should be mounted. The assistant holds the coiled longe to within two feet of the nose-band, in his left hand and stands just to the left and facing the horse's head, with the right hand on the reins (which are over the horse's neck) near the bit. The trainer takes the near rein and a lock of the mane in the left hand, pats the saddle, and catches hold of the stirrup. Whenever the horse objects, a slight snap of the longe by the assistant will attract his attention again. If the horse does not resist he should be petted. The trainer, with his back to the assistant, should stand close up to the horse's shoulder, turn the stirrup with the right hand, and insert the foot. If the horse does not object, both reins are taken with the right hand (retaining the left rein running through the hand which had a hold in the mane), catching hold of the pommel, and then lifting the

major part of the weight on the arms. If the horse still does not object, the trainer may sit down in the saddle, doing so very quietly. Whenever the horse objects, the trainer should cease until the horse is quieted. If the horse becomes nervous, he should be put on the circle again until he becomes quiet. It must be remembered that the horse's first impressions are the most lasting, and hence the utmost care must be taken in these first lessons.

After the trainer is able to mount repeatedly without startling the horse the assistant may move the horse a few steps by drawing him forward, being sure to maintain the hold on the rein with the right hand, and inducing the horse to walk on a larger circle than he, the assistant, does. In this position the assistant, by pulling the head towards him with the longe, may exercise a powerful control and prevent the horse from making a plunge and thus getting out of hand.

The mounting lesson should be frequently repeated until the horse will carry the rider without trouble. The horse, mounted, being then placed behind a trained horse, will soon be content to follow without being led by the assistant.

Accustoming the Horse to Service Surroundings

The horse should early be accustomed to military sights and sounds, such as troops, colors, bands, bugles, firing, etc. This result is best accomplished by riding a quiet and fearless horse and leading the new one, gradually making him familiar with his new surroundings. In approaching any object the appearance of which frightens the new horse, he should be kept in motion, being led toward the object a short distance and then edged away from it, each time approaching nearer, until he can touch it, if practicable, with his nose, and smell it. He must never be punished for his fear, but should be calmed, as he associates the punishment with the frightening object; nor should he be gotten up to the object by force. His approach must be gradual, and time will frequently be gained by stationing quiet and fearless horses on either side of the frightening object. The same methods apply to accustoming the horse to frightening sounds. In neither case is he afraid of that with which he is familiar. Blank cartridges, gun or revolver, should be fired at some distance from him while he is being led accompanied by one or more quiet, fearless horses. He should then be quieted with the voice and caresses, and the sound repeated at lessening distances. The procedure should be repeated as often as necessary until the

horse reaches the point where standing still and unaccompanied by other horses he is not afraid.

Training for Saddle—To Move Forward

At this stage of the training, nothing does so much good as walks and trots behind trained horses as nearly in a straight line as practicable, thus accustoming the young horse to the feel of the bit and the rider's legs. The trainer should hold a rein in each hand and have only a slight feel on the mouth, giving more rein at any time the horse demands it and then again recovering the feel.

In the lessons of "going ahead" (the most important), the legs of the trainer play the most important part and are used with only the amount of force necessary to gain the amount of go-ahead desired. Trainers must remember that the hand must give whenever a forward movement is demanded by the legs, so as not to ask something with the legs and contradict it with the hand.

The movement ahead is demanded first by even pressure with the upper parts of the calves of the trainer's legs; if that is not sufficient, by taps of the same parts, and then, if necessary by blows of the heels delivered by turning out the toes and striking with the heels just behind the cinch. In early training, when the young horse is found to have dull sides, the spurs can be used with the rowels wrapped with a piece of cloth or leather. Sharp spurs are liable to make kickers or vicious horses. If the horse does not respond to a demand for a forward movement, he can be pulled off his center of balance in place by opening one rein and pulling laterally and then closing that rein and immediately opening the other at the same time acting with both legs and clucking with the tongue. As the horse moves forward, do not continue the leg action or he will not understand what is meant by the demand for a forward movement. During the first lessons, to guide the horse it is only necessary to open the rein wide and pull sufficiently to point the head in the new direction, taking care to maintain enough pressure on the opposite rein to prevent the bit from pulling through the mouth or against the bars. Every day, until the horse is perfectly accustomed to being mounted and shows himself perfectly docile, he should be longed for a few minutes, as much so-called viciousness is nothing more than high spirits. Moreover, no time is lost by longeing, as it aids training in suppling the animal and teaching him to move forward promptly when demanded. Nothing is gained in going further with the training until the horse will go ahead

promptly from a halt to a walk and from a walk to a trot by a demand from both legs.

To Decrease the Gait

To decrease the gait, slightly raise the hands and gently pull to the rear by leaning the body back; at the same time, very gradually close in the calves of the legs, and when the gait is reduced to that desired, the hands are lowered and the normal seat resumed.

If at any time the rider feels the gait steadily increasing beyond what is desired, the same means for reducing are employed momentarily and repeated several times if necessary until the gait becomes steady. This is called the "half halt." Care must be taken that the horse's mouth is not jerked.

The Trot

Beginning early in the training, the trot should be largely used, as it teaches the horse to go into his bridle, puts him in balance, and develops his muscles. But care must be taken that the trot is not faster than the horse can take without effort. Do not let him go to "hitching."

To Make the Horse Leg-wise

When the horse is in the riding-hall or ring going around the track with his right side toward the center of the ring, he is said to be going "to the right."

If no riding-hall is available, an open-air track, about 300 by 150 feet, should be laid out, on soft level ground, in a location free from distracting noises.

When the horse readily obeys the pressure of both of the trainer's legs he should be taught to obey the pressure of either leg. This will mean obedience of the haunches, which should now be gotten control of.

There are two methods of accomplishing this: One dismounted, and one mounted. The former was generally in use, but is now being superseded by the latter method. The first method:

The trainer, being dismounted, holds the reins near the bit with one hand and lightly taps the horse with the riding-whip back of the girth, thus causing the horse to turn his haunches around the forehand. Care must be taken not to tap him so far to the rear as to cause him to kick. Vary the lesson by using the butt-end of the whip to lightly poke him back of the girth. If he does not yield to the

taps and pokes alone, draw his head toward the side on which the whip is applied while continuing the taps and pokes, and as the work progresses gradually lessen the amount the head has to be turned until he will yield, with his head straight to the front. At first be satisfied with a single step, then reward him. Again, vary the lesson by reaching over the horse's back and tapping him with the whip, so as to make him turn his haunches toward the trainer. When the horse turns freely dismounted, mount him, lightly kick him with one heel while keeping the forehand in place with reins, and continue the lessons until he turns by mere pressure of the rider's calf.

The second method:

Going on the track to the right, execute a "right oblique," and after moving a short distance from the track, execute a left about on the forehand made while still marching, causing the haunches to make a larger circle than the forehand, the trainer taking advantage of the natural desire of the green horse to get back on the track, and unconsciously obeying the aids.

The aids to be employed in the turn on the forehand while at the right oblique are the left rein opened and pulled toward the rear and the left leg used vigorously, the right rein used against the neck to regulate the amount of its curvature to the left and to stop the right shoulder from running too far to the right while the horse is swinging around.

As soon as the horse's head is pointed toward the track on the same oblique line as that on which he left it, the movement straight ahead is demanded. Leaving the track on a left oblique, the aids to be employed are the opposite of those described above.

Half Turn on the Forehand

This may be taught by either of the preceding methods; but good horsemen now discourage the abouts in place (not marching) except with a hot-headed horse tending to rush ahead.

Haunches In

When the horse has learned to readily obey the pressure of either leg of the trainer in (as above) half turns on the forehand, the suppling of the haunches can be continued on the track by the movement "haunches in." This movement is nothing more than a bend of the haunches toward the center of the riding track so that the inside fore foot and the outside hind foot will track in a straight line.

Marching on the track to the right, the method to be employed is as follows: Open the left rein with a light pull to the rear and apply the leg on the same side with enough force to move the haunches toward the inside of the track. The right rein is pressed against the neck so as to limit its curvature. The fore legs should continue their march straight to the front and not cross. In the beginning of training, the moment the trainer feels the least yielding of the haunches in obedience to the leg, the horse should be straightened. He is straightened by the reins bringing the head to the normal position and the inside leg pushing the haunches over. The horse soon learns to advance some distance in the position of "haunches in."

The Gallop

After the horse understands "haunches in" he should be taught the gallop, as this is a gait which extends his muscles and gives him balance. To gallop without danger of falling he must lead with the inside fore and hind legs. A horse leans his haunches toward the side on which he is leading with the fore leg; therefore, the position of "haunches in" places him in position to gallop with the lead on the side to which the haunches are inclined. (The shoulder on the inside and the hind leg on the inside are both pushed farther to the front.)

To secure a desired gallop lead, proceed as follows: The horse will be moved around a large circle at a trot which will be extended, and just before the trainer feels that the horse is about to break into the gallop the aids as indicated for "haunches in" will be applied so strongly as to push the horse into the gallop. The trainer must remember that his weight should be placed directly over the outside hind leg, and that his body should not be pitched forward but must retain its vertical position with the back supple. The gallop lead can be maintained by returning at any time to the position of the aids as in "haunches in." The horse at the gallop making a turn must be supported by the inside rein against the neck, the inside leg over the cinch and the outside leg well behind the cinch and the rider sitting vertical and not leaning in or forward.

Every horse has one lead which he prefers, and he should be drilled on the side on which he does not desire to gallop until he will take one lead as readily as the other. At the gallop, the horse should be given as long a rein as he demands, so that he can use his neck to balance himself in the rocking motion of the gait; but, at the same time, a gentle feel on the mouth should always be maintained.

Trainers should select soft ground on which to gallop, and never hard ground. The gallop, like all other lessons, should not be continued until the horse is fatigued. It is well to cease any lesson after the horse has responded willingly to any new demand made upon him, thus leaving him with a pleasant impression of his work, from which he will grow to like it and not to dread it.

Shoulder In

It is as necessary to supple the shoulders of a horse as it is to supple the haunches, because the horse in all his turnings must bend his shoulders and move them laterally. The best movement to supple the shoulders is the movement, "shoulder in," and it is obtained as follows:

The horse is put on a small circle at a walk and allowed to relax. The trainer then, without contraction, opens the inside rein and leads the shoulder off the track he is following, just enough to cause the outside fore foot and the inside hind foot to track on the circumference of the circle. At that moment the trainer should carry the inside rein toward the withers, maintaining a slight bend in the neck with the horse's head in, the outside rein pressed against the curve in the neck so as to keep the shoulders from swinging out, and at the same time the trainer must press the horse forward with both legs, the inside one used the stronger and just at the cinch, and the outside leg used farther back to prevent the haunches from swinging out. The horse will thus make a circle in which the haunches describe a slightly larger circle than the forehand, and the horse's neck is bent so that, to a limited extent, he is looking toward the center of the circle. After the horse learns this movement on the circle, he should be taken off on a tangent for a few steps. He soon learns this movement, and there is no better suppler for the shoulders, the neck, and the jaw.

This movement is exactly the reverse of "haunches in." In "haunches in" the front feet of the horse stay on the track and the haunches are inclined to the inside of the track. In "shoulders in" the hind feet are left on the track and the shoulders and head and neck are inclined to the inside of the track.

Half Turn on the Haunches

The horse is now ready to be taught the "half turn on the haunches," which is nothing more than an about on the haunches

while marching, and is a movement in which the shoulders make a larger circle than the hind quarters. As in the turns on the forehand, horsemen prefer to teach this movement while moving rather than while keeping the horse in place, to avoid losing the "go ahead."

This movement is most easily obtained by executing a flank movement on the haunches and then, after marching a short distance in this position, executing another flank movement on the haunches, gradually cutting down the distance that the horse moves ahead until the two flank movements are combined and the "half turn on the haunches" is the result.

Marching on the track to the right to execute a flank movement to the right on the haunches, slightly raise the hands, open the right rein, pulling laterally and leading the head to the right, pressing gradually the left rein against the neck not far from the withers and closing in the left leg behind the cinch. The weight of the trainer's body is carried slightly to the rear and right. The right leg remains hanging naturally. After the two flank movements are united in the "half turn," on the haunches and executed without effort, the circle described by the haunches may be gradually decreased in size. Haunch movements are not only excellent as a suppling means, but also in making quick turns they are largely used by the horse himself to preserve his balance.

Change of Lead

After the horse gallops at one lead as readily as at the other, the trainer can begin to train for the change of lead. While galloping to the right on the track, for example, the trainer will gallop around both turns at the end of the track and immediately after the second turn will change direction so as to follow the diagonal of the riding track and when two-thirds through the diagonal he will come to a trot and just before he enters the first turn at the end of the diagonal he will take the opposite or left lead of the gallop. He will then gallop around the four turns and immediately after the fourth turn leave the track and go across the riding track on the other diagonal, coming down to a trot as before and taking the opposite lead at the end of the diagonal. The distance at the trot can be very gradually cut down until it disappears entirely and the change of lead made just before entering the turn at the end of the diagonal.

It must be remembered that the weight of the rider should be carried over the hind leg opposite to the lead at a gallop, and the croup should be held, by the leg of the rider, slightly inclined to the

side of the lead. As a consequence, at the moment that the change is demanded the weight is shifted and the croup is pushed over toward the side of the new lead. For example: At a gallop with right lead, the weight is over the left hind leg of the horse, and the left leg of the rider inclines the croup towards the right. As a consequence, when the change of lead to the left is desired, the moment it is demanded the weight is shifted over on the right hind leg of the horse, and the croup is pushed over to the left with the rider right leg.

To Passage

This should not be attempted until the horse obeys the reins and legs fairly well. It is best taught in the riding-hall, or at the gun shed, or in some building.

To passage to the right (left)—Ride obliquely toward the wall from the left, and just before reaching it, where the horse would change direction to the right in order to move along the wall, the trainer, controlling the forehand with the reins, closes his legs, the left one farther back and with greater pressure, and moves the haunches to the right. At first, be satisfied with a slight displacement of the haunches for a few steps only, and then move off parallel to the wall. Ride away from the wall and approach it as before. Each time that the wall is approached, increase the displacement of the haunches, until finally the horse moves along the wall, his body almost at right angles to it, the forehand slightly in advance of the haunches and his head and neck in prolongation of his body. The movement to the left is similiarly taught, approaching the wall from the right, and displacing the haunches toward the left.

Another method of teaching this movement is with the assistance of a dismounted man. The horse is placed with his rump toward the wall. The rider uses his reins and legs to move the horse sidewise while the dismounted assistant reinforces their efforts by holding the cheek-piece of the bridle in one hand and shoving the forehand, while at the same time he taps the horse back of the girth with a whip to move the haunches.

Suppling and Flexions

The suppling of the horse's body in all parts should constantly be the trainer's aim, and the preceding movements will accomplish that result. The suppling of the jaw and the flexions should be

postponed to the last part of training. It is better to begin them too late than too early.

Right lateral flexions—Having the horse trained to go promptly against his bit at the demand of the legs, and while moving at a walk on the track to the right, demand the following flexion of the neck and jaw: Open the right rein until the horse brings his nose to the right on a line which comes out of the right shoulder and which is parallel to the axis of the horse, press the left rein against the middle of the neck to limit the neck-bending to the right, and the moment the position desired is obtained carry the hands low and toward the left hip and remain so until the jaw on the right gives, then return the hands and reins to their normal position. Both legs act to push the horse straight ahead during this flexion.

The left flexion is given on the track to the left with the opposite aids.

Backing

This exercise should also be reserved for the end of the training, except for a very hot horse, as the movement is opposed to the forward one which is the great object in all the other exercises. To back, the following means should be used: Slightly raise the hands, incline the shoulders to the rear very slightly, pull progressively and equally on both reins; the moment the horse gives a step, give the hands, and then repeat as above for each step backward. Back a few steps, and then immediately demand the forward movement with both legs, thus leaving the forward movement the last impression received by the green horse. If the horse "stilts" on the hind legs and refuses to move back, push the haunches a step to one side with one leg and then back a step before the horse has a chance to set himself again, then push the haunch in the other direction and back a step, and continue this until you can back straight.

The Double Bridle

All the training thus far has been in the snaffle bit; but if it is found that the horse begins to pull too much in the snaffle for his thorough control, it is time to put on the double bridle. This bridle should be adjusted very carefully and inspected often by the instructor. The snaffle or bridoon rests in the corner of the lips, and the curb rests just under the bridoon rings. In adjusting the bridle, the mouth should be opened to see that the bridoon mouth-piece rests just above the mouth-piece of the curb. The curb bit should

be used at first without a curb chain until the horse becomes accustomed to the two mouth-pieces; subsequently, when the chain is used and finally adjusted, it should pass underneath the bridoon and rest perfectly flat in the chin groove. The curb bit adjusted with the curb chain should fall back at an angle of about forty-five degrees when pressure is put on the curb-bit rings.

When with the double bridle the reins are held in both hands, the snaffle-rein should come into the hand underneath the little finger and both come out between the thumb and forefinger. When the double reins are held in one hand, the snaffle reins should be on the outside and the curb reins on the inside, each one separated by a finger, and all coming out of the hand together between the thumb and forefinger.

There are other ways of holding the reins that are equally good.

The course of training may be carried as far as desired, the methods of accomplishing which are given in equitation manuals.

Bending lessons—The double bridle is especially useful in securing proper carriage of the head and neck. Every effort should be made to get the bend in the neck at the poll and not near the withers. The trainer is dismounted and with his left hand holds both snaffle reins a few inches in front and above the horse's nose while playing the curb reins held in his right hand a few inches back of the jaw. The horse must stand squarely on his legs and must not be allowed to back. Great patience is necessary, the slightest yielding of the muscles being awarded by caressing the horse. The lesson should be continued only a few minutes at a time.

When the horse obeys the rider dismounted, the lesson should be given mounted, the rider holding up the head with the snaffle reins and playing the curb reins lower down. The lesson should ultimately be given with the horse in motion.

Bending lessons by turning the neck sidewise should not be given. They make a "rubberneck."

Gaits

The horse should be confirmed in the three regulation gaits walk, trot, and gallop, which are at the rates of 4, 8, and 12 miles, respectively, per hour.

To confirm a horse in the regulation rates of speed requires much time and patience. Stakes should be driven at some convenient place daily passed over, every 117 1-3 yards apart, and numbered

consecutively. The horse at the prescribed gait passes in one minute at a walk over one, at a trot over two, and at a gallop over three staked spaces. The new horse is best confirmed in these gaits by going over the above-described course, having him in harness with well-gaited horses.

Training for Draft

The object is, to train the horses so that when harnessed in any position in the team they will move the carriage fully equipped and loaded with ammunition over any terrain practicable for artillery and be at all times and under all circumstances under perfect control of the drivers.

After the horse has become accustomed to carrying the saddle and does not object to being ridden, his training for draft should be begun.

He may first be accustomed to the harness while he is in his stall, allowing him to smell it, putting on part of it, then removing it, proceeding gradually so as not to frighten him.

If difficulty is anticipated, he may first be longed with the saddle and bridle on, or ridden, and then harnessed while still on the longe. In the early lessons care must be taken that the traces do not frighten him by continually striking his sides, nor should they hang so as to entangle his legs.

It is preferable to use a wheel harness in all early lessons, as this accustoms the horse to the breeching, and in addition the races can better be held up. Neither traces nor side-straps should be allowed to hang down from the breeching.

The harnessed horse, unattached to a vehicle, should not be driven at a trot long enough for the metal collar to bruise his shoulders or make them sore.

As the only bit that newly-purchased horses are accustomed to is the snaffle, they should invariably be worked in this bit.

Elementary Training

To teach the horse to draw a load, he should be led or longed while a man holds ropes or pieces of sash-cord that have previously been attached to the traces so as to prolong them, beyond the reach of the horse's heels if he kicks. These long traces will also prevent his wheeling around.

As the horse moves forward, the man, following at the end of the traces, gradually holds back on them. If the horse halts, his

confidence must be restored before again starting (with no pull the traces), and less tension should be used. He will soon learn pull well, after which a second man may be added at the end of the traces.

In this exercise the horse should be urged forward by the voice and not with the whip. All violent, sudden movements should avoided.

At the end of a few days he will work well without any carriage and should then be attached to a vehicle with other horses.

Regular Training

When placed in a team the horse should first be used as off swing in a well-broken team, and if he does not at first pull he should be allowed to trail along. All sudden or violent movements of the driver that would cause the horse to jump against his collar should be carefully avoided or the horse will bruise his shoulders and always fear the collar.

When he has become accustomed to his surroundings and manifests a willingness to pull his share of the load as an off swing horse, he should be changed to some other position in the team. all this training, a caisson without ammunition should, if practicable be used, and on level ground only.

The horse should now be moved over comparatively long stretches, so as to harden his shoulders, which must be carefully watched so as not to allow them to become sore.

When a horse works freely in any position in the team with empty caisson on level ground, the difficulty of draft should be creased by gradually increasing the pressure of the brakes or load on the caisson. This training should be followed by work over more difficult terrain.

Particular attention should be devoted to steep ascents, but care must be taken to avoid giving the horse tasks beyond his ability and especially is this so with spirited horses which may easily through errors of the trainer's judgment be made into balkers and thus ruined.

In going up steep ascents the horses should move slowly pull steadily. To rush teams up steep ascents is pernicious harmful.

All difficult tasks should be approached quietly, the driver fraining from any unnecessary movement, noise, or excitement.

Horses when drawing well should never be struck with the whip.

If they manifest a disposition to quit they may be threatened at the particular instant of stopping. They should not be allowed to jump against the collar, as this bruises the shoulders.

The load should be moved by the united, simultaneous action of all the horses quietly working together.

A horse in heavy draft requires a firm support on the reins. This is especially the case when the footing is at all precarious.

Artillery horses should not be taught to jump, as by jumping over an obstacle a team horse generally bruises his shoulders, and, as the horses of the team do not jump together, each one, as he in turn comes against the collar, attempts alone to move the entire load.

As a rule, shallow ditches, ridges, etc., should be approached at right angles, as when passed through or over obliquely there is not only the possibility of upsetting the limber but in addition the pole is thrown sidewise and disturbs the balance or footing of the wheel pair.

The new horse, harnessed in a well-broken team, is first driven through or over obstructions without being hitched to any vehicle. When he passes the obstruction without altering his gait, the team is harnessed to an empty caisson, and when he works well here the resistance is increased gradually.

The most difficult haul is up a steep side-hill where the carriage slews. Here the team must be kept pointed obliquely toward the crest of the hill to such an extent as to prevent the carriage from slewing out of the road.

In all cases where not all of the horses of a team have good footing at the same time, such as in passing ditches, low walls, mudholes, etc., drivers whose pairs have good footing must make special efforts to keep the carriage moving until all secure a footing.

Assignments After Training

As a general principle, horses under seven years of age should habitually be employed as off horses; but they should be trained to work in any position in the team, or as individual saddle horses.

Other guiding suggestions: The heaviest and strongest horses should be placed in the wheel pair on account of the extra work of this pair in turning the carriage and holding it back on down grades. In any pair, the horse of the best saddle conformation and most durability should be the near horse, and the freest mover should be the off one. If both are of the same disposition and similar conformation they will work in better harmony.

THE NECESSITY FOR A GENERAL STAFF IN THE STATE MILITIA

BY CAPTAIN JOHN F. O'RYAN, 1ST BATTERY, F. A., NEW YORK

A consideration of the state of efficiency of the organized militia in the several states shows that while they are handicapped by constitutional and statutory provisions which make for inherent weaknesses, and while they suffer in many instances from lack of adequate financial support from the state, the greatest drawback to military efficiency is in many cases the opposition to progress within the forces themselves. This opposition is seldom wilfully unpatriotic, or knowingly selfish or politically expedient, but is due for the most part to the fact that progress involves a change of conditions, which for perfectly human reasons is often distateful to those who have lived under those conditions for a long period. Carlise said, "Change indeed is painful, yet ever needful." It is needful in the organized militia of many of the states today, and, to hasten its advent, the organization of a General Staff system in each state having a considerable military force will be found a desirable in- strument. These conditions are not peculiar to the organized militia They have been the bane of military establishments the world over, and it was to counteract their evil effects that the Prussians devised and adopted the General Staff system in the year 1808. Since the Prussian General Staff was organized the Prussian army has not suffered defeat. All the countries of continental Europe and Japan found it necessary to adopt the Prussian system. Prior to and during the South African War, the British had no General Staff. The unpreparedness of the British army in that war is significant. What our Federal Government found necessary in this connection will be referred to later on.

Let us consider the conditions which have caused government to adopt the General Staff system for the maintenance of their armies in the highest state of efficiency attainable. The organization of an army is generally divided into two classes, the line and the staff. The line fights; the staff feeds and maintains. The latter theoretic ally should be auxiliary to the former. As armies increased in size, however, as armaments became more technical, equipment more complicated,

and warfare more scientific, the various departments into which the staff had been subdivided grew in importance and power until they became coordinate with or even dominated the fighting branch of the army. At the same time the same advances affected the line, so that it became axiomatic that no man who ever lived could as efficiently prepare a force for war under modern conditions as could a body of officers organized as a General Staff. As General Theodore Schwan, U. S. A., said when the subject of a General Staff was under discussion in this country, "Let the war office be held by the ablest and strongest man living and he would stagger or be crushed under the labor and responsibility falling on his devoted head." The General Staff system, therefore, provides a means for controlling the staff departments, limiting their influence and coordinating their powers and energies, while at the same time planning and supervising the education of officers, the training of troops, the obtaining of militiary information, and the preparation generally for a possible state of war. But it did more than this, for it recognized human shortcomings and the principles of the psychology of command, by providing that the personnel of the General Staff should not be selected by the senior general in the same manner that he would select his own staff, but service on the General Staff should be limited to officers of special qualifications and abilities selected by a board appointed for that purpose and whose term should be limited to a period of years in order to lessen the possibility of stagnation.

The General Staff system recognized the modern principle that the army exists to support the laws of the government and not for the vanity of kings: that the army is of a greater importance to the government than the glory of any commander it might have. And so, to insure sufficient independence of thought among its membership, the usual plan adopted was to provide the necesary members through the medium of a board sworn to make such selections for the best interest of the service, instead of having them made by order of some one officer. To insure that the staff should possess continuity of esprit the details were made so that each year but a small percentage of its membership returned to the general service, their places being taken by the new selections for that year. This method insured a yearly flow of new energy, new mentality, and new ideas into the system, while inevitably and automatically those who would block the wheels of progress were retired at the end of the period of detail and were usually not elegible for another detail until they had served for a stated period in the line.

The difference between such a staff and a personal staff must be

immediately apparent. The difference in efficiency must be equally apparent. Yet each is best suited for its own purpose. To illustrate this, let us compare the genesis of a General Staff with that of a personal staff of a commanding general, and consider the customs and ideals which should affect and do affect their respective memberships. Many have claimed that the successful military organization is based on one-man power, and that on one man should be placed the responsibility for success and he should be provided with such number of officers to be selected by him as are necessary to assist him in all the fields of military endeavor which affect success. This principle is correct with respect to military operations which involve command. It has not true application to the vast field of work covering the preparation for war. In a personal staff the officers composing it owe their selection to the commander personally. A responsiveness to the commander's views, opinions, and sometimes even mannerisms, follows. Custom requires loyalty of the staff not only to the commander's expressed views but to his comfort and habits. A commanding general should have such a staff, and its members should be prepared to go to the limit of their powers to make successful his plans and operations. But in the other field of work, that of the preparations which lead up to the operations in the field, that domain not involving command but where new ideas and plans, new legislation, new applications of military principles, are to be advanced, investigated, studied, tried out, adopted or rejected, it may well be imagined how much originality, progress, and advance may be expected from the personal staff of a commanding general if the general whom they are serving is not progressive. Yet some of the greatest and most progressive geenrals of their day under the old system held important posts after they ceased to be progressive and at a time when their minds lived largely in their great past. The greater such men had been, and the greater the service they had rendered the country, the more difficult was the problem presented of lessening the evil effects of their lassitude, for the public regarded such men as national heroes who must not be disturbed or humiliated. The difficulty of inaugurating the General Staff system has been that in practically all countries it was opposed first by the element who are constitutionally opposed to all change and second by those who feared that it would operate against their interests. The senior line generals in the various armies were frequently men who had obtained promotion by reason of service rendered the nation in war. Many of them were national heroes. They were looked up to, admired, and respected by the public. But they were human, and

the greater their experience in past wars, the more apt were they to live in the past, to revere the things of the past. They had been successful with certain equipment, why change to a type which had not stood the supreme test of war? They had operated under an organization which had fulfilled the conditions of the past, why introduce innovations in present or future organization? Age dislikes innovations, and the senior generals were most often men past middle life. Their age, seniority of rank, and the hold which they had on the public esteem, often made the progressive proposals of younger officers seem like positive impertinences. At any rate such proposals were most frequently passed upon and disapproved by the senior generals in the routine of their duties. For progressive officers under such circumstances to attempt to force reforms would have constituted conduct prejudicial to discipline, for, under the old system, it was the right of the senior generals in most cases to approve or disapprove proposed reforms. To affect adversely the standard of discipline would have been worse than to forego a desirable reform. And so the plan of the General Staff system was adopted to provide a method of introducing reforms, adopting new ideas of organization, advanced education and training, without treading on the toes of the senior generals. In an article on "The Evolution of a General Staff" in the Journal of the Military Service Institute, 1903, the author says: "If the act provided nothing more than an abolition of the office of Commanding General of the Army and the substitution of a Chief of Staff, it would be worth all the efforts put forth to secure its passage. This one clause removes a condition obnoxious to all military business principles, and will undoubtedly induce harmony and more effective administration." And yet the commanding general of our army at that time was General Nelson A. Miles, whose superlative record as a soldier was so well recognized that no one would seriously claim that the plan to abolish the office was any reflection on him. It was a principle of organization that was involved, not a personality. The theory of the General Staff system is therefore to recognize that there is a vast field of military knowledge and preparation which must be kept abreast of the times, which is too vast for one man to grasp, administer, control and apply, which cannot be satisfactorily disposed of by a personal staff, and which can only be best handled when entrusted to a board of officers so organized as to be annually infused with new vitality, thought, ideas, energy, and mentality, while at the same time maintaining a continuity of existence, purpose, and esprit.

Before coming to a consideration of the proper organization of

a General Staff for the organized militia of the several states, let us first consider what organization was adopted by our federal government when the decision was made in favor of a General Staff system. Having in mind the necessity for an uninterrupted stream of vigorous effort flowing through the staff, the federal statute provided that service on the staff should be limited to four-year details from officers of the army at large. The next step was to allow the selection board a wide latitude in the selection of the offices to be detailed, consistent with the principle that the younger and more active officers should predominate. And so it was enacted that the General Staff Corps should consist of forty-six officers, four of whom should be officers not below the grade of brigadier-general, four colonels, six lieutenant colonels, twelve majors, and twenty officers of the grade of captain or first lieutenant. It will thus be seen that out of forty-six officers composing the Corps, the number of colonels is limited to four, or about eight per cent of the total: that not only are first lieutenants eligible for detail, but captains and first lieutenants by law constitute nearly half the strength of the Corps. This plan was adopted after a full and exhaustive study of the working of the General Staff system in foreign armies, and experience has demonstrated its efficiency in our own service. It is to the lasting credit of our regular service and a commentary upon the progressiveness of some of its senior officers that they were among the strongest advocates of the system.

Now, as to the conditions in the several states: Summed up, it may be said that for years the states have suffered from the effects of the authority of the old civil war veterans or from the influence of some of the military legacies left by them. This is of course no disparagement of the deeds or the worth of these men, but furnishes a practical illustration of the psychological principle that seldom does an old man's mind willingly take up new means to meet new conditions. The young men of today will inevitably become the old men of tomorrow, and they will undoubtedly possess the same foibles, for they are inherent in advanced years. In most states the adjutant-general is the active head of the state militia, and many of the adjutants-general were until recently veterans of the civil war, or, where they were without previous military experience, were under the influence of old veterans in the adjutant-general's office. It is possible that in some states this influence or atmosphere still exists and exerts an influence for extreme conservatism, which is the parliamentary phrase for backwardness. Without further analyzing the source or character of their conservatism, it must be apparent to

the critical observer that militia progress has been slow; so slow, in fact, that many young officers who have been commissioned and who have entered upon the discharge of their duties with the enthusiasm and ambition and progressiveness of youth, have been first chilled and disappointed and finally intellectually frozen and disgusted by the dominating apathy and conservatism of constituted authority, Then they have resigned their commisions. The General Staff system is the remedy for these conditions. The average governor is not sufficiently interested in, nor has he the time to adequately study, the state and needs of the militia and the military demands of the government. This should be done by a General Staff Corps. As the organized militia of the several states varies in number from none in Nevada to sixteen thousand in New York, not all states have a force of sufficient size to warrant the organization of such a Corps. On the other hand, it should be remembered that numbers have little bearing on the question of the necessity for such a Corps. If Nevada, with no troops, had an efficient General Staff Corps, of a dozen officers, it might be much stronger in a military sense than a state with three thousand uniformed troops and no General Staff Corps, for the General Staff of Nevada might exhaustively consider and determine the possible military needs of the state, the military obligation of the state to the federal government, the methods of enrolling the unorganized militia of the state, of organizing, equipping, and training that force when organized, of establishing military depots for supplies and equipment, of the selection of officers and their examination for commissions, of providing a code of military laws and regulations for the government of such a force, of the preparation of military maps of the state, and recommend to the governor and have approved by those in authority the necessary laws for the adoption of their plans. But whether or not it would be advisable for states with a very small number of organized militia to provide a General Staff Corps, it is submitted that those states with more than say three thousand troops can by the organization of such a Corps vastly increase the esprit and efficiency of their military forces.

Let us assume that in the state of X, a General Staff Corps consisting of the adjutant-general, one general officer, one colonel, two majors and four captains, have been provided by statute. The officers to fill the details have been selected by a Board appointed by the governor and sworn to select the most capable and progressive officers available in the state. Let us assume that the state provides that the period of detail shall be three years, and that the first year

three officers are appointed to serve one year, three for two years and three for three years, so that after the first year the period of detail shall be for three years, three officers leaving and three new officers succeeding them each year. Meetings are held at least once a month, members receiving the pay of their grade when attending. In order to illustrate the practical value of such a Corps in the militia, let us attend the initial meeting of this hypothetical Staff in the state of X. Meeting called to order 2 p. m. at the office of the adjutant-general in the state capitol, with the adjutant-general as chairman. The order constituting the Corps and making the details is duly read, a recorder is designated, and some of the members are beginning to wonder if they had not better adjourn, when Captain A. addresses the chair as follows: "General, there is one aspect of our national guard service which I do not like. I refer to the possibility of an officer or enlisted man being tried by a civil court for an act performed in the line of duty when called in aid of the civil authority. It may well happen that, due to public clamor and excitement, a soldier tried by a criminal court would be sentenced very unjustly. At such times he should be liable to trial only by a military court, as is the case in New York state. Since I received the order detailing me to this Corps I have examined our military law and find that there is no provision to protect our soldiers from possible abuse in this regard. I move you, sir, that we proceed to draft an appropriate amendment to the military law of the state to cover this matter, and recommend to the governor that it be enacted into law." Then Colonel B. follows: "General, I rise to oppose this proposition. I have been forty years in the service of our government and state, and I have yet to see a man wearing the uniform of our state subjected to unfair treatment by a civil court. It is bad business, this tinkering with laws. We have gotten along with this law for over twenty years without amendment, and if it has served us sufficiently well during that period I submit it will answer for another twenty years. Why, I helped to draft this law twenty years ago." Major C. then follows: "This question is one which had not occurred to me. I can see the importance of it. In answer to Colonel B., I would say that the fact that the law has stood so long without proper provision for our protection is no reason why we should continue without protection. Because a man has discovered his failure to renew a fire insurance policy is no reason why he should continue his neglect after discovering it. Now is the time to provide an adequate provision of law to protect our troops, not after the occasion for its application has arisen. I second the

resolution." The vote upon the resolution follows, and it is carried six to three. A committee consisting of Major C. and Captain A. is appointed to prepare a draft of the amendment and submit it at the next meeting. Captain B. now addresses the chair as follows: "General, while we are on the subject of the military law, I would invite this Board's attention to the fact that there is no adequate provision for military courts. We have not the power at present to enforce attendance at drills by adequate punishment. I think the committee just appointed should include in its report a statement of what is provided by the laws of other states in this connection, and a draft of a bill to provide us with military courts having adequate jurisdiction and powers to enforce its sentences." General A.: "I trust this will not be done. Our men are volunteers. We would not get any recruits if we punished them for failure to attend drills. Forty years ago I was a private in the Booneville Fusileers and we drilled once a month, and we could drill some. Now our men drill as much as once a week, that is, when they drill. We have reached the limit now." Major B.: "Gentlemen, I find that in the commands where discipline is best the interest of the men is strongest and attendance most regular. I know commands where the men drill twice a week and like it, because the work is practical and interesting and they are proud of their correspondingly increased efficiency. I think the committee should make this report, and we can then consider the advisability of adopting it." This is agreed to. Captain C., who up to this time had not offered any suggestion, now addressed the chair: "General, I would like to ask what system now exists in this state to provide units for state service to replace those ordered into the federal service by the President?" The chairman: "None that I know of." Captain C.: "Then it seems to me, sir, that it is an important part of the duty of this Board to work out a plan to cover this contingency, which, is sure to arise. It occurred at the time of the Spanish-American war, and it caused much confusion. It is, I believe, also true that we have no approved plan to keep organizations ordered into the federal service supplied with recruits. In the civil war, one of the most serious defects was the practice of recalling a veteran regiment from the front when its ranks were depleted and sustituting a raw regiment with inexperienced officers, instead of feeding the latter into the veteran regiment as required. This practice provided a means of giving to new officers higher command than they would have received under a proper system. Now is the time by adequate legislation to prevent a recurrence of such a scandalous practice, and I think a committee should be appointed to

study and consider this subject and report a plan for adoption as the policy of this state, and I so move. As the work of this committee will involve much time. I think it only fair that they should be allowed their pay and allowances for such days as are necessarily devoted to the work." Colonel B.: "Gentlemen, before we go any further I wish to put myself on record here. Although I am a member of this Board, I was opposed to the bill which provided for its organization. As I stated before, I have been forty years in the service, and I have heard more radical measures and plans proposed here today than I have heard before in the entire period of that experience. What I have heard here today convinces me that this Board is a dangerous body. It may disrupt our guard. Why, gentlemen, if we go on the way we have started, the first thing we know this guard will be good for nothing but to fight. I tell you, sir, we will have to be less radical." Captain A.: "Colonel, if the mission of the soldier is not to fight, what is it?" Colonel A.: "That may be true, sir. but——" The adjutant-general, interrupting: "There is another aspect to the work of this Board which must not be overlooked. There is no specific appropriation for it. Any funds expended in connection with its work must be taken from the general fund of the adjutant-general, which is small enough. Now, this year I wish to give new furniture to the —th regiment for use in its entertainment room. I have dress uniforms to supply to Troop Y. They have been without them for years and cannot go another year in their present condition. There is also the expense of engraving a large number of brevet commissions for officers who have served more than 35 years in the guard. For this reason, aside from any other, I do not think it practical at this time to take up the proposed measure which has been suggested." Major A.: "General, I have thus far been a listener to the proceedings of this Board, and they have interested me very much. I have been in the guard for some years, and by reason of habit I suppose have drifted along without ever having considered the conditions and contingencies which have been referred to. I know and understand the traditions and long established habits of the guard. I am not an iconoclast, but, nevertheless, I am convinced of the correctness of this proposition, namely, that the militia exists solely for the purpose of upholding our laws, both national and state. To do this, it must be prepared to fight, and to fight not as a disorganized, disease-ridden mob, but as a force of efficiently organized and disciplined troops, equipped and trained to perform any duty which it may be called upon to perform. I think, therefore, that the expenditures of

moneys which are necessary for this Board to carry on its important mission should be approved by the adjutant-general, even at the expense of the dress uniforms and brevet commissions mentioned. I think that later, upon a proper representation to the governor and the legislature concerning the importance of this work and the necessity for funds, funds will be provided. I would also frankly say that this meeting has opened up to my mind a vast field of work which it is imperatively necessary that this Board should enter upon without delay. I only marvel that we have drifted along for so long a period without consideration of these matters. This Board should be subdivided into permanent committees for the purpose of expediting business, and all subjects which are considered and reported upon by such committees should later be considered by the Board."

We will now leave the Board to conclude its initial meeting and its members to depart with minds filled with various emotions. The many important and fundamental things which should be considered by such militia boards have only been touched upon in the hypothetical meeting which we have just attended; but enough has been shown to illustrate the necessity for such boards in most of the states.

The future of the organized militia is a great one, if we will make it great. Every officer, before he gives attention to matters which are broad enough to come before such a board, should, for the purpose of preparing himself to consider such matters with a proper breadth of view, read "Upton's Military Policy of the United States," which covers the militia of the old days and its shortcomings, and should study the Swiss military system to gain some notion of what is possible of attainment by a national militra.

There should be greater intercourse among the military of the several states. This is possible with a General Staff system in the states. There should be more frequent and sympathetic conferences between the federal General Staff and the military of the several states. This would be aided and fostered by the adoption in each state of the General Staff system.

We are all interested in the same end, the reasonable preparation of our country for possible war, and anything which will materially aid in this is desirable and it is our duty to provide it.

THE CAMP OF INSTRUCTION FOR NATIONAL GUARD FIELD ARTILLERY OFFICERS AT FORT RILEY, KANSAS, JUNE, 1910

BY CAPT. ROBERT H. TYNDALL, BATTERY A. FIRST FIELD ARTILLERY, INDIANA

Should there be any doubt in the minds of men interested the national guard as to the value of summer schools for officer similar to the one held last June at Fort Riley, Kansas, for field artillery officers, these doubts would be dispelled by noting the creased efficiency at maneuvers and target practice of the office who had previously attended that school; for the school work was such that when the artilleryman later attempted to accomplish technical result he knew exactly what he was after and had a much clearer idea as to the method to be employed than he ever had before.

Wars in which the United States has been engaged have shown that men with more than average intelligence could be easily pro- cured as enlisted personnel; and there is every reason to believe that the same conditions will prevail again should the country ever be so unfortunate as to have to take up arms. In an organization of any arm there is always a certain number of men whose duties are com- paratively simple and quickly learned by men of the intelligence volunteers. But there are other men whose duties are more involved, and such men require training. Not only has the number these men greatly increased in field artillery in recent years, but the amount of training some of them must possess has still further increased. At the head of men requiring training stand the officers. More than ever does the efficiency of the entire organization for practical field work depend upon its officers.

While the business of field artillery is to assist the advance of our own troops, and more especially the advance of the infantry on the battlefield, it must be borne in mind that this assistance is purely that of fire, and that fire is effective in proportion to its accuracy and volume.

Every one who has kept track of the development of field artillery in recent years knows that our present 3-inch rapid-fire gun is a wonderful machine, and that, while it is capable of tremendous effect, it may, on the other hand, be a very ineffective weapon in the hands of inexperienced men who have not by previous work familiarized

themselves with it. Like all machines, it is only as efficient as the operator makes it. The finest automobile ever built is useless in the hands of a man who does not know how to operate it; and it is the same with this gun.

Our drill regulations state principles and give general rules. The trouble comes when we try to apply them to particular cases No two situations in the field are ever exactly alike, and, consequently, in the concise text of the drill regulations, we never find the solution of the particular problem we may have in mind. In other words, a well-instructed officer finds the regulations quite satisfactory; to the uninstructed, they are not so clear. One result of the summer school at Riley was to make the regulations more intelligible to the uninstructed officer.

In all maneuvers, field artillery is small in numbers as compared with infantry and cavalry. The result is, that most of the attention of "the powers that be" is concentrated on the two latter arms. Add to this the prevailing idea that field artillery is quite technical, and there generally results a state of affairs where the arm is placed in an almost impossible situation and is there left to work out its own salvation without competent instructors to assist. Hence the field artillery gets practically no instruction from participation in the ordinary combined movements.

The Fort Riley school was based on the idea that a man must first learn the technical part of his work before he is in a position to cooperate with other troops. In other words, he must be able to handle his battery when he is alone before he is in a position to intelligently use it in combination with other troops.

There is no better way of learning *how* to do a thing than actually *doing it* under the supervision of competent instructors; and this seemed to be the central idea in the Fort Riley instruction camp. The reservation contains almost thirty square miles, with a very varied terrain, and is the station, among other troops, of the entire Sixth Field Artillery, the only horse artillery regiment in the regular army. All the facilities of the reservation and regiment were placed at the disposition of the camp instructors, and much of the success was due to these two features.

There were about ninety visiting officers of the field artillery of fifteen states present. These officers, with about eight officers of the Sixth Field Artillery, were placed in camp, upon a well-selected site, with Captain Birnie's battery, the whole being under command of Captain William S. McNair, Q. M., Sixth Field Artillery. Horses, mounted orderlies, and men to care for the tents, were provided by

this regiment, and an officers' mess was run in the camp by the Bakers and Cooks School located at the post. The visiting officers, being thus made comfortable and not having the care of an organization to distract them from their work, were divided up into group of about ten men to each regular army instructor, and were thus enabled to make rapid progress. It is not too much to say that more ground was covered and more real progress secured in this short encampment than in all that has ever been done before for the militia field artillery officers. As near as can be recalled now, the course was about as follows:

8 a. m. to 9 a. m. daily: Mounted work, beginning with selecting positions, reconnoitering approaches, installing the battery therein, etc., the work being criticized by the instructors.

10:30 a. m. to 12 noon: Dismounted work in use of battery commander's telescope and ruler, care of material, adjusting angle measuring instruments, etc.

2 p. m. to 4 p. m.: Computation of firing data for indirect laying.

4:30 p. m. to 5:30 p. m.: Attending stables.

This gives only a rough idea of the work, there being much other instruction either "sandwiched in" or given later in the day, such as witnessing mounted inspection, inspection of field artillery redoubts, lectures on rations, sanitation, battery lines of communication, fresh beef inspection, handling kitchen accounts, gunnery, participation in the indoor conduct of fire (under Capt. W. S. McNair , who introduced it into the United States service), practice march over roads that were regarded by the average militiaman as simply impassable on account of grades, washouts, and slipperiness, that did not "phase" the regular battery, pitching shelter tent camp, terrain rides, practice in giving firing commands, and making corrections for assumed errors in calculation of firing data, inspection of the barracks, stables, gun-sheds, shops, etc., of the entire regiment of the Sixth Field Artillery; practical demonstration in equitation and riding by the Mounted Service School, witnessing target practice of Captain's Birnie's battery in both direct and indirect laying, handling the regular batteries completely officered by the national guardsmen, etc., etc. For this latter purpose, the commanding officer of the Sixth Field Artillery turned over his entire regiment to the visiting officers.

As the "instructors" lived in camp with the "students," the was ample opportunity to ask questions and clear up any doubts that had arisen on any point. The result was, that the evenings in

"Camp P-T" (as the visitors named it) were also taken up in instruction.

Not the least advantage in Fort Riley is the artillery atmosphere there. All the regular officers of the regiment seemed to think and talk artillery. It was business with them. And again, the presence of field artillery officers from the national guard of so many widely-scattered states almost amounted to a convention, and much good resulted from an interchange of views.

What most impressed me personally was the mobility of the regular batteries—their ability to go anywhere—and the smoothness and rapidity with which the firing battery worked. The latter is a matter of practice, and the same result can be obtained in a militia battery if we drill sufficiently; but for the former, we must have horses, a small number permanently belonging to the battery, and we can never possess much mobility until we do have these horses.

But in looking back at the camp I can see so many good results that were accomplished that it is impossible to pick out the best. As in all experiments when first tried, there were some mistakes; but these were far outweighed by the good things, and it is to be hoped that the encampment will be continued yearly, for it will be of great benefit to the organized militia.

INSTRUCTION OF SCOUTS AND AGENTS

BY 1ST LIEUTENANT CORTLANDT PARKER, 6TH FIELD ARTILLERY, U. S. ARMY

The instruction received by scouts and that by agents is identical. Besides instruction in signal and telephone duties it should embrace the following:

1. The use of field glasses, and the use of B. C. ruler and hand in measuring angular distances in mils.
2. Orientation.
3. Map reading.
4. Sketching.
5. Making written and verbal reports.
6. Instruction in the service of:
    a. Ground scouts;
    b. Route markers;
    c. Position reconnaissance;
    d. Security;
    e. Observation of the battlefield;
    f. Observation of fire;
    g. Reconnaisance of targets.
7. Duties of courier.

The Use of Field Glasses

Service glasses are used in this instruction. Each man is taught to focus a pair of glasses and describe minutely what he sees in a limited portion of the terrain. The instructor checks all observations with his own field glasses.

The Use of the B. C. Ruler and Hand in Measuring Angular Distances in Miles

In this instruction it is not desired that the personnel be taught to measure deflection for the guns, but that each man be able to measure the angular distance between two objects in his from This instruction finds its application in the service of observation of the battlefield, in the service of observation of fire, and in the service of reconnaissance of targets.

The letter T at one end of the ruler, and the figures 61, 62 and 63, and the figures 0, 1, and 2 in heavy letters are disregarded. Attention is called to the fact that the scale runs from left to right on

top of the ruler and from right to left on the bottom of the ruler. The knot on the string is previously adjusted by the instructor and the men are taught to hold the knot against the cheek bone under the eye, and to measure angular distances of one object from another, *i. e.* "one object is so many miles to the right or left of another."

The hands of the men are then calibrated. For this purpose the instructor, using a B. C. telescope, causes white stakes about six feet high to be set up about 200 yards from the telescope, on a line normal to the line joining the stake and the telescope. There should be 100 mils between the two left stakes and 5 mils between the remainder of the stakes to the right. These latter should number about eight. The men are cautioned to extend the arm to the limit, back of hand toward the face, tips of fingers up, palm verical, and in that position measure the front covered by their four fingers along the line of stakes. On a piece of paper are noted the following:

Width of finger at second joint ..... mils
Width of four fingers at second joint ..... mils
Width of thumb ..... mils

This data is preserved to be pasted in the men's notebooks.

The hand being calibrated each man is required to measure angular distances as before, using handbreadths as a unit, then to measure angular distances with his hand and give the result in mils.

Orientation

For this instruction the men are assembled in a room and the instructor draws diagrams on a blackboard illustrating his remarks.

The instructor explains what the cardinal points are and teaches the men the names of the intermediate points. The instructor draws on the board a diagram of the North Star, the Big Dipper, and Cassiopeia.

At the first convenient opportunity the men are taken outdoors and required to practice the three methods of orienting themselves—by compass, sun and watch (or sun alone), and the stars, as explained in books on map reading.

Map Reading

The men are taught the meaning of the word map and the difference between a geographical and a topographical map, and what

the scale of a map is. It is explained that in making a topographical map two things are required, viz.: (1) representing the shape of the surface of the ground; (2) representing the objects, natural and artificial, that are on the surface of the ground.

To teach the men to recognize on the map the objects, natural and artificial, on the surface of the ground, they are required to make copies of the authorized conventional signs until they can recognize any of them.

To teach men to recognize the shape of the surface of the ground, they must, of course, be taught the meaning of the contours, A rational explanation for the use of contours, to a beginner, is to state this: That the shape of the ground *may* be represented by covering the map with points and by placing opposite each point its elevation in feet, but that this is inconvenient as it covers the map with figures and, moreover, the shape of the ground is recognized with difficulty. Therefore the method of joining on a line all points of the same altitude was adopted.

Then hill forms, valleys forms and all topographical forms an illustrated by sketches until a contoured map is legible to the men. A sand box may be used also. Finally the men are taught to deduce the grade of a road from an examination of the map.

The instructor should provide himself with a dozen or so different sheets from the Geological Survey, and with a like number of the maps of the military reservation. These should be constantly referred to in the instruction. The men are taken indoors and are given exercises in the following, using the maps:

1. Orienting the map:
   a. Knowing the position of the cardinal points;
   b. Not knowing them, but knowing the position occupied, ground and map.
2. Finding the point on the map which you occupy on the ground.
3. Study of the terrain around a point, being oriented and located.
4. Following a route indicated on the map.
5. To make a rapid sketch from a map.
6. Then, without their maps, to follow a route indicated on the map, previously committing to memory the route as indicated on the map.

Sketching

Instruction in sketching should conform to the methods specified in text books on the subject authorized by the War Department. Proficiency in the use of the service sketching case is required. The men are required to sketch dismounted first, having previously made a suitable scale. Then sketching mounted is taught.

After the instruction in sketching is fairly on its way, the instruction in map reading is repeated. Many things not previously understood by the men, will then become clear to them.

Instruction in Making Reports, Written and Verbal

This instruction should be left to the last. The instructor requires the scout to ride over certain country and make a written or verbal report, as desired. He may also require the scout to submit a sketch of the same.

The artillery commander may or may not specify the particular points on which he wishes to be informed. Therefore, the scout should be able to make a report giving all desirable information on the terrain reconnoitered. The features to be reported on may be the following:

1. A road; 2, a railroad; 3, a water course; 4, a swamp or marsh; 5, a wood; 6, a habited place.

In order that the scout may overlook nothing of importance concerning these features his notebook is provided with the following reminders, which he should read over before he leaves on his duty and during the performance of it, making appropriate notes in his notebook.

1. Report on a road:
   - General direction .....
   - Total distance observed .....
   - Material of the road: earth, macadamized, sandy,
   - Condition of the road: dry, boggy, cut with deep ruts, rocky, smooth, solid roadbed, or soaked through and slippery.
   - Widths: Artillery can go in section column, in double section.
   - Grade: Artillery can travel over it, or cannot.
   - Gaits: Artillery can trot over it, or cannot trot over it, or may trot only between ..... and ..... etc.
   - Defiles: At (such and such) bridges, railroad crossing, or passages through towns, or at (such) an obstacle in the road.
   - Country alongside the road: The road is mostly cut, fill, or surface. Fences, what kind, generally, and how far along road. Artillery can or cannot leave road. If it can at ..... points. Neighboring country practicable or not for artillery.
   - Nature of the surrounding country: Crops, meadowland, woods, waste lands, or marshes.
   - Water: Where best obtainable along road, and for how many animals at once?
   - Miscellaneous: Supposing the enemy to be located at ....., the road is concealed from the enemy from ..... to .....
2. A railroad:
   - Number of tracks.
   - Length of railroad observed.
   - Location and extent of cuts and fills and whether they are passable or not for artillery.
   - Grade crossings on the road from ..... to .....

3. A watercourse:
   - Length of watercourse observed. Average width and average depth. Strength of current: slow, swift, rushing.
   - Bottom: mud, quicksand, hard, rocky.
   - Banks: Vertical, high, low, of crumbling earth, hard or wooded.
   - River can be crossed on pontoon, trestle bridge, ferry.
   - Bridges are located at ..... Of these the following are not practicable for artillery:
   - Fordable generally, or not.
   - Fords located at ..... Of these the following are not practicable for artillery:
   - Obstacles are or are not placed in the fords.
   - The ice is ..... inches thick.
4. A swamp or marsh:
   - Length and width.
   - Average depth of water.
   - Nature of bottom.
   - Location of fords.
   - Location of roads through swamp.
5. A habited place:
   - Number of inhabitants.
   - Number of stores and places of supply for men and horses.
   - Ways of passing through town.

General Remarks on the Use of Scouts and Agents with Artillery Commands

Whenever the enemy is known to be near, scouts must perform their duties with great caution, not for the sake of their own safety, but for the sake of concealment for our guns. The scouts should attempt to get all possible information and report it, but he must remember that the enemy is trying just as hard to find out what is going on over on our side. The apearance of horsemen on a crest coming and going may reveal the presence of batteries which are coming into position. This galloping around and exposure of scouts on a crest may have the gravest consequence not because the scouts may be hit but because it shows the enemy where our guns are going into position. Scouts and agents work in pairs whenever possible. On arriving near a crest both dismount behind the crest and one proceeds forward cautionsly, alone, on foot and looks over the crest. Scouts and agents must remember that the work required of their horses is most hard, and that therefore they must save their horse's strength and avoid useless galloping about.

Agents march in rear of the staff of the officer to whom assigned in alphabetical order of batteries, right to left. When at a distance from the enemy scouts may march with the sections to which they are assigned. When they are needed, the direction is given, "Scouts report to ———," or "Scouts of —— Battery report to ——," after which they fall-in in column of twos in rear of the agents, alphabetical order, front to rear.

It is understood that the scout ought to be of intelligence superior to the average enlisted man. In addition to this, he must always be attentive to what is going on about him, and especially must he be always oriented and always able to retrace a route passed over.

Instruction in the Service of Ground Scouts

This service has for its object the timely warning of the existence of obstacles and the ways of passing them, the guidance of the command on the right road through all turnings, and the guidance of the command through towns. This service is distinct from that of "marking the route" to be described below. The service of ground scouts is appropriately used when the command is marching off the road across country. It may also be used when marching over a road, if required. The fundamental rules for its execution are as follows:

1. The personnel engaged in this service must be able to see ahead further than the officer conducting the march of the column.

2. Each man engaged in this service must be able to see, at all times, both the man ahead of him and the man following him.

The officer conducting the march or his adjutant designates a non-commissioned officer to supervise the service of the ground scouts, designates the scouts to be used, who should not exceed two or three in number, and gives the command "Ground Scouts Out." At this command the non-commissioned officer conducts his scouts on the route to be followed, leaves one of them in sight of the officer at the head of the column, and proceeds on. The non-commissioned officer arranges the scouts as required by the principles above and is himself accompanied by the last scout. When he arrives at an obstacle he places his scout at the obstacle with direction to the guns for passing it, and moves on. The scout next the column halts at the obstacle, informs the officer conducting the march in time to avoid halting the column and moves on, when directed. If there is an obstacle whose passage will involve a change of formation, as from line into column, timely warning must be given.

Instruction in the service of ground scouts is carried on outdoors over a varied terrain.

Instruction in the Service of Route Markers

See par. 682, F. A. D. R., 1908.

A good method of marking the route is as follows: The scouts are numbered and the officers conducting the service of route markers start out, followed by the scouts. Having arrived at a point

where a marker is required, the officer posts No. 1, and proceeds, followed by the remaining scouts. No. 1 observes the direction taken by the officer and his scouts. Nos. 2, 3, etc., are posted in succession where required. When the column reaches No. 1 he shows to the officer conducting the column the direction to follow and taking an increased gait over that of the column moves on to No. 2's station, of whom he inquires the route to No. 3, whence he proceeds to No. 4, and so on. Having arrived at the post of the highest numbered scout, No. 1 is posted again, or not, as circumstances require. Likewise No. 2 having directed the column on to the post of No. 3 takes the increased gait and follows No. 1, to be posted beyond No. 1, if necessary. This operation goes on as long as desired. Great economy in the use of these scouts may be obtained by messages left with a scout such as to stay on a particular road until directed off of it, etc. If the officer conducting the service of route markers finds himself finally left without scouts, he may request the officer whose route he is marking to let him use the agents. If this is not practicable, the officer conducting the service of route markers may proceed with the officer whose route he is marking until the latter arrives at his destination, first directing the last man posted to stop at his post all scouts coming up and also the column. When the destination is reached the officer conducting the service of route markers returns to the last scout posted and, if the column has reached that scout, guides the column to its destination. If the column has not reached the last scout posted, the officer continues the marking of the route.

Instruction in marking the route will be carried on outdoors an individual man being used to represent the head of the column.

Instruction in the Service of Position Reconnaissance

Remarks.—This service has for its object the supplementing, by enlisted personnel, of the work of the reconnaissance officer. It will frequently be the case, in a cultivated and fenced in country that a reconnaissance officer will not, at first sight, be able to select positions for all the guns of a command, and that time will not permit a proper reconnaissance by one person.

METHOD OF INSTRUCTION

The Instruction is Carried On Indoors and Outdoors

For the indoor instruction the instructor, by a diagram on the blackboard of a vertical section of terrain, explains what an "open

position" is, and shows the positions of "slight derilade," "dismounted defilade," "mounted defilade," and "flash defilade." He instructs the men in the method of obtaining the last. He cautions them that the slope from crest to guns must not be too abrupt; otherwise the guns will not clear the crest. A diagram is also drawn of a "counterslope position," or a position on ground sloping toward the enemy, but defiladed from him by another rise in front.

He then instructs the men in the meaning of the terms "position for immediate action," "position of observation," and "position in readiness" (p. 110, F. A. D. R., 1908), and follows this by the explanation of the composition of a battery on a peace footing and on a war footing (pp. 192 and 193, F. A. D. R., 1908), and shows by a diagram the front in yards of a battery, battalion, and regiment in action. He instructs the men in the nature of positions desired for limbers, reserves, and train—not too far from the guns for resupply of ammunition and replacement of casualties and promptitude in limbering up, but still distant enough for concealment from the enemy and comparative safety from projectiles intended for the guns.

It is explained that if the defilade is taken against a battery which has a grove of trees in its rear, this defilade against the battery will not hold good against a hostile scout posted in one of the trees; also that if our battery takes a defiladed position on a rounded hill against a hostile battery in its front, this defilade will not hold good against a hostile observer posted considerably on the flank of the hostile battery. On account of these facts, it is directed that in selecting a position its defilade against any position possible of occupation by the enemy be noticed, as well as its defilade against the positions where the enemy is known to be. This completes the indoor instruction in the position reconnaissance.

The outdoor instruction will consist in the actual selection of positions by enlisted men. A tactical situation, including a position and strength for the hostile batteries, is assumed and scouts are sent out in pairs in a limited portion of the terrain to find positions, to report on the number of guns which may be placed therein at normal intervals, the maximum useful defilade obtainable against the hostile batteries, and the defilade of our guns when posted there against other positions possible of occupation by the enemy.

The scouts also report on the location of posts for limbers and reserve and concealed routes whereby the position may be occupied. In each case the scouts are given a fair time limit in which to

reach and reconnoitre the position, return and report, but an indefinite time is never permitted.

NOTE.—The officer conducting these exercises should, by a study of the map, or, if necessary, by actual examination of the ground, have prepared several good tactical problems before the personnel report to him, and should, himself, have already solved the problems to the men under instruction. Haphazard problems and critiques are of no value. A study of "des Exercises de Service en Campagne," by Aubrat, will be of value to an officer conducting these probelms and all other outdoor work with the personnel.

The Service of Security

Instruction in this service is carried on outdoors by the instructor, a special tactical situation being assumed by him and communicated to his scouts.

Remarks.—In the normal case, field artillery will be accompanied by the other arms and on the other arms will rest the duties connected with the service of security. But when the artillery advances beyond the bulk of the main body to take position, the amount of protection it may receive at this time diminishes and artillery commanders will take their own precautions. Likewise when having engaged the enemy a change of position is ordered, the artillery is threatened with chance encounters with small bodies and with danger from concealed sharpshooters. It must be remembered that one draft horse shot down when the column is moving on a narrow road, especially at increased gaits, will create a confusion which will materially delay the occupation of a position. To provide for the security of the march of the artillery in either case (an advance to position, or a change of position) the officer commanding the moving column causes to be organized a service of security to fit the particular needs of the case, and this, too, with the use of the least possible members. The great desideratum is *timely warning* of a danger. To this end advanced guards, rear guards, flank guards, and patrols, all of comparatively small force, may be employed. They must see as far as possible and at the same time have means of almost instant communication by means of prearranged signals (see last three lines, par. 675, F. A. D. R., 1908) with the artillery column. If the route is being marked the personnel engaged in that service may be of assistance in the service of security.

When the artillery is in position and receives the protection of the other arms the service of security will generally be properly executed if a scout is placed on each flank of the isolated group to observe and report on the movements of the enemy. But when the

artillery is in position and the other arms are not affording protection, as when an advance to a position is made ahead of the bulk of the main body, the officer in command of the group causes a service of security to be organized. Scouts are posted to the front and flanks to give timely warning of the approach of the enemy. The officer posting these scouts considers every avenue of approach open to the enemy, what means of escape of resistance our guns have, how long a time may pass before assistance from the other arms may be expected, and then posts his scouts in the best possible manner for the purpose of *timely warning*. He notifies the scouts of their particular and general duties and of his post, selected as near the guns as possible, and visible to the scouts, if possible, so that visual signals may be used. If a visual signal of danger is impracticable scouts are posted in pairs and messages are delivered by gallopers.

The Service of Observation of the Battlefield

Method of Instruction.—To train scouts to observe the battlefield they must first know how to describe in a few words what they see, then to locate what they see to another person's eye with considerable accuracy.

To teach scouts to explain in a few words what they see their military vocabulary and general knowledge must be increased. To this end explanation is made of the infantry attack, illustrating by diagrams on a blackboard. The tactics of cavalry, especially the process of dismounting to fight on foot, the normal charge, and charge as foragers, are explained. A description of the numbers, size and appearance of large units of cavalry and infantry is given, with the appearance of an advance guard. The scout is made familiar with the range of the rifle and the sound of a machine gun in action.

To teach scouts to locate what they see to another person's eye the instructor follows the principles of Pars. 455-458, F. A. D. R., 1908. To designate the position of a target which has an appreciable front the scout is taught to locate a prominent object, as explained in paragraphs referred to. From this prominent object to locate the flank of the target nearer the prominent object, then to state the front.

Thus, "To our right front, on the skyline, a farm house surrounded by evergreens.

"250 mils to the left of the farm house and on the skyline, a windmill.

"40 mils to the left of the windmill and concealed behind the crest of the skyline, a battery of six guns.

"Front of the battery, 40 mils."

Instruction may be begun indoors and use made of the terrain board. The scout is taught to locate to the instructor's eye an object on the board placed there by some third person. This instruction is repeated from time to time outdoors, the instructor requiring the scout to locate to a third person some object on the landscape.

Instruction in the Observation of Fire

The best means of instruction is the actual observation of fire. Scouts and agents of the element not firing should be required to attend and fill in a report similar to that required of officers shown below, the report to be turned in to their instructor. Previous to observing fire the men should be taught as much of the Rules of Fire (Pars. 387-413) and Observation of Fire (Pars. 359-386) as the instructor is capable of teaching. In this connection it may be mentioned that readings from the Drill Regulations on such a subject mean nothing to the average man, and the instructor must put things in a homely and simple vocabulary.

REPORT OF OBSERVATION OF FIRING BY BATTERY .....
..... 19
(date)

Range		Burst		Over or short	Deviation in mils	Remarks
Ordered by Battery Com.	Observer's estimate	No. in air. Height in mills.	No. on graze			

Respectfully submitted,

.....
..... th Field Artillery.

Instruction in the Service of Reconnaissance of Targets

The instruction is best carried on outdoors with an assumed tactical situation. The problem will generally consist in reporting on the strength, position, surrounding topography, etc., of hostile artillery which may be either completely defiladed against us, have mounted defilade or any of the other defilades. The hostile artillery is represented by some objects, preferably mobile artillery targets O and P, and the scouts are confined to a limited portion of the terrain. It is explained that the map will often help to show where a view may be obtained of the hostile defiladed batteries whose general direction only is known.

NOTE.—If a battery whose flashes are visible can be located on a map, and the examination of the map indicates that there can be but one crest concealing that battery, the hostile battery is fairly vulnerable, for—

> Flash defilade is 4 yards.
> The slope of most hills is not more gradual than one-tenth.
> Therefore the battery must be within at least 40 yards of the crest or thereabouts.

If we range on the crest and go back in increments of 25 yards, taking 3 such increments, the battery should surely be within the area searched.

The Duties of Couriers

See Par. 681, F. A. D. R., 1908.

A convenient method of instructing the men to learn and deliver verbal messages is the following: The men are arranged on the circumference of a circle of large radius, with 15 yards between adjacent men. The instructor goes to one man, gives him verbally the message, which the man repeats to the instructor; then accompanied by the instructor, he delivers the message to the next man, and so on. The message goes around the circle in this way and, if no error has been made the instructor waits until the message goes around, announces the original message and the message as finally delivered and tells who made the first error.

Before assuming their duties with batteries, scouts and agents should be equipped with a pair of field glasses and a compass (the two preferably combined), a watch, a pencil and a notebook. They should also have a pocket knife and wire rippers. In his notebook the scout should leave posted the memoranda referred to above, and besides other useful data such as the Myer code, etc., etc.

THE COOPERATION OF THE ARMS IN BATTLE

[Translated from Beiheft 117 zur Internationalen Revue uber die gesamten Armeen und Flotten, April, 1910, by Captain Oliver L. Spaulding Jr., 5th Field Artillery.]

In maneuvers, large and small, in militia lectures and discussions, and in professional publications of all kinds, the point most strongly emphasized of late is the necessity for cooperation of all arms, and more especially of the infantry and artillery. The more one studies military history the more is one impressed with this lesson.

The modern principles for the use of artillery were first! laid down and applied by Napoleon, as is shown by Lieutenant Bircher in an excellent paper in the Swiss Militar Zeitung. He was the real originator of the use of artillery in mass, for concentrated effect, which is the universal practice since 1870. The battles in Manchuria demonstrate that this principle, when intelligently applied, always gives good results, but Napoleon's application of it will long remain unrivalled. His massed artillery decided Austerlitz and later Bautzen. At Ligny the artillery of the Guard broke the enemy's center; at Mont St. Jean, Drouot's 72 guns not only prepared but accompanied the attack. So at Wagram the massed artillery decided the battle, and at Borodino it shattered the Russian columns of attack.

Napoleon's main attack was always begun and carried through by the infantry and artillery together. The cooperation of his different arms was always intelligent, and usually a model—which contributed not a little to the brilliant success of his tactics. His commanders knew how to secure this cooperation, and habitually did so. The power of both artillery and infantry, but especially of the latter, was thus greatly increased; and only in very recent years are we again beginning to demand as much in this way as he did.

In spite of the lessons of the war of 1870, and in spite of the faulty use of artillery before Pleuna and in South Africa, it was long before any of the Regulations contained a statement of the principles governing the combined use of infantry and artillery. Honig, with his clear, tactical insight, hit upon the true principles and explained them in his "Tactics of the Future." In 1870 the artillery was still

looked upon as a technical arm; Honig insisted that it be placed as a sister arm, on the same footing as the infantry.

Formerly artillery was actually massed to secure unity of action; today the mass effect is secured by the cooperation of separate groups under one command. Honig insisted that infantry and artillery fire be used to supplement each other; that each arm must rely upon the other, and that both together must constantly work together for the same end, the gaining of a superiority of fires as the necessary condition of success. The artillery of a division should be so incorporated in it that infantry and artillery are tactically one; that the last gun is ready to fight for the infantry, and that each arm thoroughly understands the other. Honig believed that all officers from the very beginning of their service should be required to study the principles and the spirit of the others. To have generals of infantry, cavalry, and artillery, is not logical; we need only one kind of general, but they should be at home in any saddle.

In 1870-71 the handling of the German artillery was not uniformly good, but nevertheless conformed in general to modern ideas; from then until the time of the Manchurian campaign we find no instances of its scientific use.

The effect of the Russian artillery fire at Lovtcha and before Plevna was most unsatisfactory. At Lovtcha, Skobeleff's 56 guns bombarded the Turkish positions for hours; it succeeded in silencing a few guns, but as soon as it ceased firing and the infantry advanced the Turks opened their rifle fire upon the Russian columns of attack unmolested. The same thing happened to General Dobrovolski's column, except that here the Russian infantry was exposed to the fire of the Turks during the artillery preparation of the attack.

Before Plevna things were even worse. From the 7th to the 10th of September the Russian artillery bombarded the Turkish positions. The Turks had no difficulty in finding cover from the fire, especially as the range was from 3,000 to 4,000 m.; they had a few guns put out of action, but their own fire was not without effect. On the 11th eighty Russian battalions advanced to the assault, but only 45 out of 444 guns could support them; the rest had fired all their ammunition, or were out of action. And it is instructive to note that the Russian attack was successful at the one point where it had artillery support and failed everywhere else.

An instance of better handling of artillery is found in the attack of Prince Mirski's column at Shipka, on January 8, 1878. A mountain

battery advanced with the 13th and 14th Rifle Battalions and supported the infantry attack; it then changed position, and by it effective fire determined the issue of the engagement. After occupying the enemy's position it held its own against superior Turkish artillery, and even against an offensive return by infantry. In this way Mirski's advance was made much more easily than Skobeleff's farther west; his guns were unable to keep down the destructive fire of the Turkish artillery west of Shenovo.

The failure of the English artillery in the Boer war was also due to incorrect tactical handling. Buller's operations in Natal especially were faulty in this regard. The bombardments of the Boer positions at Colenso and Magersfontein, by heavy naval guns were utterly without effect; when the infantry advanced to the attack, the Boer rifle fire was found as strong as ever.

The artillery wasted much ammunition in firing upon position which were in fact not occupied. In the attack on Tabanyama, six batteries fired for five hours upon the supposed Boer trenches. The result was zero; when the infantry tried to advance between Tabanyama and Spion Kop, it came under a destructive cross fire from the Boers, reinforced by a few well posted guns. The best General Clery could do was to withdraw his brigade, under the protection of the artillery.

At Spion Kop, January 24, 1900, the English artillery, though much superior in numbers, could not cope with the seven Boer guns, which had much better positions, and which inflicted severe loss upon the British infantry.

At Paardeberg, February 18, 1900, the English batteries on Gun Hill could not keep down the rifle fire of the Boers on the banks of the Modder River, and so could not properly prepare the attack of the Highlanders and the 13th Brigade. The guns on the left could not be used effectively, and fired upon targets not related to the real point of attack, such as the Boer camp at Wolvekraal. In this battle, every principle of artillery tactics was disregarded. There was no unity of command, no attempt was made to get any mass effect, and the guns did not properly support the infantry.

Taught by this experience, the English artillery at Driefontein did its best to support the infantry attack. Although the batteries did not all work together, still two horse batteries northwest of Cattle Kraal Hill did hold the Boer artillery on Signal Hill in check; while it was only the fire of the 81st Battery upon the Boer infantry that enabled the 18th Brigade to gain the Boer advanced position. And not until the 81st and 76th Batteries, changing position to the

front, had silenced the Signal Hill guns, did the Buffs, Welsh and Essex Regiments, supported by a heavy shrapnel fire from the same batteries, succeed in taking the Boer position on Alexandra Hill.

Artillery and infantry should be inseparable; their action should be united, both in space and time. The value of a preliminary bombardment as preparation for the infantry attack should not be overestimated. Although the war in Manchuria indicated that the importance of artillery fire had increased 50 per cent since 1870, and even better results are to be looked for with better handling, still it will never be the predominant factor in battle, and the main reliance of the attack will continue to be upon infantry fire. The percentages of wounds from infantry and artillery fire, taking an average from all reports, seem to have been about 85 and 15; in 1870-71 they were 91.6 and 8.4.

Against inanimate targets the effect of artillery fire is not great; sufficient cover can always be found. Even its effect upon living targets should not be exaggerated. Much greater is its moral effect, and this must always be reckoned with. Artillery fire to prepare an infantry attack means nothing whatever. The defenders will let the projectiles go harmlessly over their heads or explode in the parapets, as did the Turks at Plevna and the Boers at Paardeberg; when the infantry advances they will occupy the position, and meet the attack unshaken by the artillery fire. It is essential, then, not to allow the action of the infantry and artillery to be separated, either in space or time.

Perhaps the Japanese would not go so far as this; their infantry attack did not always receive the intelligent support of the artillery, although it must be said that the co-operation of their different arms was very good indeed. Paragraph 186 of the new Japanese Drill Regulations says: "Proper cooperation of all arms is the secret of success. But the infantry is the principal arm, and it must strike the decisive blow. It must be able to fight the battle through, even when not supported by the other arms."

A typical instance of proper co-operation of infantry and artillery is found in the attack of the 2d Guards Division at St. Privat. The advance of the infantry was supported by the divisional artillery battalion and the 4th Light Battery of the Corps Artillery, which advanced from their position between Ste. Marie aux Chenes and St. Ail to within 1,800 meters of St. Privat. Later they again changed position, moving 400 meters to the front, and so enabled the infantry of the division to hold the ground it had gained and prepare for the assault on St. Privat. Toward evening, by order

of General Pape, the corps artillery, southwest of St. Privat, opened fire upon the village; a little later, fourteen Saxon batteries at Auboue did the same. This fire, although it caused some casualties among the assaulting infantry, enabled it to take the village.

Here we find that the various artillery units instinctively worked together, even without a common commander, and twenty-five batteries united their efforts to one end. The co-operation of the infantry and artillery also was spontaneous; they supported each other, although without any means of intercommunication. If, however, the artillery could have gotten word from the infantry at the proper time, it could have avoided firing into it.

On this point the German Infantry Drill Regulations say: "The artillery must always be in touch with the advancing skirmish lines Habitually artillery officers are sent forward, to communicate by signals. Their chief duty is to keep the artillery commander informed of the position of the skirmish lines, so that he may continue his fire as long as possible."

The Japanese regulations express the same idea thus: "When the attacking infantry approaches the hostile position, the officers in command at the front should keep the artillery commander, or the nearest artillery patrols, informed of the positions of the troops and of the fall of the projectiles, so as to permit of proper regulation of the artillery fire."

In general, the Japanese regulated this matter well. It is difficult to make satisfactory deductions as to artillery from the experience of the Russo-Japanese war, for on neither side were the horses or material up to modern requirements. The guns had neither spring spades nor recoil on the carriage, nor were they provided with shields, which of course greatly affected their tactical handling. But unquestionably the Japanese artillery deserves the highest praise, in that it supported its infantry at all times, and made the most of its material. Habitually it came into action in masses, and its fire was controlled and concentrated upon the point of attack.

On the Yalu, the Japanese heavy artillery southwest of Wiju silenced the Russian guns, but could not destroy them. Against infantry, the effect of the fire of preparation was slight; the troops remained under cover until the Japanese infantry advanced, and then occupied the trenches.

At Kin Chau the Japanese artillery, 198 guns, under one commander, prepared the attack, but did not sufficiently support it. This was better done at Wafangau, especially on the left. Here the Fourth and Fifth artillery advanced with the infantry of the Fifth

Division; the fire was directed by flag signals. It soon silenced the First East Siberian Artillery brigade, and opened the way for the infantry. The shooting and the fire discipline of the Russian batteries was good, but they did not work together.

At Tashichiao the Russian artillery was perfectly concealed; the Japanese could not silence it, and it kept back the attack. At Yushulin the Russians made the mistake of holding back a large artillery reserve; to do this prevents the decisive massing of guns which is essential to success. The excuse that there is no suitable position can not be admitted. If the batteries can not be brought together in one position, at least separate groups can be so placed that all the guns can be used; and with the present equipment the separate groups can all be controlled by one commander.

At Lianoyang the fire of Colonel Slussarenko's two batteries was very skillfully conducted; from a concealed position, they silenced the Japanese batteries in less than half an hour. By personal observation, and the use of the plotting instrument and signal flags, he handled his fire so well that the Japanese attack was completely checked. On August 31st, the Japanese brought 234 field guns and twenty-one heavy batteries of position into action; these only partially prepared the attack, but gave it effective support.

At the Shaho, the Japanese artillery had gained sufficient confidence to continue its supporting fire until the advancing infantry gave the signal to cease by displaying the national flags; this fire made the Russians keep under cover. The infantry demanded the continuance of the fire until the skirmishers had actually entered the zone heaten by the shrapnel.

As these few examples will indicate, the Russo-Japanese war has not fully cleared up all the questions relating to the cooperation of infantry and artillery. It is clear, however, that fire of preparation, so-called, is useless. The infantry can not wait for the artillery to complete its work; the enemy will not expose himself until the infantry advance commences.

The Japanese procedure at Liaoyang appears to have been a model. The Swiss Colonel Gertsch, in his report, says of the Second and Fourth Armies on September 2d: "It appeared to me that the infantry was held back only long enough to enable the artillery to locate the enemy's batteries, assign targets, and adjust the fire. This, in my opinion, is the only proper course in attacking a fortified position. The infantry can not wait until the effect of the artillery fire is perceptible; the expression "silencing the enemy's guns" has lost its meaning. With the present artillery material and tactics guns

can be silenced only in exceptional cases; it requires an overwhelmly superiority and a long time. The guns of the defense may be forced to turn their whole attention to the artillery of the attack, and so prevented from firing upon the advancing infantry, but that is all. The first object of the artillery of the attack is to locate the enemy's batteries and range on them; so as to be able to turn fire upon them at any moment. As soon as this is accomplished, the infantry should advance.

In a general order issued before the battle of Mukden, General Oku, taught by experience, urges that artillery fire and infantry advance must go together, not one after the other. He says: "Artillery fire is the best preparation for the attack. But merely throwing projectiles into the enemy's position is useless; the infantry must advance at the same time, even if its progress is slow. If the infantry can not advance, the artillery should wait for a time when such advance is possible before opening fire. Infantry advance and artillery fire must be simultaneous."

The Japanese regulations express the same idea in paragraph 238, saying that the infantry must advance during the artillery duel, and not wait until the duel is decided.

The Japanese artillery should not be condemned, as it sometimes is, because, although it was used in masses, it did not always get the results expected of it. Having no shields, the batteries were often compelled to use concealed positions when, to support the infantry properly, they should have come out into the open.

The system of communications worked very satisfactorily. Observers reported the fall of the shots by signal flags and telephones; the Japanese artillery masses could always be handled as units, and the fire concentrated upon the point of attack.

The experience of this war has nowhere been fully embodied in regulations. The German Infantry Drill Regulations, with last autumn's supplements, seem the most advanced; the Japanese regulations show some of the same influence. In paragraphs 329-30, the German regulations prescribe that during the infantry attack the artillery, while keeping the hostile batteries fully occupied, must concentrate as much of its fire as possible upon the point of attack; and that the infantry must advance during the artillery duel, and compel the enemy to expose his troops to the artillery fire. This is the same idea expressed in Oku's general order. Paragraph 371 prescribes that while superiority of artillery fire is desirable, the launching of the infantry attack must not be made dependent upon this alone, but upon all the existing conditions; the artillery duel is not entirely

discarded, but such bombardments as took place at Plevna, Paardeberg and the Yalu are discountenanced. To secure unity of action, the assignment of a single commander for all the artillery is recommended.

A very important point is made in paragraph 446—that the attacking troops must expect the artillery to fire over their heads until just before the final rush; if the observation is poor, the fire is to be continued only until the first line has advanced to within 300 m. When the fire can no longer be continued upon the enemy's firing line, the ground just in the rear is to be swept, to prevent bringing up reserves. As recently as 1870, Prince Frederick Charles cautioned the artillery not to fire over the heads of the infantry, although the trajectory of the gun then in use was not by any means as flat as that of the present gun.

Paragraph 276 of the Japanese regulations makes it the duty of the infantry, without express orders, to support any artillery in its vicinity, the flanks and rear of artillery positions being particularly exposed to surprise by small hostile forces. As showing that this spontaneous support is essential, Colonel von Freytag-Loringhoven mentions the Ninth Corps before Metz on August 18th. The artillery of the Eighteenth Division and the corps artillery, in the position between the Bois de la Cusse and Champenois, had support only on the right. The effect of the Chassepot fire from the left was so great that the batteries here had to be withdrawn. Ten companies were brought up in support, but long after the artillery had come into action, and had all they could do to hold back the enemy.

On the other hand, the artillery must be prepared to sacrifice itself for the infantry, as did von der Groben's battery at Chlum Lipa, when, to cover the retreat, it exposed itself to the fire of the needle gun at 200 m. In the same way at Liaoyang, a battery of the Third Siberian Corps remained in position to cover the retreat of the infantry until annihilated by the Japanese rifle fire.

Good results may sometimes be obtained by sending single batteries or even single guns forward with the infantry, both for moral effect and to guard against counter attacks. At Spicheren, on the Rother Berg, two batteries were used in this manner very effectively. At the Tanho, on August 26, a mountain battery advanced to the skirmish line of the Fourth Regiment, of the Japanese Second Division, and forced the Russians to retire. This use of artillery recalls the "battalion guns" of the time of Frederick the Great.

It would seem, however, that machine guns are better adapted for service of this kind. The Russo-Japanese war demonstrated

that these weapons are an indispensable auxiliary, even in the attack. They can be used in positions that are out of the question for field guns. If they can be brought into action from an unexpected position, they may be remarkably effective, as at Wafangau, where the Japanese machine guns fired upon heavy Russian Columns at 2,300 m. At Liaoyang, Russian machine guns on the left flank caught a Japanese mountain battery in a millet field at 850 m., and destroyed it; and the attack of the 23d Regiment, of the Japanese 6th Division, was checked by Russian machine gun fire, and the regiment held stationary for twenty hours.

At Mukden, the 11th and 21st Regiments could make no progress in their attack upon Likiawopeng and Wankiawopeng until machine guns were pushed forward to the skirmish lines. The Russian machine guns were silenced by shrapnel fire from the mountain guns.

Machine guns were found very useful in repulsing counter attacks. General Oku recommends this use in his general order cited above. "But," he says, "the mechanism of these guns is delicate, and requires careful cleaning and oiling, and constant attention. Even the slightest injury must be repaired on the spot, no matter how critical the situation; hence these guns should never be isolated."

The Japanese assigned them singly or in pairs to battalions, and kept them on the firing line. In the pursuit, and in holding captured positions, they were invaluable. They were found so useful that Russia sent all the machine guns of her mobile army to Eastern Asia; and Japan increased her armament enough to give every battalion a gun. It would be very desirable for us also to increase the number of our machine guns, and assign them to infantry regiments.

No general rule can be given for the advance of infantry under artillery fire. The Russian columns were compelled to deploy at 7,000 paces or more from the Japanese batteries, and generally formed line of skirmishers. The Japanese used all kinds of formations, according to the ground. At Yoshirei companies advanced in column of platoons at 300 m. distance, each platoon in line of skirmishers at 5 paces interval. Sometimes the advance was by small deployed groups, keeping on the same general line; sometimes in line of platoons in column of squads, at 20 or 30 paces interval.

For this advance, and for the combined action of infantry and artillery, the only rule that can be given is that each commander, from the highest to the lowest, must be constantly on the alert to discover

the best course for his unit in every emergency, and then follow it through with the utmost energy.

It has been remarked above that the regulations of the various armies have not yet felt the full influence of the teachings of the most recent wars as to the necessity of the close co-operation of the arms. The French, however, even without any such requirements in their regulations, have of late practiced very extensively the maneuvers of the combined arms. Particularly noteworthy are the instructions given by General Percin, now of the Superior Council of War, when commanding the 13th Corps. This officer, who was promoted from the artillery, sought, in these instructions, to accustom the infantry and artillery to constant close co-operation. He ordered twenty field exercises of companies and batteries, conducted by captains of infantry and artillery, so as to accustom the smallest units to combined work and demonstrate its importance. He then ordered one such exercise for each regiment and each division. He further required that after the month of June, 1910, in all field exercises of a battalion or more, the artillery be outlined by infantry officers detailed for the purpose, representing battery commanders, agents of communication between the artillery and detachment commanders, and "orientation officers." This last term, a new one within recent years, is applied to officers of artillery, specially trained in infantry combat, who are attached to the staff of artillery commanders for the purpose of keeping their chiefs constantly informed of the progress of the action.

The last autumn maneuvers of the 13th Corps showed the results of this training. The progress of the maneuvers, it is true, was slower than formerly, for the reason that the infantry always waited for the active support of the artillery before undertaking any serious attack. But this slow progress and close co-operation were precisely the things that the corps commander was trying to get, for, as he justly said in his final discussion, this is the way it would have to be done in war.

The Minister of War approved all General Percin's measures, and ordered that exercises of this nature be held in all army corps. In further development of the same idea, General Brun ordered that corps commanders arrange to send infantry units, by rail if necessary, to suitable places for a day or two, for combined maneuvers and field firing. In this way ground can be selected which can be reached by infantry units from several garrisons, and cavalry and artillery sent there by marching. Additional opportunity is thus given for practice in field service by mixed forces, before the maneuvers.

The Minister has also approved the instructions issued by General Joffre, until recently commanding the 2d Corps, for the practical management of the service of communication in the infantry and artillery, and adopted them for provisional use by all troops. They require that, in addition to the present telephone and signal service, each infantry regimental and battalion commander shall assign a mounted officer with a mounted or cyclist orderly, and each company commander a sergeant, as agent of communication with the next higher commander. Each company commander is required to keep with him, for this duty, a corporal, a trumpeter, and one private from each platoon, and each platoon commander to designate one man whose sole duty is to watch for signals from the company commander.

In artillery communications, General Joffre's instructions distinguish between communications *upward* and *downward*. First, the artillery commander must be kept informed by the commander of the whole force, how the artillery is to support the infantry; secondly, the batteries specially assigned to support the attack must receive information as to the obstacles and resistance encountered by the infantry. The use of both mounted messengers, and telephone and signal details, is provided for.

Finally, the Minister has issued an order, intended to favor the co-operation of the two arms. It provides that the details of lieutenants, of not less than six years service and not more than thirty-six years of age, for duty with arms other than their own, shall hereafter be extended to periods of nine months, and shall be made in greater number; that captains be detailed from units not stationed in mixed garrisons, to serve for periods of not less than a month with other arms—with artillery during the season of firing practice, and with other arms shortly before the autumn maneuvers: and finally, that during field exercises of all kinds, officers of different arms serving at the same station exchange places as frequently as possible. In this connection it is interesting to note that one of the principal reasons given by the Minister of War for the recent transfer of 150 lieutenants of infantry to the artillery was that these officers, thoroughly familiar with the methods of infantry combat, would greatly assist in getting co-operation between the two arms.

Some interesting remarks on this subject were contained in the final comments of General Tremeau on the army maneuvers conducted by him last year in the Bourbonnais. He said that he had noticed that separate columns almost invariably kept up communication

on the march, but frequently lost it entirely as soon as they began to deploy for action. He considers it one of the most important duties of the divisional cavalry to see that this does not happen; but adds that the maintenance of communication is necessary, not only between different arms, but between individual units, no matter how small. As one means to this end, he recommends that the headquarters of general officers, and especially of corps commanders, be not moved during the course of an engagement except in unusual cases. If it is necessary for the general himself to leave the spot for a time, he should do so with only such officers as he requires, leaving most of his staff at headquarters. Work may then go on without interruption, and there will be no danger of important messages going astray because the officer addressed has left his post.

We have more maneuver grounds than the French, twenty to their eight, and a larger part of our infantry, together with all our field artillery, has access to them every year; but the two arms are not habitually combined for maneuvers and field firing. Unpleasant as it may be to crowd mixed units, infantry brigades and artillery regiments, into these camps for such exercises, it is the only way to teach a proper co-operation of these arms, and we should not permit ourselves to be left behind by the French in this matter.

The preceding remarks have dealt almost exclusively with the necessity for co-operation between infantry and artillery, they being the principal arms and the main reliance on the battlefield. It is not, however, meant that the cavalry may be neglected, or that it is not entitled to as high a place as its sister arms. It is much disputed today what its role in future wars will be; whether, in view of the effect of modern firearms, it will take an active part in great battles, or have to limit itself to the services of information and security, to operations in the enemy's rear, and to co-operation in the pursuit. This is not the place to discuss this question. Whatever duties may fall to the cavalry, in front or on the flanks of the army, in action, on the march or in camp, it must always keep in touch with the other arms and look upon itself as a part of the whole. Especially will this be the case in battle. Here the cavalry must be constantly in touch with the commander of the whole force; keep informed of the progress of the action; find out where its help is needed—where the sister arms require support and where it may have an opportunity to participate in a victory or ward off danger.

In all cases the personality of the cavalry commander will play an important part; upon him will depend the close co-operation of

the cavalry with the other arms. But the troops themselves must be properly trained; they must understand the tactics of infantry and artillery and how these two arms support and assist each other. Then the cavalry will see what its own part in the combined action must be.

Recognizing this principle also the French have taken a long step in advance by assigning infantry companies or battalions to take part in the annual maneuvers of the cavalry divisions with their horse batteries. It is evident that this must be of the greatest assistance in developing the great principle—the co-operation of all three arms.

"MODERN GUNS AND GUNNERY"

A practical manual for officers of the Horse, Field, and Mountain Artillery, by Colonel H. A. Bethell, R. F. A., published by F. J. Cattermole, Wellington street, Woolwich.

Colonel Bethell in his preface to this third edition of his excellent work remarks that only three years have passed since the last edition of the book was issued and yet the changes which have taken place have rendered it necessary to rewrite the book throughout.

The 1910 edition of the work covers, clearly and thoroughly, many of the subjects which must be mastered by the modern field artillery officer before he can efficiently perform his duties. Not the least value of the work lies in the fact that it is one of the very few books on modern field artillery published in the English language. There is a wealth of literature on this subject published in the French, German, and other languages; but comparatively few of these books are available to an officer who reads only English.

The scope of the book is indicated by its table of contents:

An idea of the utility of the work can be obtained from Part I, Chapter V, Accuracy of Fire, where examples, interesting to artillery officers who know the 50% rectangle of their guns, are given to show what results may be expected in fire. Thus:

Example 2. What is the chance of dropping a shell into a rectangular gun emplacement 3 yards wide, 5 yards from front to rear, with the 18 pr. Q. F. at 3,500 yards?

Assume the parapet revetted vertical, and 3' high. Then since angle of descent (from range table) is about 1 in 6, a parapet 1 yard high will cover 6 yards to the rear, and it will be impossible to get a shell into the emplacement without going through the parapet. Suppose that a shell striking the superior slope within one yard of the crest will penetrate the parapet, then our target is reduced to a surface 3 yards wide by one yard from front to rear.

Now, the 50% rectangle of the 18 pr. Q. F. at 3,500 yards is 1.75 yards wide; 3 yards over 1.75 yards is 1.7, which factor we find opposite 75% in the table, so that 75% of the shots will be correct for line.

Again, the 50% rectangle of the 18 pr. Q. F. at 3.500 yards is 26 yards long; 1 over 26 is .038, or just short of factor .04 in the table, so that 2% of the shots will be correct for elevation.

2% of 75% is 1.5% nearly.

So that in 100 shots, under ideal conditions, we may expect to put 1.5 effective shell into the emplacement.

Again, Part II, Chapter XIX, The Quick-Firing Field Howitzer, Probability of Hitting:

Example: How many rounds of lyddite shell from the 5 inch B. L. howitzer with full charge will be required to make one hit on a field casement 20 yards wide and 10 yards deep at 3,500 yards, presuming the range and line already found?

From the range table, the breadth of the 50% zone is 4.74 yards, depth 32.6 yards. Then the 100% zones are four times as large. Four times 4.74 is 18.96; therefore all the shell will be correct for line.

As regards depth, 10-326 = .3 nearly; opposite to factor .3 is the probability table we find 16%. Therefore all the shell will be correct for line, and 16% of them correct for range.

Therefore, after range and line have been correctly found to the center of the target, we may expect to obtain 16% of hits, or 1 hit every 6 rounds.

This assumes ideal conditions for practice, and absence of wind or other disturbing factor.

Under service conditions in war the probable rectangle would be nearly twice that given in the range table.

Part III, Practical Gunnery, contains excellent suggestions and demonstrations, especially on the subject of the bullet cone and shrapnel.

In this part of the book, under the heading. Indirect Laying, the following normal procedure in coming into action is given:

Under normal conditions the procedure from start to finish will be as follows:

1. Battery Commander receives his orders, reads them to officers, battery staff, and Nos. 1 and informs them where he intends to go.
2. He advances with Staff as in Fig. 93. (Note.—The Staff now follow as a closed body. See F. A. T., 1908, page 186.)
3. He arrives at his position, reconnoitres the enemy, selects his observing position, the position for the battery, and the general direction of position for limbers.
4. He proceeds to the observing position, where the rangetakers have in the meantime set up the director and are taking the range. He sends the horseholders to mark for the flanks of the battery.
5. The two signallers lay out the telephone wire from the observing position of the battery, working from the center outwards.
6. The battery leader gallops up, followed by his signaller; the B. C. points out to him the position of the battery and the direction of the target.
7. The battery leader brings the battery into action as in Fig. 94. The limbers proceed toward the position selected by the Battery Commander.
8. In the meantime the B. C. measures the angle of sight and sends it down to the battery. He also sends down the approximate battery angle.
9. The rangetakers having in the meantime taken the range to the target and to the battery, the B. C. works out the battery angle and the range with the plotter. He sends down the correction to the approximate battery angle ("all guns 1½° more right.")
10. The B. C. orders the ranging section, the nature of shell, and the corrector, and sends down the two elevations to the ranging section.
11. The ranging rounds are fired, and the B. C. holding his deflection

scale at arm's length, measures the angle of the fall of the shots right or left of the target. He sends down the deflection correction and orders a fresh elevation or elevations. ("All guns 30' more right. 4,500-4,600.")

12. The B. C. orders a further deflection correction if necessary, and a fresh elevation. If the target is bracketed he orders a fuse echelon.

13. On the result of the echelon the B. C. gives the corrector setting and the final elevation, and orders the method and rate of fire.

14. Should the target be visible guns, the B. C. orders "corrector—one round battery fire 10 seconds." He notes the error of each gun, which is recorded by the signaller. He sends down the six corrections thus: "Number 1, line. Number 2, 10 minutes more left. Number 3, 30 minutes more left. Number 4, doubtful. Numbers 5 and 6, line. Fire Number 4 again."

15. Number 4 gun having been fired again, the B. C. gives "Number 4, 50 minutes more right. Section fire 10 seconds."

16. To switch on a fresh target, the B. C. orders "Empty guns. Angle at sight 1º elevation. All guns 7º more right. Ranging section 3,800-4,100.")

The procedure is then as before, except that, the error of the day of the fuse having been determined, there is no necessity to fire a fuse echelon.

The above procedure may appear complicated. But if every detail of it has been so thoroughly practiced as to make it a matter of routine, like harnessing up a horse, the whole operation will go off smoothly and with less mental strain to all concerned than one of our old drill evolutions, such as "change from right back on number 4."

There is one point which should not be forgotten, and that is the concealment of the B. C. and his Staff—the "brain of the battery." Under ordinary tactical conditions the enemy will probably be able to locate the battery, though invisible, within, say, a quarter of a mile. Then enemy will keep a bright lookout for the B. C. and will fire on any likely observing point. It is therefore advisable for the B. C. not only to keep under cover, but to avoid selecting any *conspicuous observing* position. It by no means follows that the point at which the director is set up is the best position to observe from.

The chapters on Ranging, Finding the Fuse, and Field Howitzer Fire, are all exceedingly interesting. So, also, is the chapter on Analysis of Practice Reports. In this latter case, by the use of probability tables, the range as determined by the guns is checked up, and errors in observation are also determined in the illustration given. The remarks of the brigade commander and camp commander are somewhat caustic.

Part IV. Modern Quick-Firing Equipments, contains brief descriptions and many illustrations of the present guns and howitzers of most of the countries of the world.

The entire book is of such interest that it should find its way into the hands of every field artillery officer, or at least be placed in the library of every post where field artillery is serving.

"ÉTUDE SUR LES CARACTÈRES GÉNÉRAUX DE LA GUERRE D'EXTRÊME-ORIENT"

BY L' CAPITAINE BREVETE F. CULMANN.

Published by Berger-Levrault & Cie., Paris, 1909

The author states in his introduction that, while the present data are rather limited and not absolutely reliable, yet they are sufficient to reach quite valuable conclusions; and that, with these data, he will try to determine what revolution has really occurred in losses as a result of the progress of armament, what is the destructive power of each of the three arms, and, finally, how and why battle fronts have increased or diminished at different epochs.

The work consists of three chapters, and relative to these the author states:

"In the first chapter we shall see what sacrifices were necessary, from the time of Frederick to the present, in order to conquer. With the object of explaining the variations in losses from one battle to another, and from one campaign to another, and the variation of fighting fronts, we shall be led to briefly speak of the general character of war at different epochs.

"The second chapter will treat of losses inflicted or sustained by the three arms in 1870-71 and in 1904-5, of the amount of ammunition which was necessary to put a man out of action, of the proportion of killed to wounded, and of the results of the progress of sanitation.

"Finally, in the last chapter, we shall try to explain why Japanese strategy tended to stamp, with a slow and indecisive character (so marked in the three battles of the Liao Yang, Shaho, and Mukden), the operations by which the equilibrium was progressively broken to Russia's misfortune."

Attached to the work proper are seven appendices, giving much useful statistical information. As an illustration we print in full the first, second, and third appendices:

APPENDIX I

The following table shows the total losses sustained in the principal battles since the time of Frederick the Great, and also the HOURLY losses. These latter data are important on account of the very variable duration of the action.

Battles	Nationality of Belligerents	Number of Troops	Losses		Length in Hours	Loss Per Cent Per Hour	REMARKS
			Number	Percentage			
1st. Epoch of smooth-bores (Frederick the Great to Napoleon I)							
Mollwitz	Prussians	21,600	4,850	22.5	5	4.5	
	Austrians	19,000	4,550	23.9		4.8	
Hohenfriedenberg	Prussians	59,000	4,700	7.9	5	1.6	
	Austro-Saxons	70,000	8,000	11.4		2.3	3,000 prisoners
Soor	Prussians	22,000	3,600	16.4	5	3.3	
	Austrians	39,000	3,600	9.2		1.8	
Kesselsdorf	Prussians	30,000	4,900	16.3	2	8.2	
	Austro-Saxons	31,000	3,800	12.3		6.2	6,700 prisoners
Prague	Prussians	64,000	14,000	21.9	5	4.4	
	Austrians	61,000	9,000	14.8		3.0	4,300 prisoners
Kolin	Prussians	33,000	*13,700	41.5	6	6.9	*Including the missing
	Austrians	54,000	8,100	15.0		2.5	
Leuthen	Prussians	35,000	6,400	18.3	4	4.6	
	Austrians	65,000	10,000	15.4		3.9	12,000 prisoners
Zorndorf	Prussians	36,000	11,700	32.5	8	4.1	
	Russians	42,000	15,600	37.1		4.7	2,400 prisoners
Torgau	Prussians	44,000	†16,500	37.5	7	5.4	†Really includes prisoners
	Austrians	52,000	16,000	30.8		4.4	
Marengo	French	28,500	4,700	16.5	12	1.4	
	Austrians	28,000	6,500	23.2		1.9	2,900 prisoners
Austerlitz	Austro-Russians	86,000	12,000	14.0	5	2.8	15,000 prisoners
	French	75,000	7,000	9.3		1.9	
Auerstadt	Prussians	54,000	14,000	25.9	7	3.7	
	French	26,500	7,000	26.4		3.8	
Eylau	Prusso-Russians	82,500	26,800	32.5	12	2.7	
	French	75,000	28,500	38.0		3.2	
Aspern	Austrians	96,000	21,700	22.6	‡21	1.1	‡In two days
	French	60,000	23,000	38.3		1.8	

Battles	Nationality of Belligerents	Number of Troops	Losses		Length in Hours	Loss Per Cent Per Hour	REMARKS
			Number	Percentage			
Wagram	Austrians	118,000	19,000	16.1	§14	1.2	6,700 prisoners
	French	170,000	20,000	11.8		.8	7,000 prisoners
Moscow	Russians	104,000	43,000	41.3	15	2.8	§In two days
	French	124,000	28,000	22.6		1.5	
Great Gorschen	Allies	70,000	10,500	15.0	8	1.9	
	French	130,000	25,000	19.2		2.4	
Bautzen	Allies	94,000	12,000	12.8	‖ 15	.8	‖ In two days
	French	170,000	22,000	12.9		.9	
Leipzig	Allies	300,000	48,000	16.0	**30	.5	**In three days
	French	200,000	45,000	22.5		.7	
Ligny	Prussians	83,000	12,000	14.5	6	2.4	8,000 deserters
	French	75,000	10,500	14.0		2.3	
Waterloo	Allies	140,000	22,000	15.7	8	1.9	
	French	72,000	24,000	33.3		4.2	7,000 prisoners
		2d. Epoch of rifled arms					
Magenta	Austrians	58,000	4,700	8.1	9	.9	4,500 missing
	French	60,000	4,500	7.5		.8	
Solferino	Austrians	133,000	13,100	9.8	12	.8	8,600 prisoners
	Franco-Italians	151,000	14,400	9.5		.8	1,800 missing
Fredericksburg	Union	113,000	12,000	10.6	6	1.8	
	Confederate	78,000	5,000	6.4		1.1	
Gettysburg	Union	100,000	23,000	23.0	*25	.9	*In three days
	Confederate	70,000	22,700	32.4		1.3	
Wilderness	Union	120,000	15,000	12.5	†23	.5	†In two days
	Confederate	62,000	11,000	17.7		.8	
Sadowa	Prussians	220,000	9,100	4.1	8	.5	
	Austrians	215,000	18,000	8.7		1.1	
Wissembourg	French	6,800	1,200	17.6	7	2.5	1,000 prisoners
	Germans	39,000	1,500	4.0		.6	

Woerth	French	42,000	6,000	14.5	9	1.6	
	Germans	91,000	12,000	13.2		1.5	
Mars-la-Tour	Germans	66,300	‡15,800	23.8	10	2.4	‡Including the missing
	French	121,500	13,800	11.4		1.1	
Saint-Privat	Germans	198,600	19,600	9.8	8	1.2	
	French	120,600	§12,300	10.2		1.3	§Including 4,400 missing
Sedan	Germans	165,400	8,900	5.4	12	.5	
	French	108,000	17,000	15.7		1.3	
Coulmiers	Germans	18,500	780	3.9	9	.4	
	French	40,000	1,600	4.0		.4	
Loigny	Germans	38,000	4,100	10.8	9	1.2	
	French	98,000	15,500	15.8		1.8	
Saint-Quentin	Germans	35,000	2,460	7.0	9	.8	
	French	35,000	|| 3,400	9.7		1.1	|| Not including a large number of missing, among whom was some killed and wounded
Plevna I	Russians	10,000	2,800	28.0	7	4.0	
	Turks	14,000	3,000	21.4		3.1	
Plevna II	Russians	32,500	7,300	22.5	10	2.3	
	Turks	23,000	1,200	5.2		.5	**In five days
Plevna III	Russians	80,000	15,500	19.4	**40	.5	
	Turks	35,000	4,000	11.4		.3	
			3d. Wars of the Transvaal and Far East				
Maggersfontein*	English	8,000	950	11.9	13	.9	*In other battles the following English losses are given:
	Boers	6,000	250	4.2		.3	
Colenso	English	15,000	950	6.3	8	.8	Madder River 6.9
	Boers	4,000	30	.8		.1	Spien-Kop 5.0
Yalu	Russians	16,000	2,400	15.0	7	2.1	Stormberg 4.5
	Japanese	42,000	1,040	2.5		.4	Paardeberg 9.1
Kinchow	Russians	18,000	830	4.6	14	.3	Driefontein 8.0
	Japanese	42,000	4,320	10.3		.7	
Wafangou	Russians	36,000	3,840	9.7	12	.8	†In eight days
	Japanese	36,000	1,210	3.4		.3	
Liao-Yang	Russians	150,000	16,500	11.0	†90	.12	‡In eight days
	Japanese	128,000	24,000	18.5		.2	
Scha-Ho	Russians	200,000	42,500	21.2	‡90	.23	§In seven days
	Japanese	170,000	20,000	11.8		.13	
Sandepou	Russians	125,000	10,000	8.0	§70	.1	|| In ten days
	Japanese	50,000	7,000	14.0		.2	
Mukden	Russians	310,000	59,800	19.3	|| 100	.2	
	Japanese	290,000	41,000	14.1		.15	

APPENDIX II

Density of Fighting Fronts in Men per Running Meter in the Principal Battles from the time of Frederick the Great to the Present

Campaigns	Battles	Nationality of Belligerents	Strength	Extent of Front in Kilometers	Density of Men per Running Meter
		1st. Epoch of smooth-bores (Frederick the Great to Napoleon I)			
Wars of Frederick the Great	Hohenfriedeberg	Prussians	59,000	7	8
		Austrians	70,000		10
	Soor	Prussians	22,000	3.5	6
		Austrians	39,000	4	9½
	Kolin	Prussians	33,000	6	5½
		Austrians	54,000	7	8
	Breslau	Prussians	30,000	12	2½
		Austrians	80,000	12	6½
	Leuthen	Prussians	35,000	6	6
		Austrians	65,000	11	6
	Zorndorf	Prussians	36,000	5.5	6½
		Russians	42,000	5.5	7½
	Torgau	Prussians	44,000	7	6
		Austrians	52,000	5.5	9½
	Kunersdorf	Prussians	49,000	4	12
		Russians	68,000	5	13½
Wars of the Revolution	Jemmappes	Austrians	13,800	8.5	1½
		French	42,000	8.5	5
	Fleurus	Austrians	32,000	20	1½
		French	65,000	20	3
	Schliengen	Austrians	36,000	10	3½
		French	38,000	10	4
	Emmendingen	Austrians	28,000	20	1½
		French	36,000	20	1½
	Zurich (1st battle)	Austrians	50,000	10	5
		French	20,000	10	2
	Marengo	Austrians	28,000	4.5	6
		French	28,500	4.5	6
Napoleonic Wars	Austerlitz	French	75,000	12	6
		Austro-Russians	86,000	15	6
	Eylau	French	57,000	8	7
		Prusso-Russians	82,000	5	16
	Aspern	French	60,000	7	8½
		Austrians	96,000	7	13½
	Wagram	French	170,000	18	9½
		Austrians	118,000	18	6½
	Moscow	Russians	104,000	8	13
		French	124,000	5	25
	Bautzen	French	170,000	15	11½
		Prusso-Russians	94,000	15	6½
	Dresden	French	120,000	14	8½
		Allies	140,000	14	10
	Waterloo	French	72,000	4.5	18
		English	67,000	4	17
		2d. Epoch of rifled arms			
1859	Solferino	Austrians	133,000	18	7½
		Franco-Italians	151,000	18	8½

Campaigns	Battles	Nationality of Belligerents	Strength	Extent of Front in Kilometers	Density of Men per Running Meter
The Rebellion	Fredericksburg	Union	113,000	25	4½
		Confederate	78,000	25	3
	Gettysburg	Union	100,000	10	8
		Confederate	70,000	10	5½
	Wilderness	Union	120,000	11	10
		Confederate	62,000	11	5½
1866	Sadowa	Austrians	215,000	10	21
		Prussians	220,000	18	12
Franco-German War	Woerth	Germans	91,000	6	15
		French	42,000	5	8
	Spicheren	Germans	34,000	6	5½
		French	27,000	6	4½
	Mars-la-Tour	Germans	66,300	10	6½
		French	121,500	10	12
	Saint-Privat	Germans	198,600	17	11½
		French	120,600	14	8½
	Coulmiers	Germans	18,500	8	2
		French	40,000	8	5
	Hallue	Germans	23,000	10	2½
		French	40,000	12	3
	Saint-Quentin	Germans	35,000	16	2
		French	35,000	17	2
	Lisaine	Germans	40,000	20	2
		French	140,000	20	7
		3d. Wars of the Transvaal and Far East			
War of the Transvaal	Colenso	English	15,000	10	1½
		Boers	4,000	10	¼
	Maggersfontein	English	8,000	16	½
		Boers	6,000	18	1-3
	Paardeberg	English	13,000	8	1½
		Boers	to 5,000	8	½
Russo-Japanese War	Yalu	Russians	16,000	20	4-5
		Japanese	42,000	12	3½
	Wafangou	Russians	30,000	15	2
		Japanese	30,000	20	1½
	Liao-Yang (Sep. 1, 1904)	Russians	150,000	35	4
		Japanese	128,000	40	3
	Shaho (Oct. 9, 1904)	Russians	200,000	60	3
		Japanese	170,000	60	3
	Mukden (Mar. 4, 1905)	Russians	310,000	110	3
		Japanese	290,000	110	3

APPENDIX III.

Hourly Losses of the Most Heavily Engaged Units in the Principal Battles from Frederick the Great to the Present Time.

Organizations	Battles	Approximate strength	Losses		Length in hours	Loss per cent per hour	Loss per cent in officers
			Total	Per cent			
1st. Epoch of smooth-bores (Frederick the Great to Napoleon I)							
Battalion of Grenadiers, von Wedel	Soor	402	311	77.4	2	38.7	83.3
Battalion of Grenadiers, Hunchow	Kesselsdorf	500	378	73.6	2	37.8	33.3
Battalion of Grenadiers, Nimschofsky	Kolin	*700	*677	95.3	4	23.8	100.0
First Battalion of the Guard	"	*800	*499	62.4	1	62.4	80.0
Regiment Prince Henry	"	*1,200	*930	77.5	3	25.8	54.3
Regiment Moritz	"	1,430	1,190	82.1	3	27.4	68.4
2d and 3d Battalions of the Guard	Leuthen	1,200	518	43.2	1½	28.8	?
Battalion Grenadiers, Jung Billerbeck	Torgau	400	358	89.5	2½	35.8	?
Battalion Grenadiers, Hacke	"	400	302	75.5	2½	30.2	?
Battalion Grenadiers, Rathenow	"	400	293	74.2	2½	29.7	?
Division Suchet	Uena	11,000	2,645	24.0	8½	2.8	?
Infantry of Augerau	Eylau	1,200	5,200	43.3	1	43.3	?
Division Morand	"	6,890	2,926	42.5	7	6.1	42.8
Regiment Kolberg	Dennewitz	2,400	630	26.3	2½	10.5	?
4th Regiment of Eastern Prussia	"	2,000	543	27.2	4	6.8	?
2d Regiment Wurtemberg	"	*600	530	88.3	3	29.4	100.0
2d Battalion and Fusiliers, Guard Corps	Wartenbourg	1,000	379	37.0	3	29.4	100.0
2d. Epoch of rifled arms							
20th Austrian Regiment	Nachod	2,500	722	28.9	2	14.4	?
60th " "	"	2,500	685	27.4	2	13.7	?
1st Foot Regiment of the Guard	Sadowa	2,600	410	15.8	2½	6.3	?
17th Infantry Regiment	"	2,600	*187	7.2	3	2.4	12.3
14th Austrian Regiment	"	2,250	†1,360	60.4	2	30.2	12.3
Grenadier Regiment No. 7	Weissembourg	2,800	352	12.6	2	6.3	?
" " " "	Woerth	2,475	566	22.9	4	5.7	?

*Including prisoners †Undoubtedly partly prisoners

6th Grenadier Regiment	Woerth	2,800	906	32.4	5	6.5	46.2
46th Infantry Regiment	"	2,800	1,017	36.3	4½	8.1	59.2
Maire Infantry Brigade	"	3,300	‡1,927	58.4	¼	233.6	59.2
2d Turkish Regiment	"	2,300	‡2,051	89.2	4	22.3	91.0
78th Regiment of the Line	"	1,865	‡1,398	74.4	Some minutes	22.3	91.0
24th Infantry Regiment	Mars-la-Tour	2,700	1,060	39.3	7	5.6	70.1
11th Grenadier Regiment	"	2,550	1,160	45.5	½	91.0	?
16th Infantry Regiment	"	2,783	1,361	48.9	1	48.9	80.0
57th Infantry Regt. (1st and Fusilier Batts.)	"	1,856	679	36.5	1	36.5	80.7
1st Foot Regiment of the Guard	Saint-Privat	2,700	1,092	40.4	2½	16.2	64.3
2d Foot Regiment of the Guard	"	2,709	1,115	41.3	2¼	18.3	70.9
3d Foot Regiment of the Guard	"	2,760	1,096	39.7	2½	15.8	72.0
2d Grenadier Regiment of the Guard	"	2,700	1,058	39.2	2¾	14.3	73.1
4th Grenadier Regiment of the Guard	"	2,780	929	33.4	2¾	12.2	54.0
Battalion Tirailleurs Guard	"	900	450	50.0	2½	20.0	100.0
3d Company of 89th Grenadier Regiment	Loigny	525	167	31.8	3	10.6	36.4
4th Bavarian Battalion of Chasseurs	"	500	187	37.4	6	6.2	33.3
61st Russian Infantry Regiment	Plevna III	2,200	1,220	55.5	20	2.8	
62d Russian Infantry Regiment	"	2,100	1,158	55.1	20	2.7	56.1
63d Russian Infantry Regiment	"	2,500	1,200	48.0	2	29.0	33.3
117th Russian Infantry Regiment	"	2,100	1,050	50.0	2	25.0	67.6
124th Russian Infantry Regiment	"	2,100	850	40.5	2	20.3	40.5
3d. Wars of the Transvaal and Far East							
1st Manchester	Elandslaagte	380	42	11.1	2½	4.4	
2d Gordon Highlanders	"	450	133	29.6	2½	11.9	
Detachment of Debarkation	Graspan	190	84	44.2	1	44.2	
2d Seaforth Highlanders	Maggersfontein.	800	100	23.4	12	1.9	44.0
Black Watch	"	800	276	34.5	12	2.9	59.0
2d Lancaster Regiment	Spionkop	600	§195	32.5	12	2.7	60.0
2d Lancashire Fusiliers	"	800	§317	39.6	12	2.7	44.0
1st Inniskilling Fusiliers	Peter's Hill	800	230	28.8	3	9.6	44.0
1st Welsh Fusiliers	Paardeberg	900	86	9.5	2	4.8	21.8
1st Yorkshire	Driefontein	850	28	3.3	1	3.3	
9th Russian Tirailleur Regiment	Yalu	2,100	§900	42.9	7	6.1	56.4
12th Russian Tirailleur Regiment	"	2,100	§890	42.4	7	6.1	58.9
22d Russian Tirailleur Regiment	"	2,100	§260	12.4	7	1.8	10.2

‡Among whom were prisoners. §Including missing.

NOTES ON FRENCH FIELD ARTILLERY LITERATURE

Interest in French books on the use of field artillery has recently become more or less general throughout our service. This is but natural, as our entire system of field artillery is largely based upon French ideas.

In view of this great interest it is believed that a short resume of the contents of a few of the more important books will be of interest. The books included have been selected from a large number of works.

No book is included which is not worthy of being classed as authoritative in its particular sphere. It may be noted that most French military books are written in a simple straightforward style; hence, anyone knowing the rudiments of French can rapidly acquire facility in reading them.

The list is as follows:

1. L'Artillerie de Campagne en Liason avec les autres Armes. By General Langlois. Published by R. Chapelot et Compagnie, Paris. 2 vols. Price about 15 francs.

This book was originally published in 1892; that print is now exhausted, but a reprint was made in 1908.

Langlois' work is a truly remarkable book. From inquiries pushed into every realm of the military art he deduces the functions of field artillery and the manner of fulfilling those functions. More than this, General Langlois deduced in his original book the characteristics which a field gun should possess. The adoption by France in 1897 of the precursor of all modern types of field guns was directly traceable to General Langlois' studies. Langlois has been quoted in every language in the civilized world. Many of the so-called "new ideas" of today are but quotations, either consciously or unconsciously, from Langlois. It may be interesting to know that the book here noticed is the chief of those works which have recently brought to General Langlois the much-coveted honor of a seat in the French Academy.

2. L'Artillerie de Campagne. By Campana. Published by Lavauzelle, Paris. Price about 7 francs 50.

A portion of this book is devoted to matter similar to that contained in our books on ordnance. The book is well worth while, however, on account of other features. Among these may be mentioned: the detailed consideration given to the shrapnel and its effect on various targets; the chapters on tactics and the utilization of the terrain; the description of various systems of field artillery in use in Europe, especially the German.

3. Le Canon a Tir Rapide dans La Bataille. By Culmann. Published by Lavauzells, Paris. Price about 7 francs 50.

Captain Culman is one of the best known and most thorough of the younger French military writers. He is a very prolific writer and his statements are constantly quoted in the German military press.

The book here considered is devoted to the tactical employment of field artillery on the battle-field and the effect to be expected from it. Characteristic of the book is the damper which it puts on the wild, unreasoning claims of those who think that we can kill everything in sight.

4. Les Exercises de Service en Campagne dans le Groupe de Batteries. By Aubrat. Published by Berger Levrault, Paris, 1910. Price 7 francs 50.

This book has been through numerous editions, the latest being that of 1910. Without doubt Colonel Aubrat's book is the greatest French work on the subject of field artillery training. It is probably the most complete work of its kind in any language. With every succeeding edition the leading German artillery writers, such as Rohne, pay it the tribute of lengthy quotations and comments.

The book considers the training of field artillery in every form of activity which it will be called upon to exercise in war. The author illustrates methods of training by concrete cases of problems and solutions. The solutions are not stereotyped in form, but take the shape of running narratives. No one who reads this book intelligently can fail to be benefited by it.

5. Mecanisme du Tir de L'Artillerie de Campagne. By Maillard. Published by Lavauzelle, Paris. Price about 7 francs 50.

This book is practically a complete treatise on the subject of indirect laying, the effect of fire, the execution of and employment of fire, etc. It is clear and logical. It is well, however, to note that in all French books on this subject there are occasional statements which are not mathematically accurate, and that when these statements are made there is seldom any explanation as to their lack of absolute exactness. However, no one accustomed to our own methods of explaining the theory of indirect laying and of fire is likely to take exception to the few shortcomings of the French in this respect.

6. Cours Elementaire de Tir de Campagne. Second edition. By Treguier. Published by Lavauzelle, Paris. Price about 5 francs.

This book covers much the same ground as does Maillard's. The two, however, supplement each other. The two together leave no detail untouched so far as concerns the French ideas on fire and indirect laying.

This list is in no sense exhaustive. Many of those familiar with the French writers will doubtless object that Roquerol, Alvin, Girardon, Boffocher, Challeat, Le Rond, Percin, and numerous others have not been included. The controlling idea, however, has been to give a list which would be within the means, both as to time and money, of the average officer, and at the same time a list which would contain the cream of the French thought.