

VOLUME X

NUMBER 3

MAY-JUNE

**THE
FIELD ARTILLERY
JOURNAL**

EDITED BY

ARTHUR F. CASSELS

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

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

**COPYRIGHT, 1920, BY
THE UNITED STATES FIELD ARTILLERY ASSOCIATION**

Contents, May-June, 1920

Trophy Presented to the Citadel of Verdun	<i>Frontispiece</i>
Power of Fire	209
Translated from the French by Colonel Harry L. Hodges, General Staff	
Ammunition Supply and Distribution	238
By Colonel A. S. Fleming, Field Artillery, U. S. Army	
Being A Tactical Study of the Field Artillery Group in Retreat	243
By Lieut. Col. A. H. F. Weber, C. M. G., D. S. O., <i>psc.</i> , R. F. A.	
Organization Under the New Law	273
By Lieut.-Col. Oliver L. Spaulding, Jr.	
Questions Affecting Artillery	279
Lecture by General Le Gallais to the Officers of the 16th Infantry Division, French Army.	
Notes on Maps	289
By Major C. H. Marks, Corps of Engineers, U. S. Army.	
The Horse and the War (Concluded)	295
By Captain Sidney Goltrey, British Army.	
Current Field Artillery Notes	310
Submerging a 75 mm. Self-propelled Mount. German Opinion on Heavy Field Artillery and its Assignment to Divisions.	
The United States Field Artillery Association	321
Proposed Amendments to the Constitution.	
Book Review	327
Index to Current Field Artillery Literature	328

THE UNITED STATES FIELD ARTILLERY ASSOCIATION

Organized June 7, 1910

OFFICERS

PRESIDENT:

Major-General Wm. J. Snow, U. S. Army, Chief of Field Artillery.

VICE-PRESIDENT:

Colonel Geo. Le R. Irwin (Field Artillery) Inspector-General's Department, U. S. Army

SECRETARY-EDITOR AND TREASURER:

Lieutenant-Colonel Arthur F. Cassels (Field Artillery), U. S. Army, Retired

EXECUTIVE COUNCIL

Major-General Wm. J. Snow, U. S. Army.

Brigadier-General Fox Conner, U. S. Army.

Colonel George E. Leach, National Guard of Minnesota.

Colonel D. C. Weld, National Guard of New York.

Lieutenant-Colonel A. A. Starbird, U. S. Army.

THE FIELD ARTILLERY JOURNAL

Edited by

Arthur F. Cassels

Lieutenant-Colonel (Field Artillery), U. S. Army, Retired.

PUBLISHED BIMONTHLY FOR

THE UNITED STATES FIELD ARTILLERY ASSOCIATION

BY J. B. LIPPINCOTT COMPANY

227 SOUTH SIXTH STREET

PHILADELPHIA, PA.

LONDON OFFICE: J. B. LIPPINCOTT COMPANY, 34 Bedford Street

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

Entered as second-class matter November 20, 1915, at the post office at Philadelphia, Pennsylvania,
under the Act of March 3, 1870.

CLUBBING ARRANGEMENTS WITHDRAWN

Because of the increased cost of manufacture it has become necessary for the U. S. Cavalry Association and the U. S. Infantry Association to withdraw from the clubbing arrangement with the U. S. Field Artillery Association; therefore, the offer of the U. S. Field Artillery Association to obtain for its members subscriptions to the Cavalry Journal at \$1 per annum and to the Infantry Journal at \$2 per annum must be withdrawn. The Secretary of the U. S. Field Artillery Association will be glad to place subscriptions to the other magazines for members, but can do so only at the regular subscription rates of those magazines. The Field Artillery Journal can be furnished hereafter to members of other Associations only at the regular subscription price of \$3 per annum.



TROPHY PRESENTED TO THE CITADEL OF VERDUN
By the Staff and Students of the Army Centre of Artillery Studies, Treves, Germany

Trophy Presented to the Citadel of Verdun

BY THE
MEMBERS OF THE SECOND AND THIRD CLASSES AND THE CENTRE'S STAFF
OF THE

ARMY CENTRE OF ARTILLERY STUDIES, TREVES, GERMANY

This trophy was presented to the Citadel of Verdun as a slight token of appreciation for the hospitality and valuable instruction received by the American officers from the French officers stationed there during the visits on staff rides of the former.

The trophy, as may be seen from the photograph, consists of a bronze shield, holding together the French and American flags. On this shield is represented the Citadel of Verdun, framed in the ribbon and bearing the Cross of the Legion of Honor which was bestowed upon it for its heroic defense—an achievement that will live forever in history. Upholding this is the American eagle, representing the aid that America rendered the common cause, and bearing in its talons laurels of victory. On either side are branches of oak and laurel representing strength and victory, with the lions, guardians of Verdun. Surmounting it all is the Cock of Gaul, crowing in triumphant victory.

The following is inscribed on the breast of the American eagle:

En Souvenir des visites des Officiers
Américains du Centre des Etudes d'Artillerie
de Treves
A Verdun, Mars et Avril, 1919,
et en reconnaissance de l'Accueil Fraternal qu'ils
ont reçu de leurs Camarades Français,—
General Passaga,
General Valantin,
Colonel Faugeron,
Lieut.-Colonel Sarot,
Commander Serdet.

On the outside ribbons are inscribed the names of the officers who subscribed for this token of the hospitality they received from their French comrades at the Citadel, as follows:

Brigadier Generals

Harry G. Bishop
Henry W. Butner
Wm. C. Cruiskshank
Wm. R. Dashiell
Adrian S. Fleming
Herman Hal
Johnson Hagood
Andrew Hero
Lucius R. Holbrook
Tieman Newell Horn
Evan M. Johnson
Augustine McIntyre
Edward A. Millar
Manus McCloskey
Frank Parker
Fred W. Sladen
F. Le J. Parker
Lutz Wahl
Pegram Whitworth

Colonels

Frederick T. Arnold
Otto L. Brunzell
Joseph R. Davis

Laurence Halstead
A. U. Faulkner
Nathan Horowitz
Alden C. Knowles
Howard L. Landers
Morris E. Locke
Richard McMaster
Thomas A. Pearce
Robert H. Peck
Russell P. Reeder
James P. Robinson
Edgar A. Sirmyer
Edmund K. Sterling
Ernest S. Wheeler

Lieutenant Colonels

Richard E. Anderson
Alfred Arnold
D. M. Beere
Charles C. Benedict
Frank Bloom
Charles R. Blunt
Arthur R. Christie
Louis A. Craig
Shepler Fitzgerald
Jesse Gaston

William D. Geary
Wm. W. Gordon
Wm. C. Harrison
Harcourt Hervey
Evan Lewis
Allan C. McBride
Kenneth P. Lord
Marshall Magruder
Wm. W. Overton
Bernard Peyton
Robert Phinney
Ralph Royce
L. C. Sparks
Frederick B. Terrell
Eugene B. Walker
Newton Polk

Majors

Robert M. Bathurst
Robert B. Caldwell
William M. Cravens
Joseph D. Coughlan
Peter C. Geyer, Jr.
John Stewart Harrison
Thomas George Lanphier
Martin F. Scanlon

The trophy was presented to General Valatin, commanding the Fortresses of Verdun, at the Citadel, on June 4, 1919. The presentation was made by Major General Ernest Hinds, Chief of Artillery, American Expeditionary Forces.

The trophy now hangs in the Citadel.

THE FIELD ARTILLERY JOURNAL

VOL. X

MAY-JUNE, 1920

NO. 3

Power of Fire

A study of the changes necessitated in the different arms and in the ideas touching upon the conduct of operations which the power of fire has brought about during the war, 1914-1918.*

SUMMARY

I. A retrospective view of the general characteristics of war during the nineteenth and twentieth centuries. The evolution of our conception of war from 1870 to 1914.

II. The preponderant rôle of fire in the war of 1914-1918; changes in the tactical organization of the different arms which resulted from it.

III. Evolution of the general ideas and methods governing the conduct of operations, under the influence of the progress in arms, armament and in fire action.

Conclusions.

CHAPTER I.

SINCE the campaigns of Napoleon, three great causes have modified profoundly the forms of combat and the processes of military operations; they are:

The development of arms (power of fire).

The tremendous increase in effective strength (numbers).

The progress in means of communication.

A. NINETEENTH CENTURY

Of these three causes, the two last are the ones which have exercised the greatest influence upon the development of operations

* Translated from the original French by Colonel Harry L. Hodges, General Staff.

THE FIELD ARTILLERY JOURNAL

in the wars of the middle and last of the nineteenth century (1866, 1870-71, 1877-78).

Power of Fire.—It is remarkable that Prussia triumphed in 1866 and in 1870-71 without her armies having had an absolute superiority of artillery and infantry fire over those of Austria and France.

1866. The Prussians whose infantry was armed with a rifle (Dreyse needle) had some batteries equipped with a gun quite perfect for that epoch (Krupp gun, breech loading). Their artillery was, nevertheless, dominated in several encounters by the Austrian artillery, surer in its methods and more readily manœuvred.

1870-71. The Germans employed their Krupp material with boldness and power, while the French artillery, used timidly and dispersed, was paralyzed by reason of the adoption of a defective fuse, time fire being impossible between 1500 and 5000 metres. On the contrary, the French had a rifle (Chassepot) superior to the Dreyse and from which they obtained excellent results (losses of the German infantry in the battles of the month of August).

If the Prussian command gained the war in 1866 and 1870-1871, it was due above all to the manner in which it conducted its operations taking advantage of the number and the means of communication, in a word, "manœuvre."

1877-78. The first war of the Balkans was fertile in information relative to infantry fire and the necessity for artillery support for infantry. It was before Plevna that the Russians and the Roumanians used the first pieces of heavy artillery. But these lessons in the power of fire appear of secondary interest with regard to the strategic and tactical passiveness of the Turks.

The Increase of Effectives.—Prussia, vanquished by Napoleon in 1806, restored its military strength by instituting universal obligatory service and in organizing *mobilization*; it carried thus to a very high degree of perfection the system of the "Nation in Arms." Its High Command and the Great

POWER OF FIRE

General Staff, by their reasonable and concrete studies, familiarized themselves with the handling of mobilized armies (conduct of war, initial reunion of the forces, marches and strategic manœuvre, communications, etc.).

The mastership shown by Von Moltke in 1866 and 1870 in the mobilization and concentration of his armies should be contrasted with the fatal error committed in 1870 by the French, who concentrated and mobilized simultaneously and who fought successively their active army and the masses organized from their reserves. (The Germans invaded France with 512,000 men against 240,000, this being the total strength of the seven mobilized French army corps.)

Improvement in the Means of Communication.—This development took place in the road systems, transport and communication.

At the time of Napoleon, the road systems were not dense; there was found on an average in western Europe 15 to 20 kilometres between parallel routes. In 1866 and 1870, Von Moltke, in order to move his armies, was able to use a road on each 8 kilometres of front; thus the German masses were seen to be manœuvred with flexibility in the half-deployed formation, immediately available for combat or manœuvre (quick thrusts at St. Privat and Sedan).

Transport.—The invention and development of the railways assured the mobility and the facilities of supply demanded by the enormous increase in their effectives. (Services rendered by the railways in 1839, 1866, 1870-71.)

The most important of these services consisted in the possibility of multiplying the lines of communication and in making them the most powerful instruments of strategic manœuvre. In this connection note the skill and boldness of the Germans in the use of railroads in 1870-71. (Unloading on the field of battle, transport during operations, use of tracks in proportion to the advance on Paris, organization and use of the lines of communication, etc. Witness, on the French side, a use much less methodical, and grave misuses, such as those that marked the transport of the army of Bourbaki of the East.)

THE FIELD ARTILLERY JOURNAL

Communication.—At the same time that these changes in the railroads occurred the electric telegraph developed and transformed the conditions of the command of armies in the field.

1870-71. Superior directing of the German armies by the German G.H.Q. installed at Versailles; conduct of the national defense by Gambetta, who, from Tours, gave the impulse to the provincial armies.

Thus, it appears clearly that in the nineteenth century, after Napoleon, the manner of making war and of giving battle was only moderately influenced by the progress in arms and that the essential principles of Napoleonic strategy and tactics (all of movement) took on a greater value because the masses could be moved with more rapidity and precision. We are thus led back to the incomparable model for the war of movement—Napoleon.

B. TWENTIETH CENTURY

The wars of the Transvaal and of Manchuria, and that of the Balkans showed no appreciable progress over what Von Moltke had done in the matter of mobilization, in the handling of armies, in the preparation and conduct of battle; but they served to bring out in relief the increasing power of armament characterized by smokeless powder, the repeating rifle with a flat trajectory, the machine gun, the artillery of accelerated fire, then rapid fire (light and heavy), realizing ranges longer and longer and able to employ greater numbers of projectiles.

In the Transvaal (as in the first year of the War of the Balkans) there appeared above all the efficiency of the "adjusted fires" used by an entrenched infantry. The British infantry, poorly supported by an artillery which was too weak and which did not accompany it with its fire, broke only with difficulty the resistance of the Boers (militia deprived of cohesion and of the offensive spirit, but excellent riflemen). (Typical example of the combat of the Modder River, November 28, 1899, in which the troops of Lord Methuen were surrounded during five hours within a circle of fire without the Boers thinking to attack or outmanœuvre them.)

POWER OF FIRE

In Manchuria and in the second war of the Balkans the value of the machine gun revealed itself (at the same time an instrument of the offensive and of the defensive). There were revealed also the redoubtable effects of heavy artillery (Manchuria and Balkans) and of light rapid-fire artillery (Balkans), the decisive importance which the mission of artillery took in battle by the accompaniment of infantry, counter-battle destruction, etc. It was noted there that the fight became indecisive when the opposing artillery was equal. There was found a phenomenon already noted in 1870 (St. Privat, Hericourt-La Lisaine, Champigny, Buzenval), that is, the inviolability of fronts upon which the power of fire is assisted by a judicious use of field fortification and notably of continuous defensive organizations of which the flanks are supported on impassable obstacles (Tachataldja).

The deep study of these wars from the beginning of the twentieth century should have made us foresee the preponderant rôle which, in the conflicts of the future, would be played by the use of fire—principally of the fire of artillery. Nevertheless, in spite of the warnings of authorized witnesses, we did not depart from the beliefs that the study of the lessons of the war of 1870 had formed for us; that is to say, from our absolute faith in the offensive by movement, cost what it may. Even the idea of the inviolability of fronts strengthened our belief in the manœuvre and in evolution which in the tactical, as well as strategic, consideration look towards the overflowing or envelopment of the adversary.

Rapid-fire artillery not having appeared in Manchuria and the Japanese having proved themselves unskilful in the subject of the use of heavy artillery, the information from the Russo-Japanese War concerning tactics and technic of artillery was of little value. From the second war of the Balkans, we gathered only the fact of the enormous superiority given by the rapid-fire field artillery of French make over corresponding Krupp material. Consequently, while admitting that in these campaigns the power of fire had been a considerable factor in

THE FIELD ARTILLERY JOURNAL

the victory, we admired, above all, the offensive, the spirit of the victors, the thought of the manœuvre, the skill of movement under fire, and we did not know enough to draw categorical conclusions of the necessity of increasing our armament and perfecting our methods in the use of fire. In the place of pushing the development of our matériel of war (artillery, automatic arms, aviation) the military writers vaunted in the general problems of the field of battle, based upon the increase of the power of fire, those solutions called "economic" or quite speculative ones. (Examples: la Plaque Malandrin, the steps of moving the infantry in the zone of fire, turtle covers, filtration, oblique marching, etc.)

In sum, that which struck us in the spectacles of the wars from the beginning of the twentieth century was the passivity of the vanquished (Boers, Russians and Turks). As we were living in the sad souvenir of our ancylosis of 1870, our general conception of war and our ideas of battle did not find themselves practically modified by it.

CHAPTER II

PREPONDERANT RÔLE OF FIRE DURING THE WAR OF 1914-1918

To understand the preponderance of the factor of fire in the battles of 1914-1918, one may study the actual experiences of battle (*faits de guerre*) or examine the evolution of arms in the combat units. A critical analysis of the actual events of battle is not my present intention. It is rather to consider the organic transformation in combat units from the viewpoint of armament, for these changes are based upon the same experiences in war. Their examination, completed by that of the methods of combat in the different arms, permits us to separate readily the successive changes of combat in the different arms.

A. INFANTRY

Our infantry entered into the campaign with the armament corresponding to its conception of a war of movement, short and violent. (Rifles, bayonets, machine guns.) The assignment

POWER OF FIRE

of automatic arms was two machine guns per battalion. Its rifle was out of date.

In the first encounters the automatic arm affirmed its power. The conditions of its use in attack and defense, the necessity of opposing to it machines of superior power and of offering to it only small objectives transformed rapidly the organization and tactics of the regiment, of the battalion and of the company.

At first the allotment of machine guns was increased in the brigade quota. Then the magazine rifle of 1886-93 was replaced by the rifle of 1907-15 (with clip). The automatic rifle was adopted in February, 1916; finally, on September 27, 1916, as a result of previous fights and experiments rationally conducted on the target range, the company and battalion were reorganized to fight with a powerful and complex armament which permitted the use of direct fire and of indirect fire.

This armament, in which the automatic arm held the major place, comprised the automatic rifle, the machine gun and rifle grenade (curved fire), the infantry gun and the gun of 37 mm.¹ At the same time the methods of combat of the smaller units were clearly changed in the general direction of the use of formations at the same time extended and deep. (Diminution of density, echelonment in depth.)

The tactical use of the machine gun was perfected. Its indirect fire made of it an arm of accompaniment and of interdiction fire.

The organization of September 27, 1916, divided the company into four sections, provided with the same means of fire combat (in which the half sections were not homogeneous). It lasted until September 10, 1917, upon which date the General in Chief divided the company again into eight homogeneous half sections. This transformation was a result of the power of fire which obliged the infantry in the offensive and the defensive to be divided into groups small enough to permit the exigencies of cohesion and of the use of fire.

¹ Without considering numerous Trench machines.

THE FIELD ARTILLERY JOURNAL

But the change in the company towards an organic formation of identical combat groups, of a minimum strength and having at the same time capacity for fire and the greatest possible movement was not achieved. Our researches were built upon the use of an automatic arm more easily handled than our machine gun, more powerful and rugged than our machine rifle, that is to say, a veritable light machine gun which will become in very fact the nucleus of the combat group. The tactics of small units will be based upon the rational use of this arm (placing it, moving it, supplying it, protecting it, etc.).

Already the half sections, such as were provided for by the note of September 19, 1917, had appeared to be too unwieldy, and we foresaw the divisions of the company into twelve combat groups (three groups to the section).

Meanwhile these profound modifications of the organization and of the methods of combat of our infantry would have had, opposed to the German infantry, only a temporary efficiency if we had not assured for it the decisive support of the tank. In effect, the fight is made up of fire and of movement. From 1914 to 1917, fire has been perfected so much by the improvement of mechanism that the movement of infantry upon the field of battle is possible only with the support of and under the protection of powerful artillery; this diminution of the factor of movement was so noticeable that there came to be distinguished two classes of war, the war of movement and the war of position. The use of the motor and of the caterpillar tractor gave to movement a great part of its importance, combined with armored concealment, it assured to the users of machine gun and of the infantry cannon a certain invulnerability which will be employed with the greatest profit in the "manœuvre."

The appearance of mobile armour upon the field of battle opens up other perspectives as yet undeveloped. One can conceive henceforth an infantry in which the combat group armed with automatic arm will manœuvre and fight in armor, that is to say, in a tank. The economy of personnel that a company

POWER OF FIRE

thus organized will permit to be realized in comparison with a company of actual machine guns is at once noticeable.

To summarize: The changes in infantry in the course of war brought about by the power of fire include divers phases which correspond to the methodical perfecting of its two methods of action, fire and movement. The infantry commenced first by increasing the capacity of fire, and accomplished this without becoming too unwieldy. At the same time it extended its formation of march and of combat in order to reduce as much as possible the effect of hostile fire. But its mobility upon the field of battle will remain strictly subordinated to the support of artillery until the moment when the tanks of accompaniment shall permit it to free itself in a certain measure of the mechanism of this support.

B. CAVALRY

As is natural, our cavalry was in 1914 still more than our infantry imbued with the idea that movement and shock were the decisive actions of battle; it is with this thought that it undertook its double task; its missions of reconnaissance, of security and its missions of combat. It found before it a cavalry, refusing all mounted collision and making systematic use of fire action (combat on foot or supported by advance elements of infantry).

It is true that by this play the German cavalry lost all offensive power; hence the complete overthrow of his cavalry divisions during our retreat to the Marne, and even during "the race to the sea." But, on the contrary, our cavalry encountered immediately extreme difficulty in grappling in conflict, being able to lay hold only on indefinite outlines. It saw itself paralleled in its work of investigation by aviation, which is able to reconnoitre from above. On the other hand, engaged upon the front of battle, maybe in order to cover or prolong a flank, maybe to close a breach, it learned immediately the violence of long dismounted combats for which its larger units were prepared neither tactically nor organically.

THE FIELD ARTILLERY JOURNAL

A change took place then of which the steps may be summarized as follows:

First Phase.—The divisions of cavalry augmented the number of their combatants on foot, until that time represented alone by the cyclist groups. At the very first, some chiefs took the initiative of forming foot units with the troopers who were temporarily dismounted; then this measure became general by the creation in each regiment of the fifth (foot) squadron, finally the joining in a tactical group of the foot squadrons of each division of cavalry, giving birth to the "groupe leger,"² a veritable battalion of reserves equipped with a platoon of machine guns (August, 1915). Paralleling this the armament and equipment was adapted to the exigencies of the service of the cavalry in the trenches.

Second Phase.—The tendency to form specialists in fighting on foot, distinct from the combatants on horseback, took definite shape in the form of a reduction of the effectives that the cavalry placed at the assistance of the artillery (men and horses). Some divisions of cavalry were dissolved. Six regiments of cuirassiers were dismounted and served with the "light groups," previously created, to form foot regiments after the model of infantry regiments. A foot regiment as an organic support was attached to each division of cavalry; the divisions of cavalry consisting henceforth of three mounted brigades, one foot regiment, one cyclist group, three horse batteries, two groups of automatic guns.

Third Phase.—Finally, in December, 1916, there came into use a truly new principle, which caused the modeling of an organization and instructions of all cavalry upon the practice of combat dismounted, considered as the normal method of combat of that arm. The steps of the change were marked by four documents. Instruction of December 8, 1916, upon the use of cavalry in battle and the note of December 10, 1916, modifying the tactical organization of the squadron (reduction to three platoons having each approximately the combatant

² Light group.

POWER OF FIRE

strength and specialists of the section of infantry). Note of July 10, 1917, which established the squadron with four platoons while increasing its strength.³ Note of November 27, 1917, which gives to the squadron such a formation that henceforth the cavalry will be able to put on foot units of combat *indentical with those of the infantry*.

Besides the fire strength of the large units of cavalry being considered insufficient, the General in Chief caused to be established at the end of 1917 a program which provided for the division of cavalry the reinforcement by a cyclist group, by some section of regiment machine guns, by some⁴ A.M.A.C.'s and by horse artillery; for the corps of cavalry, the creation of corps artillery.

At the beginning of 1918 the six foot regiments of the six divisions of cavalry then existing were grouped by three's in order to form two divisions of foot cavalry (D.C.P.). We had then two cavalry corps formed respectively of three divisions of cavalry (D.C.) and of a division of cavalry on foot (D.C.P.) each capable in consequence of dismounting a force equivalent to two divisions of infantry. It was the assimilation of the cavalry corps to the army corps.

Some words upon the question, violently disputed, of the possibility of the use of the large units of cavalry (cavalry divisions and cavalry corps); it is necessary to start this discussion by recalling that a cavalry division is able to put in line only a number of foot soldiers equivalent to a regiment of infantry and in the place that a mounted cavalry division occupies in extent. Concerning the use of the cavalry division and cavalry corps in the battle of 1918, these large units have been a very precious instrument of strategic manœuvre in the defensive phase of the battle; the armistice intervened too soon to have been able to use them in the offensive phase against an adversary who had reached the limit of resistance and was ripe for rout.

³ This measure was based upon two reasons, 1st: Lack of flexibility in the squadron of three platoons. 2nd: Insufficiency of total effective strength, (140 men) to the exigencies for the formation of specialists.

⁴ Auto mitrailleuse, auto cannons.

THE FIELD ARTILLERY JOURNAL

It has been desired to consider these successive transformations in the small and large units of cavalry as a consequence of a fatal law, which led that arm to the form and to the activity of a simple mounted infantry. This conception is in error—rapidity and mobility remain the distinctive qualities and the "raison d'etre" of the cavalry. What it is necessary to have are units of cavalry having on foot a power of fire very nearly equal, man for man, to that of the infantry and endowed with those qualities of dash and flexibility when mounted that it has had in the past. Thus constituted the cavalry remains a necessary arm. It will be understood better when we have defined the characteristics and examined the actual capacity of its parallel arm, the aviation.

C. AERONAUTICS

The War of 1914-1918 has made of aeronautics an "arm" of the service, that is to say, a force of which its intervention in battle is able to be an element indispensable to success, and of which the use (technical, tactical) can be submitted to certain rules.

This is evidently a consequence of the fact that aviation manœuvres and operates in the "three dimensions." But this accession of aeronautics to the dignity of an arm certainly cannot be accomplished if the aeroplane remains a simple vehicle in place of becoming, at the same time, an auxiliary and an instrument of the fire fight.

The rôle of aviation is double; missions of information and liaison and missions of combat.

Information. Liaison.—During the first operation of the campaign, conforming to peace time ideas, aviation was employed only in strategic reconnaissance. It was a question above all of watching the "mobility" of the enemy.

In proportion as the front became stabilized and its task was increased, it was necessary to watch the activity of the enemy either in position or in movement. The work of strategic reconnaissance losing immediate interest, aviation found its

POWER OF FIRE

work increased by that, always more intense, of tactical observation. Hence follow the recourse to aerial photography and the establishment of numerous observation units operating: first, for the assistance of the command (reconnaissance, mission of liaison), and second, and above all, for the artillery (mission of fire).⁵

Combat.—The missions of combat aviation are of two kinds: aerial and the attack of objectives on the ground.

(a) An aerial combat has for its object the mastery of the air; it becomes necessary from the moment when each of the opposing forces of aviation has to protect its work of observation.

The pursuit, born thus in 1915 under the form of single combats, developed from the beginning of 1916 (in Verdun in February) into the tactics of the offensive by groups operating under the same command; it became during the battle of the Somme (July and October, 1916) one of the principal factors of our success by permitting our observation squadrons to work in all security with the artillery and with the infantry. The methods of execution of its missions of fire and of liaison reached, in the course of this battle, a high degree of flexibility and precision. In 1917, the lesson of the Somme was not lost sight of by the Germans; our aviation groups, although reinforced and given rugged and rapid apparatus, hurled themselves upon a hostile aviation, ardent, well-equipped. Thus, 1918 is marked not only by a simple increase of our means of pursuit, but also by a tactical organization which guaranteed their action in mass, leading to the formation of the aerial divisions.

1914. (b) The attack of objectives on the ground took a continually increasing breadth from 1914 to 1918 as had aerial combat but with less of continuity in its development, such was the beginning of day bombardment, the dropping of steel arrows, etc.

⁵ Note at the armistice November, 1918, there were 100 flying machines of observation for 75 flying machines of combat and of bombardment.

Squadrons of Observations	148
Squadrons of Combat	80
Squadrons of Bombardment	39

THE FIELD ARTILLERY JOURNAL

1915. Day bombardment intensified in two forms; action in battle in connection with the other arms, (projectiles of 90 to 155 without precision and without efficiency) and grand aerial raids on enemy territory.

The success of two large expeditions upon Ludwigshafen and Carlsruhe taught us to devote powerful means to these raids; the enemy countered by the pursuit and inflicted upon us costly checks (example, Sarrebruck), so that the year 1915 finished with a dearth of day bombardment.

1916. Beginning of night bombardment which revealed to us the importance of night reconnaissance in order to learn the indications of the activity of the enemy.

1917. Methodical development of night bombardment and the reappearance of day bombardment executed by Bréguet machines under the protection of pursuit groups.

1918. Large raids were abandoned for moral, political, tactical reasons; direct intervention in battle becomes the regular thing (intensive use of the machine gun in phases of operations. That is to say in the crises). As a result, while in January we had six bombardment groups, at the armistice we had ten groups. The action in mass of these groups was assured at first by the division into squadrons, then by incorporation into an aerial division.

(c) The aerial division was created on May 15, 1918, by the union of two mixed groups (comprising pursuit and bombardment—a total of 600 flying machines of which 370 were pursuit; 230 were bombardment). This creation answered at first the primordial necessity of defensive combat; then followed its use in reserve—finally, it guaranteed the concentration of efforts and the effect of surprise to the different phases of the strategic offensive. The importance of the equipment of the front with aviation fields became evident.

This survey of the development of aviation may be summarized in the following words:

Used at first exclusively by the command in strategic and tactical observation, the flying machine was soon utilized for

POWER OF FIRE

assistance in producing fire effect and began its observation for the artillery. As it manœuvred in the "three dimensions" and its radius of action continued to increase, it was able to escape, in a certain measure, the blows coming from the earth and to see those objects which escaped (on account of distance and other causes) the fire of artillery and of infantry; it armed itself then to fight its fellow-creatures in the air in order to prolong upon the objectives on the ground the action of the fire of the infantry and of artillery.

Thus its development is intimately tied to the problem of the use of fire. Certainly it has not reached its limit and one can foresee a future in which the technical development in our aviation will transform profoundly the conditions of the fire fight.

But it must not be forgotten that the use of aviation in battle, at this time, is limited above all by the double necessity, first of navigation while orienting itself upon the ground. Second, of landing upon terrain especially prepared. Hence follows intermittent liberty of action (that is to say, subject to atmospheric conditions) and lack of mobility (the use in mass is subordinated to the existence of and to the installation of landing grounds).

Aviation consequently is not ready to supplant either cavalry or artillery, the latter in the use of fire and the former in the mission of reconnaissance and of liaison.

D. ENGINEERS

Before this war there was assigned to the engineers in the field a triple mission, fortification work, communication work, mines and demolition. It is well to note the changes brought about in the three methods of activity by the power of fire.

Fortification.—Since the fronts have stabilized themselves on account of the combatants digging into the ground—a phenomenon brought about by fire—the fortification of the field of battle has taken an enormous extension; based upon the echelonment of the forces in depth, it has been forced to include little by little all of that series of organizations which have for

THE FIELD ARTILLERY JOURNAL

their object the assuring of deployments, of movement and of placing under cover the units engaged (that is to say, in sector). Thus, the reinforcement of the divisional engineers has been forced upon us immediately and in a way the more imperative because it was necessary to overcome a real incapacity of the infantry in the use of tools. Hence, at the end of 1914, we had two companies of engineers to each division of infantry. Following this, the individual soldiers familiarized themselves with the work of the war of position and sapper-miners were able to confine themselves more and more with the tasks which required superior technical skill. It was this which explains why they were organically reinforced in 1914 (from memory—the creation of special units, companies of M.D.,⁶ companies of workers in cement, etc.), answering the necessity of extending their work to include that of camps and cantonments.

Communications.—In the last years of the nineteenth century our conception of a war, all of movement, had led us to the belief that the engineers would become more and more the arm of the communications. The importance which the problem of communications has taken in the preparation and the development of battle have proved to us how correct this view was, but it is necessary to distribute to-day powerful technical means (personnel and matériels) in order to move and supply the armies in operation, it is not only because these armies employ an enormous strength of men and enormous equipment, but it is also on account of the efficiency of the destructive action of the artillery and aviation against the lines of communication. (Study the results in this respect which certain preparations of artillery in attacks against limited projectives have brought about—the field of shell holes). The rôle of engineers as specialists in the work of communications has increased at the same time with the power of fire.

Mines and Demolition.—Inversely, the increase in the fire of artillery (A.L. and A.L.G.P.)⁷ has progressively freed the

⁶ M.D.—Mines, Demolitions.

⁷ Heavy Artillery and Heavy High Powered Artillery.

POWER OF FIRE

engineers from the rough work of mines and of putting in operation demolitions in the preparation and execution of attacks. During the first half of the war numerous companies of sappers were employed in subterranean warfare, but rare have been the cases in which the mine has been able to contribute efficiently to the success of an important operation. (Carmey, May, 1915, 17 mine chambers, from 300 to 1500 kilogrammes; Messeines, June, 1917, 19 mine chambers loaded with a total of more than 400 pounds of explosives.) This type of war disappeared little by little in 1917. More quickly yet had the employment of engineers as artisans of demolition, who opened the way to the infantry, been abandoned. It was from the middle of December, 1914, that field artillery commenced to utilize the explosive shell with non-delay fuse in order to make breaches in the systems of wire entanglements, and the attack accessories; then came the artillery of the trench, etc.

Thus, without having had to modify, under the demand of new conditions in fire fight, its tactical organization (armament and interior organization of small units) the engineers have nevertheless been obliged to adapt their activities to these conditions.

Supplanted by artillery in the current work of demolition upon the field of battle, it has seen infantry take charge of the work of the organization of the terrain. Its principal domain rests then in the technical works of fortification and of communications, and this domain will not cease to grow with the progress of mechanism, particularly of arms.

E. ARTILLERY

The artillery is *the fire arm*.

The characteristics of its change in the course of the war are going to form the base of the work of the C.E.A.⁸ It suffices then to recall here that this change has assisted in creating a system of artillery (projectiles, matériel, methods of fire, doctrines of employment) capable of striking (destruction or

⁸ Centre Études Artillerie.

THE FIELD ARTILLERY JOURNAL

neutralization) all the objectives on the field of fire under whatever form they present themselves.

Importance given respectively to the power and to the mobility of our present system of artillery: the development of mobility has appeared from the tactical and strategic point of view of an essential interest during the war not only in the phase of attacks on limited objectives, but also in the greater movements of 1914 and 1918. The future in this respect will see the artillery on caterpillar trailer, and the fight of tanks against tanks.

CHAPTER III.

EVOLUTION OF GENERAL IDEAS AND OF MEANS BEARING UPON THE CONDUCT OF OPERATIONS UNDER THE INFLUENCE OF THE IMPROVEMENT IN ARMS

HAVING considered in detail the "means of fire" of which each arm disposes to-day, we can begin the examination of several ideas and general problems of strategy and tactics, in order to form an idea of the influence of this recent improvement upon the conduct and development of operations.

A. EXTENSION AND CONTINUITY OF FRONTS

The extension of front in modern war has been a consequence of the "divisional system" (organization of armies into divisions). Napoleon is the first who knew how to draw from this extension its greatest strategic advantages; primarily strategic security, then the initiation of operations. He held the entire theatre of operations with his forces disposed in a formation such that the enemy was able neither to defeat them separately, nor to prevent their concentration where battle was imminent. This was what he called "having the army concentrated."⁹

⁹ Examples—Campaign in Italy (1796-97). In April, 1796, 60,000 men disposed over 120 kilometres; later 45,000 upon the line of the Adige which measures 160 kilometres from Indre Lake to the sea.

1805. Disposition of the Grande Armee upon a front of 200 kilometres between Wurzburg and Strasbourg.

1806. Concentration upon the Marne 200 kilometres.

1812. Concentration in space of 400 kilometres.

1813. Operations around Dresden disposed upon 150 kilometres, etc., etc.

POWER OF FIRE

In the conflict of nations in arms the initial concentration of the forces has taken a unique character; the opposing armies are so disposed by groups as to be able not only to support each other and to concentrate rapidly in one or more points of the strategic chess-board, but also able to establish without delay a continuous front of engagement.

This tendency to the immediate realization of a continuous front is, without doubt, favored by the enormous increase in effectives put in line and, as in 1914, by the fact that the adversaries executed their respective concentrations nearer to their frontiers and entered into contact very rapidly; meanwhile, the deepest reason for it should be sought in the actual power of fire which forbids the offering of flanks to the enemy and which assisted by a skilful use of terrain permit the mastery of large spaces with weak holding forces. *The continuity of front has become one of the first conditions of strategic security.*

Note the phenomenon of the establishment of "front" in the various theatres of open operations during the war of 1914-1918. The flanks of the strategic dispositions now seek the support of impassable obstacles because the power of fire gives to flank manœuvres an effectiveness continually growing greater. Example: "the race to the sea."

B. DEFENSIVE AND OFFENSIVE

1. Defensive.

In order to conquer, it will always be necessary in the last analysis and in the final phase of operations to have recourse to the offensive. But industrial progress and especially the improvement in arms make of the defensive a plan more and more efficacious.

The defensive serves to gain time or to economize men. It is the greatness of this gain or of this economy which grows with the efficacy of fire.

Napoleonic War.—At the time of Napoleon the defensive force that troops were able to obtain from the use of fire was

THE FIELD ARTILLERY JOURNAL

relatively little; thus Napoleon usually defended himself by exposing some detachments—even cut off—to the blows of his adversaries or to play the fate of a manœuvre upon the capacity of resistance of a body of troops. Examples: 1805—a retreat was provided for (the evening before Austerlitz), should the enemy attack before the arrival of the corps of Davoust and Bernadotte; 1806—instructions given at Lamies; 1807—measures taken for the eventual concentration for the Grande Armée, stationed upon the right bank of the Vistula (retreat of Bernadotte's Corps).¹⁰

After Napoleon, in proportion as the power of fire increased, so the idea of positive results from a skilful defensive took shape and developed; it gave birth to a system of security based upon the use of detachments of all arms—the system in which the conception of the general advance guard has for the moment held a big place.¹¹

1. In short, one is becoming more and more conscious of the rôle which the defensive is able to play in the application of the principles of economy of forces. But for a long time the advantages of the defensive have been exploited with ideas totally foreign to this principle.

Examples drawn from the wars of the nineteenth and twentieth centuries—ill-omened charm exercised by the methods of the defensive combat upon the doubtful leaders and badly instructed armies.¹²

2. It was necessary to await the war of 1914-1918 in order to assign, on the part of the Germans at first and then of the Allies, a rational use to the defensive as an element of strategic manœuvre. Note the use of interior lines by Germany fighting upon two fronts, the redistribution of the French forces from the moment when the front became stable (in the passive sectors of the line, there were maintained only simple covering formations,

¹⁰ An exception may be drawn from the beginning of the campaigns of 1796 where the initial concentration of the forces is based upon the use of mountain positions lending themselves to a short defensive.

¹¹ It suffices to recall the discussion which took place in France between the partisans of the general advance guard and of the "mixed detachments."

¹² Bazaine the 16th and 18th of August, 1870—Kuropatkin in Manchuria, etc.

POWER OF FIRE

thanks to a very extended organization of terrain and fire).

2. Offensive.

To-day the offensive is able to obtain results only at the expense of an overwhelming superiority of means. In this respect experience has shown that artillery has become the arm "par excellence" of the offensive—hence the importance of having a system of artillery (every kind of projectile and type of matériel) and of realizing in the zone of attack the numerical superiority in batteries of all calibres. Consider also the consequences in the domain of strategy in which the expectancy of the Allies at the beginning of 1918 was vindicated; a double inferiority, that of effectives which caused them to await the entry of the Americans into the line, and that of armament which could cease only with putting into use, by the end of the spring of 1918, of the matériels of modern artillery and armored tanks lead to this vindication of their viewpoint.

C. STRATEGIC EXPLORATION (RECONNAISSANCE)

As has been seen in studying the changes in our cavalry from 1914 to 1918, the effectiveness of fire restrains singularly to-day the use of cavalry in exploration.

The service of reconnaissance has for an end not only gaining contact with the enemy but also the verifying of all the hypotheses that the General-in-Chief in building his plan figures as to the conduct of the enemy.

Gaining Contact.—Remains possible for the cavalry by means of certain precautions, but it reduces itself generally to the indication, more or less precise, of apparent outlines. The auto machine guns and the auto cannons constitute henceforth the machines of normal accompaniment of cavalry reconnaissances.

Verifying the Hypotheses.—The cavalry in this matter has a double superiority over aviation; it is able to make prisoners and to furnish "negative information." On the other hand, opposed to a vigilant and active enemy it will only exceptionally

THE FIELD ARTILLERY JOURNAL

be able to pierce the lines of security which cover the manœuvres of large opponents. Aviation, thanks to its faculty of observation from above by night, as well as by day, will be the more able to decipher the enemy's moves. But the work of exploration by flying machines can be embarrassed as is that of cavalry by fire from the ground: role of D.C.A. (Defense Centre Avion).

D. LINES OF COMMUNICATION

The lines of communication have to-day a sensitiveness at the same time less and more than in the time of Napoleon; less because the development of railways and roads permits of increasing them and consequently of using them with flexibility over the full extent of the theatre of operations and also because the extent and continuity of fronts assures to them permanent protection; the more because these lines offer very vulnerable points and have always to carry, in moments of stress a very heavy traffic.

Examples of Nineteenth Century.—War of the Secession—manœuvre executed in November and December, 1864, by General Sherman against the communications of the Southerners between Atlanta and Savannah with an army of 65,000 men (471 klm. in 26 days, destruction of 375 klm. of railway).

War of 1870-71.—Fear of Marshal Von Moltke for his communications between Paris and Germany, and the precautions that he took to safeguard them.

In studying the action by fire upon the lines of communication, consider the use of long-range cannon, bombardment by aeroplane and note the importance that these actions have taken in 1914-1918, while the choice of certain fronts of attack was limited by the vulnerability of the communications serving them.

Examples: Attack by Germans upon Verdun, 1916. "Rupture" of St. Mihiel. French offensive, April 16. American offensive, September 18. Reduction pocket Château-Thierry, July 18. French-American offensive, September 26, aiming at the main railway transversal line of communication,

POWER OF FIRE

Hirson-Mezieres, in such a way as to separate the German front into two fragments isolated by the Massif of the Ardennes—strategic value of the move. Comparison of the results procured by the bombardment by cannon and by aeroplanes.

E. FORTIFIED PLACES

The system of circular fortified places with a central citadel is obsolete. The reasons for this fact appear complex. In reality they lead to one only—the power of modern arms.

In order to escape the destructive effects of fire permanent fortification has to spread itself (dispersed order is the penalty of the progress in arms).¹³

Entrenched camps established after the old pattern should have an enormous perimeter if only to exempt their nucleus from the first bombardment of the enemy; they immobilize moreover for their defense a considerable number of men, and the real "raison d'etre" for a fortified place is really economy of forces.

On the other hand, with present-day armament envelopment is the decisive factor of success, since it facilitates concentration of fire, from which arises the organic weakness, so to speak, of the circular fortified places.

The "fortified region" took the place of the circular fortified place in 1915. (Decree of July, 1915.) Consider the fortified regions of Verdun, Belfort, Dunkerque, during the World War; they form an integral part of the front of which they constitute strong points.

F. MARCHING AND HALTS

The dominant factor in the formations for marching and for halts is that the depth of the field of battle is undetermined That is to say, that a body of troops in any battle formation

¹³ The "Fests" of the entrenched camps of Metz (Lothringen, Kaiserin, Kromprinz) establish a plan for dispersed formation to-day nearly superannuated (by reason of the power and of the quality of artillery material that are used in the attack of fortified positions) but which in 1914 had a very considerable value.

THE FIELD ARTILLERY JOURNAL

whatever is able to be observed and consequently under fire (gun or aeroplane) at considerable distances from the battle front.

Consequences:

(a) In the domain of tactics, marching formations, halt formations are characterized more and more by dispersed order. This leads to the art of camouflage, which is necessary henceforth on the unorganized as well as the organized battlefield. On stabilized fronts the "modus vivendi" is strictly subordinated to the conditions of the fire fight by reason of the permanence and precision of the work of observation: creation of the S.R.A. (Service Renseignement Artillerie¹⁴).

(b) In the domain of strategy, special precaution should surround the grand movements or assembly of masses. Examples may be drawn from the war of 1914-1918, and of the wars at the end of the nineteenth century;

1866. The evening before Sadowa: the three Prussian armies, with a total strength of 300,000 men, are assembled in a space of which the front measured thirty kilometres; that was decisive density of attack.

1870. The 18th of August the seven German army corps marched in broad daylight upon a front of 12 kilometres, which represents a density of more than twelve men per running metre. At Sedan, the evening of August 31st, the French army was concentrated in a triangle with a side of four kilometres.

1914-1918. Concentration and movement of the German mass of attack in March, 1918 (Eighteenth Army, Von Rutier), nineteen divisions of infantry moved by night marches to the base of departure of the attack, which measured 20 kilometres. On the side of the Allies: surprise realized by the English November 30, 1917 (battle of Cambrai); concentration of means for the counter-offensive on July 18, 1918, and for the attack of September 25, 1918, in Champagne.

Hence the importance, not only tactical but strategic of the dispositions taken to gain the mastery by fire (counter-preparation

¹⁴ Artillery Information Service.

POWER OF FIRE

of artillery, bombardment by aeroplane) of the probable zones of hostile assembly.

G. ECHELONMENT IN DEPTH

The idea of the echelonment of forces in depth held an important place in the instructions or tactical orders given by the High Command—by the Germans as well as by the French—during the war of 1914-1918. This echelonment was in response to a prime necessity for the preservation by the Chief, of his liberty of action in attack and defense, despite the power of fire employed by the adversary.

Actually, the perfecting of arms imposes on combatant troops extended order (less easily handled than close order) and the utilization of the terrain; a body of troops engaged is a "troop fixed," or nearly that, able only to advance or retire but not to move to the flanks. Battle demands thin lines, incapable of coördinated manœuvre. It is necessary, then, in order to manœuvre, to reserve means which should be held as long as possible outside the zone of hostile fire or at least under shelter from this fire. Besides the dispersion which is imposed on troops engaged allows an economy of forces and a facility of echelonment in depth.

Particular case of "defensive fronts": in the defensive, echelonment in depth ought to make one lose sight of the necessity of assuring the continuity of occupation of the front. The foremost outworks ought to be held even under risk of creating intervals by which the hostile infantry will penetrate and which will favor the concentration of fire and the movements of envelopment by the adversary. Lessons furnished in this respect by the defensive battle of 1918 (the infiltration). Note, June 24, 1918, by the Commander-in-Chief—definition and rôle of the positions of the Army (C.Q.G., 3rd Bureau, 29,686).

H. CONDUCT OF BATTLE

First. Offensive Engagement.—The rôle of fire in the beginning of the battle is preponderant whether it is a question of

THE FIELD ARTILLERY JOURNAL

using an advanced guard charged with gaining contact with the enemy, of reconnoitring, etc., or whether it is a question of attacking a known enemy while departing from an organized base.

In the first case, the advanced guards ought to be ready to become engaged immediately upon a front corresponding to the power of fire of the large units which they are to cover and to guide. In other words, they are not to expose these main bodies to concentration of fire or of manœuvres of envelopment which would hinder the deployment of their artillery. The advance guards will then be disposed in width (breadth); they will be capable of entering into action very brutally, that is to say, to deploy very quickly powerful means of fire. Hence, the placing of artillery of all calibres well to the front, disposed for engagement, and the capital importance of a good organization of observation (aerial and terrestrial) and of means of transmission of information.

In the second case, the first action of the attack is the assault which is prepared, supported, covered, etc., by artillery. *Different forms in which the fire action may then develop:* the determination of these forms has become one of the essential prerogatives of the High Command (factor of surprise). Examples: 1916-1917—The commanders of the groups of armies and of the army were free to fix the length of the preparations for attack, because each army attack formed part of the strategic manœuvre. *Choice of the zones of attack:* to the number of considerations which weigh in the choice of the zones, where the principal efforts ought to be applied, there should be considered of first importance the possibility of realizing powerful concentration of fire, of disrupting the enemy's artillery system, of assuring the forward movement of the artillery. A typical example may be drawn from the offensive battle of 1918: Manœuvre executed from the 8th to the 12th of August upon the Avre by the First French Army (plan of manœuvre based upon the capture of an artillery position—plateau to the north of Moreuil).

POWER OF FIRE

Second. "The Manœuvre."—Before 1914, one had "the manœuvre" a conception in which the factors "movement" and "men" played the principal rôles, if not the exclusive rôle, namely, the movement of their forces with a view to realizing at points judged favorable, the superiority of effectives, principally of infantry.

The idea of "manœuvre" is to-day enlarged; one manœuvres now also with fire; therefore, the return to the employment of artillery in mass is seen, and the importance taken by the counter-battery and the necessity of having artillery reserves becomes evident. Example: First French Army from August to November, 1918—rôle of the artillery of the army in the battles of Montdidier, St. Quentin, Guist, in which the artillery was an instrument of manœuvre.

During the battle from 1914 to 1918 the General Reserve of Artillery (R.G.A.) has been at the disposal of the General-in-Chief, a powerful instrument of strategic manœuvre.

Henceforth, it is possible to vary the allotment of infantry forces and of artillery means to a particular operation and in consequence of adapting the forms of the fight exactly to the tactical and strategic ends. Example: Artillery fight directed by the British from May to August, 1918, during the reconstitution of their divisions (divisions which had undergone the shock of the German armies in March), result of this fight.

Third. Exploitation of success, prolonging the action after rupture of the fortified lines of the enemy.

Some few machine guns, well hidden and served by resolute men, suffice nowadays to arrest a pursuit. The problem of the exploitation of the success and the prolongation on unorganized territory of the offensive rupturing actions is then essentially one of the use and manœuvre of fire. It brings into play the complete questions of the liaison between the arms (infantry, artillery, aviation). A great step will be taken to resolve it fully the day when one shall be able to organize methodically observation on the field of battle for the benefit of the command which forms, puts into action and reconstitutes the reserves.

THE FIELD ARTILLERY JOURNAL

Fourth. "Defensive-Offensive" Battle.—This form of battle was not practiced by Napoleon (certain writers are in error in having given this character to the battle of Austerlitz); on the contrary, Wellington employed it with success in Spain against the lieutenants of the Emperor where success was due to a judiciously combined use of fire and field fortification.

The war of 1914-1918 abounds in examples of defensive-offensive combats and offers several types of battles of this class; counter-offensive by Germans near Cambrai, November, 1917, against the British; battle of the Fourth French Army in Champagne, July 15-20, 1918, etc.

It is to the progress in armament that we should attribute the efficiency of this type of combat.

CONCLUSIONS

The developments which precede lead us to state that the physiognomy of the War of 1914-1918 is determined principally by the conditions of the use of fire.

Where it is a question of the tactical organization of the different arms they are seen to tend inevitably towards the constitution of combatant units equipped with engines of fire more and more numerous and powerful and is stopped in its progress along this line only by the limits imperatively traced by the necessity of movement and of ammunition supply. Thus aviation, which started out as a means of transport, became an "*Arm,*" owing solely to the fact that it opened a new field, without limits, to the fire fight.

Where it is a question of large problems of strategy or tactics only that solution is sound which guarantees from the first either superiority of fire or protection from it.

It is impossible, therefore, to gain a true idea of the events of this war without having gained previously an exact knowledge of the arms placed in use from one day to another by each of the adversaries.

As a matter of fact, hostilities came to an end when certain improvements had been made or were about to be made (such as

POWER OF FIRE

long-range guns, caterpillar tractors, light machine guns, etc.). We must know these improvements if we desire to predict with the least chance of error the combat formations of the future.

The study of the material of war should more than ever, by reason of the never-ceasing improvements in mechanism, form the basis of works and discussions concerning strategy and tactics. It is armament which determines, above all, the manner of entering into or conducting a battle.

Ammunition Supply and Distribution

BY COLONEL A. S. FLEMING, FIELD ARTILLERY, U. S. ARMY

THE discussion of the means and methods by which ammunition should be handled between Army depôts and the batteries for which it is ultimately intended has developed two opposite views.

One view, held by the Field Artillery, is substantially in accord with the recommendations made by the Superior Board, A. E. F. This view, in brief, is that ammunition *supply* in its restricted sense, ends at the Army depôts; that there the artillery should take charge and be responsible for the forward movement of its ammunition, having a minimum of its own personnel and transportation for this purpose and securing additional assistance from the Supply Section, General Staff, when necessary to meet unusually heavy requirements; in short, that its ammunition service is a function of its command.

The other view receives its strongest and ablest support from officers who became experts on supply questions at the headquarters of some of our highest tactical units in the A. E. F. This view may be summarized as follows:

No distinction exists between artillery ammunition and any other kind; ammunition, equally with all other things required by the troops is a function of supply, and should be handled by G-4 at the headquarters of armies, corps and divisions like all other supplies. This school agrees that "there should be an ammunition train and an ammunition company as part of their* appropriate commands," but holds that these ammunition trains should be Motor Transport units and these ammunition companies should be composed of Ordnance personnel, and that "all trains of an army, corps or division are available for handling any type of supplies and that the Commanding General, through his staff, makes all decisions as to the use of the

* Chiefs of army corps and divisional artillery.

AMMUNITION SUPPLY AND DISTRIBUTION

trains." At the same time it is stated that "within the corps it (*i.e.*, ammunition supply) is a function of artillery command, being intimately connected with the operation of the arm and the service of the piece, but even there it cannot go uncoordinated by the staff of the corps or division commander."

In practice, the artillery ammunition functions would be the same under either plan so long as these ammunition trains were not wanted for other purposes, but the artillery claims that these functions would be more efficiently performed by its own personnel and transportation. The real crux lies: First, in the situation that arises when G-4 desires any or all of these trains for the transportation of other supplies; the artillery view would necessitate the order of the Commanding General if the Chief of Artillery felt unable to accede to the request of G-4, whereas the other view would allow G-4 to take such action as he thought proper, in the name of the Commanding General. Second, in the fact that under the supply view the ammunition train would remain with the division if the artillery brigade were attached.†

Both of these views have been ably presented and supported. But from a General Staff viewpoint both lack comprehensiveness. If the artillery view possibly fails to give due consideration to the broad question of supply, the supply view ignores tactical considerations.

The present organization of the various motor trains and their assignment was based on the idea of giving the equivalent of the horse-drawn transportation previously authorized, but the greater mobility of motor transportation (which had not been considered) gave a greater tabular carrying capacity. This tabular capacity was never realized in the A. E. F., where the question was further obscured by conditions of stabilized or semi-stabilized warfare necessitating the transport of enormous quantities of ammunition and the creation of enormous ammunition dumps. These conditions were widely different from

† This may increase the difficulty of coöperation when an artillery brigade without any train joins a division, and if it be a reinforcing brigade for an attack, the division may be seriously embarrassed at the very time the demands on its transportation are the heaviest.

THE FIELD ARTILLERY JOURNAL

those that obtain in a war of movement, where the consumption of ammunition will be less unlimited, the accumulation of large dumps in the zone of the Army will be rare, and ammunition must be delivered promptly in comparatively small quantities at constantly shifting points.

The following principles are enunciated as being sound and applicable to this question:

1. The ammunition accompanying troops, as well as their organization, should be based on the requirements of open warfare, and should be the minimum deemed sufficient to meet combat needs until additional ammunition is available.

2. All ammunition accompanying troops, except that carried on the person or with the guns, should be transported in *combat trains* which are integral parts of appropriate units.

3. The function of supply, as respects ammunition, ends with its transfer to combat trains.

4. Combat trains constitute a rolling reserve of ammunition for distribution according to the needs of combat. They should therefore be refilled as soon as emptied.

5. The principles of echelonning in depth and maintaining a reserve apply to combat trains as well as to personnel.

6. The assignment of combat trains to the various units of any combat arm and their relative size therein are governed solely by tactical considerations.

7. Within a regiment, combat trains must be sufficiently mobile to deliver ammunition wherever needed; the combat trains of larger units need not leave the roads and consequently should be of the same type as the transportation for general supplies.

8. Ammunition allotted to divisions by the corps should be transported by rail (or water) as far to the front as practicable, in order to save road hauls. Motorized combat trains in divisions should reach as far to the front *and rear* as practicable; when they cannot reach the rail (or water) dump, other dumps (refilling stations) must be established within their reach by other transportation.

AMMUNITION SUPPLY AND DISTRIBUTION

Ammunition supply must conform to tactical requirements.

Additional ammunition to meet extraordinary demands beyond the capacity of combat trains should be transported in general supply trains as far to the front as practicable.

Principles 5 and 6 permit the amount of ammunition carried in combat trains to be considerably reduced, since successive commanders have the means of meeting promptly an unusually great demand by any particular unit.

APPLICATION OF THESE PRINCIPLES TO THE FIELD ARTILLERY

During the war some of our light regiments were able to carry about one day's fire,‡ our 155 regiments about one-half day's fire. Their ammunition vehicles proved utterly inadequate to handle the usual amounts of ammunition from dumps to batteries.§ This inadequacy was met by the motor battalion of the ammunition train (the latter being the successor of the one of pre-war days, though of greater tabular capacity), which also operated in part as a brigade combat train.

Our pre-war organization, *based on open warfare*, contemplated 1.55 day's fire *on wheels* with each division, of which 1.19 days' fire was carried within the regiments, and the remainder in the "artillery section of the divisional ammunition train."

A careful study of the amount of ammunition to be carried by the artillery combat trains of a corps is requisite for a correct conclusion. But in view of the greatly increased expenditures of ammunition to be expected, it would appear most unwise to carry less than was contemplated prior to the World War.

The following recommendations represent a minimum:

1. Each firing battery to carry .5 day's fire.
2. Each battalion to have a combat train organized as an ammunition company to carry .5 day's fire.
3. Each brigade to have a combat train organized as a battalion with appropriate sub-divisions to accompany any regiment

‡ The actual shortage of caissons in the regiments was compensated for by the two caisson companies of the ammunition train.

§ No reference is intended to large accumulations of ammunition for attacks.

THE FIELD ARTILLERY JOURNAL

detached. To carry about .5 day's fire (requiring 162 truck tons).

b. Each Chief of Corps Artillery to have a combat train of the same organization as that of the brigade.

This gives a total (assuming four combat divisions per corps) of 1.6 day's fire.

The assignment of this small combat train to the corps is necessary in order that additional ammunition may be rushed to the artillery of any division in emergency. This assignment should be made even if the brigade combat train must be reduced correspondingly.

In considering this important question it is essential to remember that:

1. In a war of movement the ammunition must march with the troops, large dumps being formed only when a great battle is impending or the front becomes more or less stabilized.

2. The ammunition in combat trains is a reserve on wheels, to be fed in when and where needed.

3. The tactical situation governs the location of combat trains and their employment.

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

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

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

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

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

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

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

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

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

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

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

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

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

PREFACE

IT was said of personal memoirs by an eminent Wit that either the writers appeared to have completely lost their memories or they had done

* Reprint from *The Journal of the Royal Artillery*, November, 1919.

THE FIELD ARTILLERY JOURNAL

nothing worth remembering; someone else has said that we need more autobiographies of nonentities. The object of these chapters is to place on record a set of actual experiences before we again become dependent on theory for training. Official reports have a human tendency towards self-defence and war diaries do scant justice to the actors of a battle-drama. An accurate record of experiences ("the name men give to their mistakes," says the above-quoted Wit) should have a certain value if only as a foil to the seeming platitudes of the training manuals, the instructions contained in which are sometimes contravened in battle owing to the pressure of circumstances; unfortunately, either from modesty, or wisdom, or simply from indolence, few men publish such records until much later, by which time they become archæological studies—already in 1918 the methods of 1914 seemed old-fashioned. By the end of 1917 trench warfare had brought about methods ill-suited to a war of movement, half-paralysed initiative, and discounted the value of quick decision when without orders or advice from behind. This state of affairs was responsible for errors which perhaps would not have been committed by officers and men of the army of 1914—which is not at all to say that the latter were better soldiers or, to come down to our subject, better gunners. There may be criticism contained herein, it is quite inevitable even if undesirable, but the writer's criticisms are directed chiefly against himself; for any criticism appearing herein he apologizes, as he always met with the greatest courtesy and consideration from his superiors and the most loyal coöperation from those placed under his command.

PART I. March, 1918.

(Eight Chapters.)

An Examination of the German Criticism that "the British Artillery was Splendidly Served, but Badly Directed."

"Men venture necks to gain a fortune; the soldier does it every day (eight for the week), for sixpence pay."—(HUDIBRAS).

Chapter I.—Conditions previous to the German Offensive on 21st March.

THE 1917 fighting, culminating in the battle of Passchendaele, had brought centralized control of artillery to its zenith; there was hardly any initiative left to subordinate artillery commanders except in the choice of gun-platforms and the management of personnel.¹ The offensive reigned alone in the mind of the rather weary British Army, in a manner suitable to the theory of military training, but possibly suiting also the enemy.

¹ Subordinate commanders posted nearly all officers, men and horses to batteries—which gave those commanders a chance a chance to maintain the efficiency for which they were responsible.

TACTICAL STUDY OF F. A. GROUP

One should consider this and the following conditions in order to arrive at an estimate of "moral" which we are told is the major element of success and must therefore be taken first.²

The 6th Division had been engaged during the whole of 1917 in what may be called "active trench warfare" on the battlefield of Loos. The 6th D.A., (who had been longer "in" than the infantry) were "pulled out" early in October after it had been decided to abandon certain projected operations against Lens; instead of the expected march to the Salient, the division moved south and was heavily engaged at Cambrai, certain phases of which operation were unexpected and were even carried out by some people in "undress." After Christmas the 2nd Brigade R.F.A. was relieved (the infantry had been gone some time) and "rested" in the snows till 20th January, 1918.

At Cambrai the brigade had suffered considerable casualties, which included a veritable holocaust for the 42nd Battery, its commander (Major N. B. Robertson, D.S.O.) being killed, 7 other officers wounded, and nearly all its Nos. 1 put out of action; hardly an officer or senior N.C.O. was left whom the men knew.

During the period of rest-and-training, a set of instructions was received outlining a new policy for employment of the artillery in view of the now obvious likelihood of a German offensive on a first-class scale. The change of policy affected all ranks as involving an immense amount of manual labor. The burden of these new instructions was the disposition of the defending artillery in depth, its concealment, and its surprise action in the form of counter-preparation. In practice, the depth of the prepared battle zone was insufficient while concealment in such terrain proved impossible however devotedly "silent"³ the batteries. The idea was that by never shooting the guns, the enemy would be unaware how and in what strength they were disposed; in some terrain it is easy to conceal guns, but in such as that round Bapaume one could not, with the material available, conceal the work necessary to dig in a large force of artillery. It is a fable that tactical lessons are taught by the Higher Command; lessons penetrate from the front line backwards through whatever obstacles are laid out against them; after casualties to the defenders, these lessons do eventually reach their final objective, where they are used. After our experiences in March and April,

² The writer of "Infantry Tactics," in the August, 1919, number of the *R.U.S.I. Journal*, says "It is questionable whether the German offensive would not have been checked sooner if every moment had been devoted to musketry and training in open order . . . A well-trained soldier lying behind what cover he can find . . . is a much more formidable obstacle to tackle than an untrained man in a well-dug trench . . ." Says Sir John Fisher "Born fools count ships; wise men reckon the ability of the crews."

³ The name given to positions which were not used except in emergency was "silent positions."

THE FIELD ARTILLERY JOURNAL

and theirs in May and June, the French applied these January principles on July 15th, but in quite a different way; on receipt of warning of attack, they changed many battery positions. On March 21st practically all our gun positions got their share of German shells, and some rather more; on July 15th a combination of the three very same principles enunciated in January, but now applied by the light of experience, resulted in a decision against the Germans of the very highest importance. In March we failed to combine concealment with material strength; in July the French found a successful product of concealment and mobility. We shall return to this point later.

Towards the end of January the 6th Division relieved the 51st across the Bapaume-Cambrai road; there was very little fighting,⁴ but an endless amount of manual work in carrying out the new ideas; it was a period heartily disliked by all ranks.

In February the 6th Division side-slipped to the North (left) to allow the 51st to come back to their old line. This system had inconveniences for the 6th Division, but it was instructive to gain touch with several different ways of fighting the forthcoming defensive battles—you can stop where you are, go back, or go forward, but it is well to see what your next-door neighbor is doing. The new ideas had been less drastically applied in the February area and a great deal of work was necessary. The 6th Division completed its three weeks' tour on this front, but, though all was supremely quiet at the beginning, the wind got up towards the end presaging the coming storm; false alarms with much counter-preparation occurred on March 10th, 13th, and other subsequent dates; attempts to relieve the division failed like Sisyphus again and again.

As regards the 2nd Brigade, R.F.A., the 21st Battery was lent to the left group and emplaced complete in a "silent" position—as we used to say, "a position of anticipation." On 21st March the right group consisted of the 42nd, 53rd and 87th Batteries, R.F.A. The 42nd Battery (scarcely recovered from Cambrai) was near completing a new position—a big task; the headquarters and two sections had just occupied this (silent) position, in an endeavor to carry out the principle of depth; unfortunately, with relief staring us in the face, determination to calibrate a particular gun before handing over led to there being three guns in the forward or "active" position on "Zero" day instead of the usual two. The 87th (Howitzer) Battery had had rather less to do; it had its headquarters and two sections in a silent and really well concealed position (a gully not marked on the map); but here again our luck was out, for the R.F.C.* were educating observers, and, to lessen difficulties, the two forward guns had been increased to three on

⁴ The Germans interfered very little.

* Royal Flying Corps.

TACTICAL STUDY OF F. A. GROUP

the 20th March; the B.C. had only just returned from hospital and was not yet well acquainted with the ground. The 53rd Battery only came on the scene a day or two before the German attack; it had been several weeks at the III Army Artillery School, and was in great form, but had had insufficient time to perfect its acquaintance with the terrain; three guns were in a "silent" position (well known to the Germans), two in a new forward position and one was an anti-tank gun. Thus one might say the right group was perhaps a shade below normal efficiency; the effort to carry out a G.H.Q. policy as originally interpreted by someone else had been confusing—drastic alterations had had to be made to that interpretation at a late hour. The average soldier was below par, for the continual offensive is neither salubrious nor exhilarating; on the top a change of policy involving heavy manual labor; daily, even hourly, warnings of an overwhelming attack to be supported by tanks of fabulous speed, size, armament, pattern and number. It was unfortunate that our Intelligence could not get hold of facts or trust us with the truth that the Boche had so few; overmuch talk of tanks occasioned "nerves" rather than caution—our most phlegmatic subaltern awoke one night at the clinking of a passing engine crying, "Tanks, Sammy, Tanks"; lastly the need of employing certain guns to stop them robbed each battery of from 10 per cent. to 20 per cent. of its efficiency.

So much for the human element; let us now consider a natural one in the shape of geography.⁵ First and foremost, our whole area was open country, arable land where agriculture had been suspended, covered with rough grass; dotted here and there with the relics of villages of the usual mud and timber type with an occasional ruin of brick and stone; in the centre of each village a cross-road pitted with shell-holes near which lay generally a heap of white stones which had once formed the shell and tower of the village church. The area was intersected by long, continuous lines of trench and belts of barbed wire (lying S.E. and N.W.) which formed the only obstacle to movement; a country well suited to the individual horseman, and to movements on foot on a wide front. The features are shown on the map, but it is necessary to give prominence to certain points:

(a) The importance of the II Army position east of Bapaume lay in the lack of communications from Bapaume rearwards; there was only the one great road from Albert across the battlefield of the Somme. Bapaume itself was an important junction of roads and railways; its houses were far more uninhabitable than they looked at first sight—on investigation, it was completely in ruins, but it had a considerable (military) population accommodated in cellars converted into dugouts, while above ground had grown up quite a little city of canvas and hutting concealed amongst the shrubs and ruins; in the neighborhood were many big "dumps."

⁵ See map, Part I, Chapters IV and V.

THE FIELD ARTILLERY JOURNAL

(b) The open nature of the country rendered camouflage most difficult; except when placed in sunken roads, it was practically impossible to hide work from the German air camera.

(c) Our forward zone (facing N.E.) was intersected by a series of depressions of tactical importance running N.E. and S.W., therefore at right angles to our line, so that the enemy on the heights behind Pronville and Queant, where lay the "Hindenburg Line," obtained superior observation.

(d) Observation over the enemy forward system in front of Pronville and Queant could only be obtained from our front or support trenches (first or Blue system⁶)—in fact from the outpost line.

Other topographical features will be noticed as we come to them; let us turn to artificial features. To obtain a true idea of a minor difficulty of war, it must be understood that, though maps are as common as men in a headquarters office and much cleaner, in the forward area they are hard to come by and often extremely hard to read, as anyone will testify who has tried to refer to the F.O.O.'s* map after a shower of rain.

Between the opposing trench systems was a wide No Man's Land, perhaps a mile;⁷ the ground went level to varying distances in front of our outpost line (front-line trench) then dropped quickly, thus giving the enemy dead ground on his side of No Man's Land, over which it was very hard and in certain places impossible to obtain ground observation.

Our forward zone combined the first (Blue or Outpost) and second (Red or Reserve⁸) system; these were good trenches in very fair order and gradually becoming well provided with dugouts; they had been dug by the British at the conclusion of the German withdrawal in the Spring of 1917, and since then lightly held. They were very efficiently wired.

Our battle-zone began with the third (Brown system⁹), a single line of trench just completed and well wired; behind this there was another single line of trench, only traced in some parts but fairly well wired, known as the fourth (Green) system.¹⁰

The 21st Battery position (left group) was in the Brown system (C 20 d), where its guns were destroyed by the German bombardment. The 42nd Battery main position (I 17 d) was 2000 yards behind the Brown Line, and furthest back, being 6000 yards from the enemy or more; it was strongly dug in a widish depression in clay soil; the work was impossible to camouflage

⁶ See below.

* Forward Observing Officers.

⁷ On the left the opposing trenches were almost touching, at a place known as the Birdcage, valuable to the enemy for observation and a marked salient in his "Observation Line."

⁸ Between 500 and 1200 yards behind "outpost line."

⁹ Approximately 1800 yards behind the Red Line. It was sometimes spoken of as "the Haig Line."

¹⁰ Three to four thousand yards back.

TACTICAL STUDY OF F. A. GROUP

without a large amount of material. The 53rd Battery main position (I 5 c) was in a sunken part of the Morchies-Vaulx country road, about 1000 yards behind the Brown Line; it had fair dugouts. The 87th (Howitzer) Battery main position (I 4 a) was in a small deep depression whose eastern face was almost perpendicular and contained good dugouts; the depression was not shown on the map and provided a very good howitzer position; it was close behind the Brown Line. The three forward positions¹¹ (all of which had dugouts) were slightly in front of the Brown Line, and were the only ones used for ordinary fire—sniping, calibration, coöperation with aircraft, harassing fire, fire at request of infantry, etc. The O.P.'s in normal use were unsatisfactory—two in the support trench of the first or Blue system and one in the second or Red system; they provided, however, good views and had dugouts. We shall discuss this point later in the day.

The instructions of January, 1918, were based on the system of centralized control, but this system depends for its very existence on communications. The "bury" will be discussed later in Chapter III; it is enough to say here that the Right Group Headquarters, as taken over in February, were located with its affiliated Infantry Brigade Headquarters practically *in the Brown Line* (C 29 d), and that buried communications thence to batteries were not so very inefficient; it was considered necessary by the authorities to shift these combined headquarters further back; from the new headquarters (I 17 a), occupied only on 16th March, still incomplete and unprotected except for one long unfinished tunnel, there was no single buried line to any gun position, and on the morning of the 21st March the main "bury" was still unconnected to the I.B.* Signal Station down in the tunnel; this connection was made during and in spite of the enemy bombardment but helped the artillery very little, for it gave only communication to battalion headquarters and flank brigades. Such a condition of communications¹² forbade of control of fire and had a vital effect on the support rendered by the group.

With a remark on the weather this overlong résumé of conditions obtaining at dawn on the 21st March will finish. The weather was unusual; a high barometer; instead of mud there were hard ground, dry trenches and *good roads*; instead of cloudy days and dark nights, we had brilliant sunshine by day, bright and frosty moonlight nights with morning mists till about 10 A.M. The effects of the weather were far-reaching; obstacles usually impassable at this time of year could be negotiated; air reconnaissance was facilitated; though they made our withdrawal less uncomfortable, such conditions must help the stronger force more in proportion that they assist the weaker; and lastly the morning mist *could be relied on to conceal the assault.*

¹¹ 42nd J 7 b, 53rd I 6 b, 87th C 29 a.

¹² Over 2000 yards as the crow flies from Group Headquarters to 87th Battery main position.

* I.B.—Infantry Brigade.

THE FIELD ARTILLERY JOURNAL

CHAPTER II.

THE DEFENCE SCHEME

THE 6th D.A. used, when a new line was taken over, to issue a Defence Scheme, which was a bulky pamphlet of twelve to twenty pages of foolscap based on the Divisional Defence Scheme, and attached to it were several tables, of which the most important one showed the position of every headquarters, every gun position, limits of areas of fire, S.O.S. line or points, O.P.'s, and wagon lines, etc.; other tables were attached allotting targets for "concentration schemes," targets to assist flank groups on receipt of code-calls, inter-group-boundaries, list of O.P.'s showing areas of observation, a table of information concerning the Heavy Artillery, etc., etc. Unfortunately, the writer is not in possession of a copy, and it is doubtful if any copy of the February Defence Scheme still exists. One copy was issued to every group, brigade, and battery, to each infantry brigade, and each neighboring divisional artillery.

It was necessary to issue from within the group to each battery a subsidiary Group Defence Scheme; of the Right Group Subsidiary Scheme one copy¹ exists; it is printed here in full,² exactly as in possession of each battery on the 20th March.

Chapter III contains discussion on various points in the scheme, the numerals (i), (ii), (iii), etc., in the scheme as printed in this chapter referring to the various paragraphs of Chapter III.

* * * * *

*Subsidiary Notes for Morchies (Right) Group to 6th
D.A. Defence Scheme. (i).*

A. General Remarks.

The principal features to notice on the front of the Right Sector are:

- (a) Our forward trench system is on a forward slope.
- (b) It is intersected by valleys running roughly at right angles to the opposing lines, thus giving the enemy good observation from the Birdcage (D. 14) and the heights beyond Pronville over our natural approaches.
- (c) Behind our forward system the ridges and valleys lie more parallel to the opposing lines.
- (d) The flanks of our sector lie in depressions while the centre of our front system of trenches lies on a spur (D. 20).
- (e) We have a Front System, the Red Line (known as the Reserve Line), the Brown Line (or Beaumetz-Morchies-Vaulx Line), and the Green Line. All officers must be acquainted with these four systems.

¹ Still covered with the mud thrown up by shell which burst in Group Headquarters but on 21st March.

² Risking the criticism of Lieut.-Col. Phipps, see *Journal of the Royal Artillery*, June, 1919.

TACTICAL STUDY OF F. A. GROUP

- (f) No Man's Land is again very wide, except opposite the Birdcage.
- (g) We have little observation over the enemy's front line, but better over his second line.
- (h) The area presents no natural tactical obstacles.

B. Observation, Liaison, and Communications.

Observation (ii).

1. (a) Linnet I O.P. is manned by 42nd Battery. Linnet II by 87th Battery, and Sparrow O.P. by 53rd Battery from dawn to dusk.

(b) Bat O.P. D.25.c.O.O. is manned by 53rd from dusk until it is necessary for the F.O.O. to leave so as to reach Sparrow by dawn. It is provided with S.O.S. signals. 53rd provides rifle.

Liaison.

2. 42nd and 87th in turn find 48 hours (iii) liaison with the battalions holding the line.

Headquarters Right Battalion D.26.c.4.1.

Headquarters Left Battalion D.25.d.9.8.

Liaison officer lives with Right Battalion but is to visit Left Battalion every day (iv).

In case of tactical emergency a liaison officer will be found for both battalions.

Communications (v).

3. The "bury" runs from Vaulx (Headquarters Left and Centre Brigades and Left Group) to Skipton Reserve and to Right Battalion Headquarters through Morchies Copse, whence a branch will eventually run to Right Infantry Brigade and Morchies Group Headquarters at I. 17. a. 6. 8. (vi).

Practically all lines go through exchanges, and there is one special O.P. Exchange (O.P.X.), to which the 90th Brigade R.G.A. is connected. Each O.P. has a double line to O.P.X., one of which can be plugged through to the forward section.

Batteries are connected to group by air-line. (vii).

There is one direct line from Morchies Group Headquarters to 90th Brigade R.G.A. (viii), and also direct lines to both flank groups.

C. The Defence of the Front System.

S.O.S. Lines, Concentrations, and Liaison Barrages for the defence of the Front System are given in the 6th D.A. Defence Scheme and its Appendices "A," "B," "C."

The S.O.S. Signal is a rifle grenade bursting into two white and two green stars. These are kept at Battalion Headquarters and at Bat O.P.

THE FIELD ARTILLERY JOURNAL

D. Rearward Defences (Red, Brown, and Green Lines). (ix).

The system of Reserve and Reinforcing Artillery Positions is given in detail in the "D.A. Rear Defence Scheme," of which all batteries have a copy. Details as to position numbers are also given there.

Appendix I is an extract as regards Right Group.

Responsibility for work has been notified separately.

Hours of work, 9 A.M. to 12:30 P.M., and 1:45 P.M. to 4:15 P.M.

E. Anti-Tank Defences. (x).

1. (a) 42nd Battery mans a 15-pdr. at D.26.c.2.4. and an 18-pdr. in Leech Avenue.
(b) 53rd Battery has an 18-pdr. at D.25.b.0.5.
(c) 21st Battery has a gun at D.25.a.8.8. attached to 53rd.
(d) 87th Battery mans a 15-pdr. at D.19.c.20.25.
2. In the event of a Tank attack 42nd Battery sends a gun from J.7.b.10.45. to approx. J.1.d.1.4.
53rd sends a gun from I.4.d.9.7. to approx. I.5.a.5.4.
3. For details see Appendix V.

F. Miscellaneous.

1. A set of Standing Orders affecting fire discipline, etc., is given in Appendix II.

2. Wagon-Lines are in H.17.c. In event of emergency, limbers and firing-battery wagons will be ordered forward to the valley running from I.13. central to I.7. central. It is to be distinctly understood that, though orders may reach the wagon-lines from higher sources, the real liaison is between the wagon-line and the gun-line of each battery; the Wagon-Line Commander must inform the Battery Commander where the wagon-line is. Orders sent to the wagon-line from higher sources will always be repeated to batteries. (xi).

3. One gun in each 18-pdr. Battery will be prepared to deal with low-flying aircraft, the shell to be timed to burst 400 feet vertically above our front-line trench, using a false angle of sight. (xii).

4. A special form of support exists called "Counter-preparation" (CPN) designed to interfere with enemy assembly. There are three varieties of it, viz., "CPN/A," "CPN/B," "CBN/C," details of which are shown in the 6th D.A. Defence Scheme. Appendix VI will give further details.

5. A table of harassing schemes is given in Appendix III.

If no orders are received by batteries before 6 P.M., each battery will select its own times and targets, keeping well beyond the enemy front line, and firing 12 rounds per active gun. (xiv).

6. The Trench Mortar Control Scheme is shown in Appendix IV.

7. Concentrations to meet certain eventualities are given in Appendix VI.

8. Ammunition Orders Appendix VII.

TACTICAL STUDY OF F. A. GROUP

Appendix I.—Table of Rearward Positions (MORCHIES Group.) (xv)

1 UNIT.	2 POSITION.	3 O.P.	4 RATE OF PROGRESS.	5 BRIGADE HEADQRS
		FOR DEFENCE OF RED LINE.		
42nd Battery	107 106 and 118	C. 30. a. 15. 80.	107 complete and occupied. 106 occupied; 118, platforms prepared and ammunition stored.	2nd Brigade at I. 17. a. 6. 8.
87th Battery				
53rd Battery	102	D. 25. c. 20. 05.	102 complete and occupied.	I. 11. a. 7.0 (ready).
1st Reinforcing Brigade	108, 115, 116, 156	D. 25. c. 20. 05.	156 still occupied by Left Group. 108-115-116, ammunition stored and rough Bty. Hdqrs. prepared.	
3rd Reinforcing Brigade	109, 117, 119, 121	C. 29. c. 9. 6. and I. 5. c. 3. 8.	Ammunition stored.	I. 9. d. 2. 6. (ready).
		FOR DEFENCE OF BROWN LINE.		
21st Battery	128 111	I. 11. a. 0. 1.	Bty. Hdqrs. 128 prepared, Bty. Hdqrs. 111 ready; (to be shared with H. A. 229); Recesses for Ammunition in course of preparation for all positions.	All three Brigades to be in Bank between Positions 123 and 128 at I. 14. a. 7. 2.
42nd Battery				
87th Battery	112	I. 5. a. central	Recesses prepared or in course of preparation.	
53rd Battery	110			
	113 (21)	I. 5. c. 6. 6. and I. 11. a. 1. 1.		
1st Reinforcing Brigade	114 (87)			
	122 (42)	I. 12. b. 1. 5. and I. 5. c. 8. 8.	Ammunition stored: 1500 per 18 pdr., and 1200 per 4.5 in.	
	123 (53)			
3rd Reinforcing Brigade	124-127 (21, 42, 87, 53)			
		FOR DEFENCE OF GREEN LINE.		
21st Battery	142	Best sites at I. 14. a. 8. 5. I. 13. a. 5. 8. I. 7. a. 4. 8.	Positions only marked.	Not yet selected.
42nd Battery	140			
87th Battery	143	144, 145, 194, 195 not yet decided		
53rd Battery	141			
1st Reinforcing Brigade	144, 145, 194, 195			
3rd Reinforcing Brigade	not yet decided			

O.P.'s (Red and Brown Lines) all ready and labelled—simple pits, trench boarded, sheltered with corrugated tin, and camouflaged.
MARCH 12th, 1918.

THE FIELD ARTILLERY JOURNAL

APPENDIX II

Standing Orders for Positions (2nd Brigade R.F.A.) (xvi)

I. Forward Positions

1. An officer will always be with the active section and in possession of a fighting map.
2. 75 per cent. of men to have rifles up to a maximum of 12 rifles, with 50 rounds per rifle.

II. Main Positions

1. Not to be used except in case of S.O.S. but to be kept in every respect ready as if in daily use. (xvii.)
2. 12 rifles and 100 rounds per rifle to be kept in the gun-pits.
3. When tactical conditions require it, a mounted orderly with horse, is to be kept at position.

III. All Positions

1. A good exit to be prepared for every pit. (xviii.) One gun at every position must be prepared to go out against tanks.
2. Every position to have a rocket sentry at night and a rocket indicator marked with the flanks of the battery S.O.S. line, Battalion Headquarters, and Magnetic or True North. (xix.)
3. Every pit to have a scheme-board signed by an Officer, and a paper showing range, switch, angle of sight to three points in our front line. (xx.)
4. Not more than 200 rounds per 18-pdr. or 130 rounds per howitzer to be kept in the pit. Gas shell to be stored separately. 18-pdr. ammunition to be stored not more than three deep. (xxi.)
5. Two men per gun to sleep in or near the gun-pit. One officer, one signaller, and two men per gun to "stand to" from dawn on for one hour. (xxii.)
6. Every position to have a "Battle Station Table." (xxiii.)

IV. General

1. One gun per Battery to be prepared to engage low-flying aircraft.
2. Positions to be wired all round. (xxiv.)
3. Visual communication to be practised daily. (xxv.)
4. One hour's drill per week with gas respirators on. Sights to be checked after a switch. Officer in charge to wear gas respirator during drill. All ranks to wear gas respirators at the "alert," forward of the wagon lines. Working parties away from position and at night will wear gas respirators at the "alert" while at work.
5. Fish-nets not to be used—to be replaced by a rabbit-wire camouflage.
6. Muzzle velocity to be painted on the piece and on shield. Date of calibration to be painted on off side. Gun History Sheet to be kept in wallet attached to brake-arm. (xviiia.)
7. Every position to be provided with a grease trap and a lid latrine.
8. Detachments will be called to "Detachments Rear" if a General comes to the position.

V. O.P.'s. (xxvi.)

1. Every O.P. to be furnished with:
 - (a) Diagram of communication.
 - (b) Map showing arcs of fire for all 6" Hows. and 60-pdrs. firing over our zone. (Batteries must keep this map up to date.)
 - (c) Log Book (marked with name of O.P.)
 - (d) Pointer. (e) List of Code Calls.
 - (f) Panorama or hand sketch in log book. (g) Beware Notice.
2. Night O.P. to be provided with a rifle and S.O.S. rifle-grenades.
3. N.C.O. and personnel to be armed.

Appendix III to Morchies Group Defence Scheme. (xxvii.)

Group Harassing Shoots will be arranged on the following scheme and no further orders will be given to batteries than "Scheme Time"
Scheme A.

(In the case of suspected relief)

42nd Battery Roads from German Front Line to "Observation" Line D. 15. (xxviii.)

53rd Battery Trenches from German Front Line to Birdcage D. 14.

87th Battery Points where German Front Line crosses above.

TACTICAL STUDY OF F. A. GROUP

Scheme B.

(In the case of suspected relief)

42nd Battery Melbourne Street N. of D.10. central.

53rd Battery Melbourne Street S. of D.10. central.

87th Battery Points where trenches, river, road, and track cross Melbourne Street.

Scheme C.

53rd Battery Enfilade streets N.W. half of Pronville.

42nd Battery Enfilade streets S.E. of Pronville.

87th Battery Centres of activity Northern portion of Pronville.

Scheme D.

53rd Battery River bank D.3.c.o.o. to D. 9. central.

42nd Battery River bank D.9. central to Melbourne Street.

87th Battery Crossings of the river, especially plank bridges.

Scheme E.

42nd Battery Road D.4.c.2.3. to D.9. central.

53rd Battery Road D.9.c.0.5. to D.9. central.

87th Battery Selected points on above.

Note.—On Code Call "Transport" all active sections will fire:

(a) 3 minutes intense. Scheme D.

(b) 12 minutes silence.

(c) 3 minutes intense. Scheme E.

90th Brigade R.G.A. undertake to coöperate if warned.

March 12th, 1918.

Appendix IV to Morchies Group Defence Scheme. (xxviii)

System of Control of Heavy and Medium T.M.'s

1. For the battle, the Officer appointed to control T.M.'s in Right Group area will be located at Right Battalion Headquarters (D.26.c.4.1.).

2. He will have direct lines to an officer (D.25.a.98.68) i/c Nos. 7 and 8 M.T.M.'s. and to an officer (D.20.d.90.45) i/c Nos. 9, 10, 11 and to No. 1 H.T.M. (D.26.b.40.45). Communication by runner to Nos. 16, 17, 18 M.T.M.'s. at J.2.b.3.7.

3. The O.C. Nos. 7 and 8 T.M.'s will be in the dugout at Sparrow O.P. which is being prepared accordingly.

4. The O.C. 9, 10, and 11 will be at No. 9 position.

5. S.O.S. Lines are laid down for all Mortars in the 6th D.A. Defence Scheme.

6. Concentration "A" brings Nos. 10 and 11 on The Strand.

" " "B" brings Nos. 9 10 and 11 on The Nest.

" " "C" brings Nos. 7 and 8 on to Park Lane.

7. Nos. 7 and 8 fire only at the request of the Left Battalion Commander. Nos. 16, 17 and 18 fire only at the request of the Right Battalion Commander.

8. A Table showing S.O.S. Points and Concentration is to be kept in every Mortarpit. It will be signed by an Officer.

9. In addition every Mortar is to be provided with range and switch to our own front line at the extremities of its arc of fire.

10. Every Mortar will be kept laid on its S.O.S. Line.

11. Under control of the Senior T.M. Officer, rounds will be prepared at "Stand To" with charges ready to fire.

12. Detachments will invariably "Stand To" at dawn at the time when the Infantry in their neighborhood do so.

13. The N.C.O. i/c of each pit will be given a copy of Standing Orders and Instructions relating to his own weapon.

March 12th, 1918.

Appendix V to Morchies Group Defence Scheme

Anti-Tank Defence. (xxix)

1. 42nd Battery mans a 15-pounder at present at D.26.c.20.35.

It covers the valley in D.26.c. & b.

2. 53rd Battery mans an 18-pdr. at D.25.b.5.2.

It covers the valley in D.19.d.

THE FIELD ARTILLERY JOURNAL

3. 21st Battery (Left Group) has an 18-pdr. attached to 53rd at D.25.a.8.8. It covers the ground immediately in front of it, and the high ground west of Leech Avenue, and the high ground in D.19.a. & b. It needs Infantry to help to pull it out of its pit.
4. 87th Battery mans a 15-pdr. at D.19.c.20.25.
It covers the valley through D.19 central.
5. Another 18-pdr. (42nd) comes in to-night.
6. 42nd Battery (forward section) sends a gun to J.1.d.1.4.*
7. 53rd Battery (main position) sends a gun to 1.5. central.*
8. Standing Orders for all Anti-Tank Guns.
 - (i) Stand To at dawn when the Infantry do and report to nearest Infantry Officer.
 - (ii) 100 A.X. "non-delay" for use against tanks.
100 A. for use against Infantry.
 - (iii) Nobody to show himself near the gun during good visibility. Practice (including gas-masks) at dawn and dusk.
 - (iv) N.C.O. i/c to have a panorama showing ranges.
 - (v) Copy of these standing orders to be up in gun-pit.
 - (vi) Boards showing ranges by hundreds of yards to be put out in various required directions.
 - (vii) One rifle and 50 rounds per man to be kept in pit.
 - (viii) The gun to be silent except in case of actual attack. Gun always to be fired "direct laying" over open sights or through the telescopic sights or the rocking bar.
First target Tanks (H.E. non-delay).
Tanks will be engaged even at the risk of hitting our own infantry.
 - (ix) Should it be impossible to continue fighting the gun for some such reason as damage to the piece or no more ammunition the N.C.O. i/c detachment will take breech-block away with him, damage the screw head, and smash the buffer with a pick-axe.

March 12th, 1918.

Appendix VI to Morchies Group Defence Scheme

1. In the event of CPN/B (xxx).
 - (a) 42nd Battery engage the hollow between The Nest and the enemy front line in D.15.b. with 4 guns, and the front line in D.15.b. with the remaining two. The four guns will use 106 fuze. (xxxxa.)
 - (b) 53rd Battery will engage the hollow in D.14.d. as far east as the Copse in D.15.c. with 4 guns.
Remaining 2 guns enemy front line D.15.a.
 - (c) 87th Battery—
2 guns in hollow D.14.d. (106 fuze if available).
2 guns search road Nest—D.14.b.5.1.
2 guns enfilade trench D.14.c.6.6.—D.14.b.5.1.
2. (xxx b) Should the enemy obtain a footing in our line there will be two concentrations:
Concentration Lion.
42nd Battery D.27.a.28.30—D.27.a.10.56.
53rd Battery D.27.a.10.56—D.26.b.93.83.
87th Battery Sunken road Lynx-Support inclusive to D.20.d.85.30. and the trenches about Lion Post (D.21.c.10.17.).
Nos. 16, 17, 18 M.T.M.'s. can join in this concentration.
Concentration Leopard.
42nd Battery search valley about D.19.d.9.9.
53rd Battery search low ground about D.19.b.
87th Battery on trenches in neighborhood according to situation.
Nos. 7 and 8 M.T.M.'s can join in this concentration.

March 12th, 1918.

* In case of tank attack.

TACTICAL STUDY OF F. A. GROUP

Appendix VII to Morchies Group Defence Scheme Ammunition Orders. (xxxix.)

1. Echelons to be kept full.
 2. Batteries in action:
 - 18-pdrs. 200 rounds per gun in pits.
300 rounds per gun in vicinity.
100 rounds per gun A.R.P.
 - 4.5" Hows. 130 rounds per gun in pits.
200 rounds per gun in vicinity.
70 rounds per gun A.R.P.
20 rounds per gun lachrymatory.
30 rounds per gun lethal (in small dumps apart).
 3. Rearward positions:
 - (i) R 1 and R 3 Brigades (Red) Positions 500 rounds per gun 18-pdr. and 400 rounds per gun 4.5" H.
 - (ii) R 3 Brigade (Brown Positions 124-127) 250 rounds per gun 18-pdr. and 200 rounds per gun 4.5" H.
 - (iii) At Positions 106 and 118; 400 and 200 rounds smoke shell respectively.
 4. Proportions.
 - Guns with range under 4000x 50 per cent. shrapnel, 25 per cent. H.E. delay, 25 per cent. non-delay.
 - Guns with over 4000x 40 per cent. shrapnel, 110 per cent. H.E. non-delay, 50 per cent. 106.
4.5" 75 per cent. 106 (when available) 25 per cent. H.E. non-delay.
 5. Empties, clips, fuze-covers to be collected and returned. (Only 10 per cent. wastage allowed.
 - Empty cartridge cases to be packed in empty boxes.
 - At reserve positions, ammunition to remain boxed.
 6. Heavy T.M.'s 100 rounds per mortar.
 - Medium T.M.'s active 200 rounds per mortar (9,10,11).
100 rounds per mortar (7,8,16,17,18).
 7. When light railway is used:
 - Groups notify Staff-Captain, place, time, number, and nature.
 - Staff-Captain demands trucks.
 - Batteries supply guides at the Dump and unloading parties at battery end.
 - Quick unloading is an essential feature of railway supply.
 8. Dump is Harrogate Dump I.l.d. central, or some spot on Decauville Railway in case of shelling.
- In the case of withdrawal:
- (i) The Corps Dump is in Favreuil Wood.
 - (ii) D.A.C. will establish a dump at H.22.a. central.
 - (iii) Dumps will be established on the following roads:
 - Sapnigies—Bihucourt H.7.a.
 - Grevillers—Bihucourt G.23.
 - Thillooy—Bapaume N.2.a.
 - (iv) D.A.C. will probably be at Thillooy.

March 12th, 1918.

CHAPTER III.

A DISCUSSION OF THE DEFENCE SCHEME.

(i) *General.* The foregoing scheme may be interesting to future generations as showing the functions of a group commander R.F.A. in 1918; when one considers that it was only subsidiary to a much longer scheme, it will almost certainly be interesting as showing the pitch (or shall we say the length?) to which "control" had got. After all, a Defence Scheme is but a confirmation of verbal instructions; it gathers in a concise form the

THE FIELD ARTILLERY JOURNAL

hundred and one orders which would otherwise be on a hundred and one separate sheets of paper; it is a sort of Standing Orders for Group Area, and it is libellous to suggest that one *raison d'etre* of Defence Scheme is "against the Court of Enquiry." But there is the old problem of the horse and the water—one can hand to an individual his very own copy of the scheme, but one cannot make him read it; "Journalism is unreadable; literature is not read," sayeth our Wit. Anyway, we all had defence schemes of one kind or another, and there are many points in this one which afford opportunity for discussion.

(ii). *Observation.* Not contained in this early edition of Appendix II, but which appeared in later issues,¹ there existed an order that F.O.O.'s or Liaison Officers who found themselves out of communication with their batteries or brigade, were to make there way back to the nearest point on the "bury" and report. In practice it seemed never to be realized that a F.O.O. out of communication is an officer wasted. On 21st March both the "Linnet" F.O.O.'s were captured in the O.P. after several hours' useless waiting in the dugout; the F.O.O. at "Sparrow" rightly returned to his battery when he could do no more good where he was. An opinion was not uncommonly held that young officers attending courses should have received more detailed instruction in the combined duties² of a F.O.O.; it is not until one has studied Section 5 of the First Army Artillery "Catechism for R.F.A. Subalterns" that one realizes what the full duties of a F.O.O. are; yet this same section (the pamphlet was issued in 1917) contemplates an advanced form of centralized Control and is inapplicable to the war of movement. F.O.O.'s in trench warfare often sat for 24 hours in one single unsafe, insanitary and uncomfortable spot; in a moving battle, where the one great difficulty is to produce *timely* fire, they must move about to collect information; in *any case they should be accompanied by a N.C.O. as a deputy F.O.O.*; it is good training for the N.C.O. and gives the officer valuable liberty. The strength of a O.P. party is therefore one officer, one N.C.O., and two signallers; they need a Lucas Lamp for visual as an alternative to the telephone; they should all be armed, and it has been suggested that on occasions a Lewis Gun would be well employed there.

(iii). *Liaison is an exchange of favors in which each side hopes to gain something for itself.* To perform liaison work efficiently an officer must be known to the people he is liaising with and either personally liked or professionally respected; in 24 hours a strange officer can scarcely make himself felt; 96 hours is better, but the absence of one officer from a battery for 96 hours is often very inconvenient; 48 hours was a compromise.

(iv). The battalions were close together, connected by a good trench,

¹ See July Scheme, Part II, Chapter VI.

² Observation, Ranging, Signalling, Intelligence and Liaison.

TACTICAL STUDY OF F. A. GROUP

and officers fit to perform liaison were scarce, what with leave, courses, horses, etc. It was a Standing Order in the Brigade that no Subaltern did "liaison" until passed by the Brigade Commander; to send an insufficiently trained officer does more harm than good; the officer must have *authority*, which is *based* in the first instance *on knowledge*³—good artillery knowledge and a smattering of general military knowledge. The system of liaison which grew up with trench warfare had taught the infantry to expect artillery support of a kind impossible in the war of movement, but it taught them also a good deal about artillery, so that in the end it was "good value." But the same remark applies to liaison officers as to F.O.O.'s; once out of communication with the artillery, they are useless, and can do better work by personal report to the battery or artillery brigade than by remaining at infantry headquarters. This was not at that time understood; of the two liaison officers on duty on 21st March, one was hit trying to fight an antitank gun, and one commanding a company; a liaison officer was captured on 23rd (long after communication was broken) with a battalion headquarters; a liaison officer was wounded on 24th bringing forward a machine gun. None of these four were doing any direct good as a liaison officer.

The period on liaison was often most uncomfortable, accommodation at infantry headquarters being invariably short. A liaison officer generally needs his batman; he may or may not require a couple of signallers with telephones and a lamp, according to circumstances.

(v). *Visual*. No mention is made in this part of the Defence Scheme of Visual, but a visual scheme had been arranged and carefully practised from the February headquarters; the change of headquarters and battery positions in the middle of March, however, rendered this scheme null and void; a new scheme was made out, but had not yet been sufficiently practised. Visual needs continual practice, not only general practice of personnel, but detailed practice of the scheme; it often goes well enough on a quiet day, but weather conditions have a great effect—shells even greater; in a prepared visual scheme, the visual stations need the most exact siting, camouflage, and fortification; the enemy bombardment was well enough distributed on 21st March to interfere with visual even without a mist; the mist effectively prevented it until well after 9.00 A.M.

(vi) and (vii). *Telephonic communication*. It will be seen that the "bury" was only in its infancy; a most ambitious scheme existed as a "pious hope," on the basis of which good artillery communications could later have been organized. It has been said that a man promises according to his hopes, but performs according to his years. It appears to the writer beyond doubt that, to ensure control of fire and thence a proper artillery

³ Major-General Uniacke, in his address to Young Officers (*Journal of the Royal Artillery*, May, 1919), puts great stress on the duty of knowledge.

THE FIELD ARTILLERY JOURNAL

defence, the importance of buried communications was not appreciated in high places. It is contended that the labor used on the construction of rearward positions, some of which were really worse than useless (see para. xv), would have been better employed on "buries"—an opinion stoutly put forward at the time; presumably it was not beyond hope to beat off the enemy without any withdrawal? There was hardly any communication on 21st, except by runners, who had a rough passage and much exercise.

(viii). *Heavy Artillery*. We come to the controversial question of coöperation between the Heavy and Field Artillery. In the Third Army, the Heavy Artillery was decentralized and liaison existed between the two branches; there was a direct line from Right Group Headquarters to 90th Brigade, R.G.A., and fire arrangements to meet circumstances were commonly made with the Infantry Brigadier by the Right Group Commander for both branches. In addition, all sorts of minor liaison was put into force with various batteries of 90th Brigade, R.G.A., whose commanders placed themselves at the disposal of Right Group Commander after communications gave out on 21st March. All this was the result of personal, not official, arrangements. Later on, in another Army, a different state of affairs existed; it was actually necessary for the Infantry Brigadier to deal with two Artillery Commanders—an unsatisfactory condition of things. To *cure* that condition it is suggested that the F.A. Group Commanders should be given the status which they created for themselves in the Third Army⁴; to *prevent* that condition seems to point to amalgamation of the branches, or training together in peace, or the inclusion in a larger group of a few such weapons as 60-pdrs. and 6" Hows.

(ix). *Rearward Positions*. See para (xv.) where question is fully discussed.

(x). *Anti-Tank Defence*. See para (xxix).

(xi). *Wagon-Lines*. In peace time, we had been trained for open warfare, and to regard the battery as an indivisible entity, but the long range of the German guns had necessitated the horses being accommodated many miles behind the gun position, and it gradually became a habit of mind to consider an artillery unit as consisting of two echelons—the "gun-line" and the "wagon-line." The latter was generally run by the Captain, B.S.M., and B.Q.M.S.; many batteries located their "offices" there; they were often used as rest houses. This was well enough for trench warfare, but it proved necessary to modify the custom for a war of movement. An artillery brigade generally had an air-line to one office in the wagon-lines, otherwise communication was entirely by orderly; to save time, D.A. often sent orders to

⁴ Another solution is to have Mobile Artillery Group Commanders, coming from either branch, acting as local C.R.A. to the Infantry Brigades. Such a solution would also solve the problem of increased groups during active operations—See Chapter VII.

TACTICAL STUDY OF F. A. GROUP

the wagon-lines direct, which orders were not always repeated to the gun-line; it happened more than once that the B.C. found his wagon-line gone "into the blue," Gun-lines in a war of movement shift as tactics demand and the wagon-lines might not know of the move for some time, unless careful arrangements are made. In a war of position the guns get their ammunition from a dump beside the guns which is replenished by its wagon-line or by rail⁵ from the Divisional Dump which was run by the D.A.C. or from even further back; in a war of movement there can be no dumping and the supply in the battle area is mobile, which means that the batteries must have their firing battery wagons close to, or with, them. The wagon-lines supply also rations, stores, etc. Already at Cambrai, mistakes had been made—hence this note in the Defence Scheme; but no amount of foresight can prevent things sometimes going wrong, especially when there is heavy shelling about, and it is not too much to say that the efficiency of a whole Group (three or more Brigades R.F.A.) was impaired by the failure of a brigade-staff wagon-line to keep touch with Group Headquarters during the later stages of the March fighting. A brigade commander in a moving battle really needs a special brigade representative⁶ at the wagon-lines, but it is not desirable to arrogate or to centralize too much.

(xii). *Enemy Aircraft.* The order to detail one gun per battery to deal with low-flying aeroplanes came from above; it was once practised, not without success; it necessitated certain alterations to the gun-pits.

(xiii). *Counter-preparation.* "Counter-preparation A" was a sort of S.O.S., the target being the enemy's front trenches instead of on No Man's Land. "Counter-preparation B" was the commonest form of "CPN," the targets being selected portions of the enemy's forward area, on a regular fire-timetable. "Counter-preparation C" was against the enemy's rearward area. "CP;" was designed, of course, to catch the enemy during or after assembly, but before the assault; it had become a recognized form of bombardment, having been initiated on our side during 1917, so far as the writer knows. "Silent" (as well as "active") positions were used for this; of course, if the alarm was false, there was a danger that the "silent position" would be given away, and for that reason counter-preparation was not to be put in force without orders from higher authority, *so long as the communications were holding.* It appears to afford great opportunity for the use of gas-shells.

(xiv). *Harassing fire.* Night-firing had not in March, 1918, reached the pitch of organization that succeeded the German offensive; after the capture of Mount Kemmel in April, it is supposed to have been the constant

⁵ The supply of ammunition by light railway is a tricky thing; it needs good staff arrangements, a thorough understanding of the rules by the troops and often considerable determination on the part of the railway personnel.

⁶ Consider March 23—withdrawal of transport behind the railway—Chapter VII.

THE FIELD ARTILLERY JOURNAL

harassing in the salient created by the enemy for himself between Bethune, Hazebrouck, and Dickebusch, which eventually influenced Prince Rupprecht of Bavaria against a renewed offensive.

(xv) *Rearward Positions.* We come to the question of Rearward Positions:

(a) It will be noticed that two reinforcing brigades were allowed for in this scheme; roughly, therefore, there were 12 positions to be prepared for the defence of each of the 4 systems, or a total of 48, including the three actually occupied by 42nd, 53rd and 87th batteries.

(b) As regards the positions for the defence of the First (Blue) System, it was believed to be understood that forward sections would join the main positions in case of necessity,⁷ but most people had realized that, unless the move was completed *before the assault started*, these forward sections might not be able to get away—in any case they would probably join up with their batteries at the positions for the defence of the Second (Red) System, if not still further back. We shall see what happened; the Defence Scheme was not too clear on this point.

(c) It will be seen that the positions had been grouped on a linear basis, as if at a given moment the whole infantry line would withdraw from any one line to the next. This was obviously wrong and so it turned out; on the evening of the 22nd we held the Brown Line in some parts and the Green Line in others; the Artillery were chiefly in the Green Line positions (by order from superior authority) and too far away to meet the tactical situation. The solution is that rearward artillery positions must be sited *in depth*⁸ if it is to meet whatever tactical conditions obtain at the time. In "the Salient" in April and May this was done; an immense amount of reconnaissance⁹ had to be carried out, and automatically *ail responsible people became acquainted with the rearward areas, which is the one essential*. It must be added that, owing to the Heavy and Field Artillery not being in perfect liaison, cases occurred of heavy and field batteries selecting the same positions unbeknownst to one another. Care must be taken not to site rearward positions with obstacles behind them.

(d) The January instructions were particular about the preparation of O.P.'s in depth, and, obediently to orders, all the O.P.'s mentioned in Appendix I were prepared, but of course without communications.

(e) For rearward positions what digging is necessary? A position can be overdug—difficult to enter and still more difficult to vacate. A battery

⁷ Except that the 87th Howitzer Battery, which was to go to Position 118 (behind the main battery position).

⁸ See figure, sub-para (e) below.

⁹ A custom exists in the French Artillery by which officers who have reconnoitred Artillery Positions fill in a printed "Carnet de tir" for that position, which is filed for future reference.

TACTICAL STUDY OF F. A. GROUP

commander forced to withdraw will almost certainly make for a rearward position which he has dug, even if this position is not well suited to the new tactical situation which had arisen; and the tactical situation is seldom understood before midnight. The order of priority of work was constantly being changed, but whatever it was at the moment, the authorities expected to see "work" and therefore stress was laid on artillery entrenchments. For every rearward position a fighting map was prepared, but did ever a map reach a battery in time to be used? It was at last decided to fill these positions with ammunition, see Appendix VII, para. 3 of the Defence Scheme, and this was done.

On the 20th March work, the progress was as follows:

Red Line } Positions occupied or ready.
Blue Line }

Brown Line positions—rough shelter for brigade or battery headquarters, gun-platforms sited, with ammunition stacked in shallow pits.

Green Line positions marked only.

O.P.'s all constructed for use by F.O.O. and telephonist; no communications.

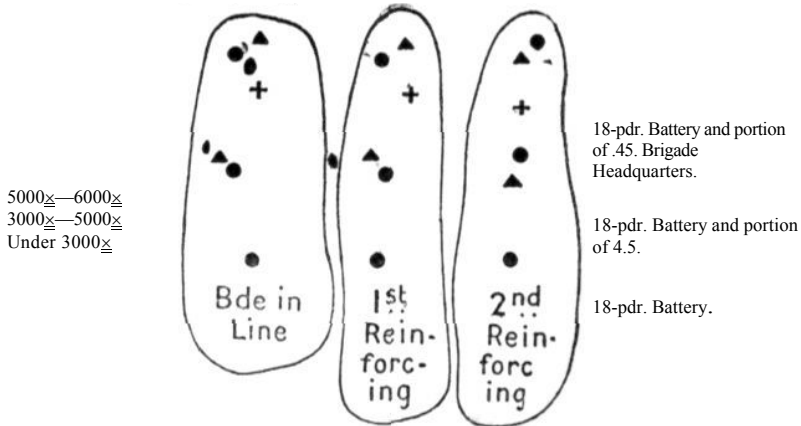
Ammunition placed in accordance with orders.

Fighting Maps still in possession of Survey Company.

The preparation was not complete, but we were certainly approaching the condition of "having a splendid future behind us."

It is contended that the following is a better order of priority:

(1). Positions sited, Brigades distributed in depth:



Group Headquarters wherever Infantry Brigade is.

With Group Positions (Brown, Green, etc.) behind one another at 1000_±—3000_± distance there would be positions to suit any tactical situation.

Positions *must* be known to both *gun and wagon-line* personnel.

THE FIELD ARTILLERY JOURNAL

(2). O.P.'s sited, not too far from positions, capable for use not only for defence but *for support of possible counter-attack*. Visual station (fortified) from O.P. to some place near Brigade Headquarters. One O.P. per Brigade, with simple trench and covered approach.

(3). Group Headquarters fixed¹⁰ and communications prepared beginning from top downwards. Plan of communications, at any rate, worked out in detail and known to all; *wire stored* at Group, Brigade, and Battery Headquarters—it is always short in a moving battle.

(4). A rough shelter in which a Commander can lay out his maps at once; stored in this shelter a fighting map and a minimum of telephone wire; brigade headquarters to be in a more advanced state of preparation than battery ditto, as there is no labor available after occupation.

(5). The question of ammunition depends on circumstances; by far the larger portion of that stored was never touched and some was to be found there on our return in the Autumn! Where good liaison exists between gun-line and wagon-lines, storage of ammunition is not absolutely necessary.

(6). Hardly any construction of gun-positions is necessary and is indeed inadvisable, unless it can be properly camouflaged.

(7). A "Rearward Area Bury" in the II Army area was of inestimable value, but a F.A. Group cannot initiate so big a task.

(f) The question of labor is difficult; the battery has two sources of supply—gun-line and wagon-line; the claims upon battery labor are endless, much of it unfortunately connected with things of no material importance in a time of stress. Decentralization of responsibility for work is valuable to a point; possibly it may be best to go as far down as batteries, but where the matter is urgent, as in February and March, and decisions as to priority¹¹ are necessary, the best arrangement is probably brigade working parties under an officer specially told off and free from other duties; the question is one of circumstances, but labor will certainly be hard to find what with leave, hospital, and courses, and assistance must be given by the D.A.C. In a war of movement the B.A.C. is preferable to a D.A.C., one of the principal advantages being that the Brigade Commander has a reserve of labor which otherwise is non-existent. The work on hand in March included the redistribution of the forward positions, the construction of rearward positions, and the protection of the wagon-lines against bombing.¹²

(xvi). *Standing Orders*. Gun-pit Standing Orders were unknown to our pre-war artillery. In imitation of the gallant Cavalier, we "fired and drove

¹⁰ For this we must depend on the Infantry.

¹¹ Decisions of importance such as between communications (affecting the fight in the battle zone) and rearward excavations (in expectation of withdrawal) must originate from the general staff.

¹² Quite a different set of authorities threatened the unfortunate regimental officer over this question. We had actually been ordered to provide a *six-foot wall* round standings.

TACTICAL STUDY OF F. A. GROUP

away"; every individual was a professional artilleryman. At the period here under discussion, we were auctioneers, acrobats, or policemen interested in polo or philately perhaps, but seldom in ballistics; yet the sorting of ammunition was a life-study in itself! A man's reputation depended on his knowledge of the meteor and the latest modification to the outpost line. In each different Corps or Army, some special fancy of a Chieftain entailed some special rule within the gun-pit; the unpardonable sin varied from being seen without a steel helmet to growing oats in the limber-boxes; officers and men changed nearly every day. The later stages of Cambrai had taught us that even in a war of movement there is still a S.O.S. Line, there are still concentration schemes, aiming posts still blow down, sights still need daily checking, the meteor to be considered, rocket indicators to be put up, ammunition to be sorted, etc. Appendix II was the first time that a set of standing orders were attached to a defence scheme in the 2nd Brigade, R.F. A; later in the year it was much elaborated. The more widely these standing orders are known and drilled into the detachments, the more rapidly a battery becomes efficient after change of position. The next Field Artillery Manual may contain a chapter on Trench Warfare, under which it is to be hoped there will be grouped a set of simple gun-pit rules; for purposes of gunnery and efficient support of the infantry, there is no difference whatever between the elaborately emplaced gun and the weapon dumped during a moving battle among the ruins of a roadside cottage.

(xvii). *Gun History Sheets*. The procedure as regards gun history sheets was not well carried out; in most cases there existed no such sheets; where they existed they were often kept with the office papers instead of with the guns. If the case on the gun can be made waterproof, it is obviously the place for the sheet.

(xviii). *Silent Positions*. The question of "silent positions" has been already discussed at some length in Chapter I. The essence of their existence is that they are not known to the enemy. They must not, therefore, be registered from, nor used¹³ except during a general bombardment; nor must they be recognizable on an air-photograph. Unless they fulfil these conditions, they are useless and should either be "active" or unoccupied, in which case the personnel could rest and train. It is to be feared that a large number of positions surnamed "silent" in February and March failed to fulfil these conditions. Where camouflage is easy, such as in a "close" country, the permanent occupation of silent positions may do no harm; where it is practically impossible, some other device for concealing artillery must be discovered. Immediately before an *offensive* the time is short and the enemy

¹³ Never firing from a position tends to make detachments slack and lends itself to "showing-off." Change of detachments is the remedy for the former and within limits there are advantages in the latter.

THE FIELD ARTILLERY JOURNAL

has not time to note much more than that artillery reinforcements have made their appearance; but on the *defensive*, one may have to wait weeks or months, and the solution appears to be a series of alternative positions into which one can move if the defenders have the luck to get warning of an attack (as at Rheims in July). Alternative positions can be occupied from the wagon-lines as well as from other positions, and personnel might be better employed at rest and training than in occupying gun-pits which they dare not use.

The desiderata of a "silent" defensive gun-position, if otherwise tactically and technically suitable are:

- (a) Its *not* being *known to the enemy*: subject to this proviso, it should be as strong as possible.
- (b) First-class communications.
- (c) Gas-proof shelter in the neighborhood.
- (d) Facility of exit.

(xviii). *Exit from positions*. The importance of facility of exit varies with circumstances dependent on the special task of the battery, but a gun emplaced so that it takes half an hour or so to pull out of its sheath in daylight is always bad. This was unavoidable on the Passchendaele Ridge, owing to the broken nature of the ground. Normally batteries get some time to move; in a very rapid withdrawal a gun fought up to the moment of its capture probably performs a duty of the highest importance, even if the incident finds no recognition in the Honors List.

(xix). *Rockets and Rocket Indicator*. Battalion Headquarters was the place where S.O.S. rockets were to be looked for; rockets¹⁴ had recently been much improved and were now easily distinguished. The rocket-indicator was the night sentry's post—it is necessary to fix some such post, as a F.G.C.M. refused to convict a man as absent from his post when found dozing in a dugout.

(xx). *Registration within our own lines*. The Germans used to register their front line intentionally as well as occasionally dropping a "short" there. Just previous to the March offensive, the Right Group registered all its T.M.'s with dummy rounds on points within our own lines.

(xxi). *Storing of Ammunition*. A selection from orders by various higher authorities.

(xxii). *Dawn and alarm arrangements*. "Dawn" was determined by the Infantry Brigade in the Line. If the alarm arrangements are good, two men per gun is enough; men thus accommodated have to be very much on

¹⁴ It was commonly thought that light signals might have been more freely employed than they were for coöperation between infantry and artillery in the war of movement; the French wrote much about them and certainly the German artillery seemed able to coördinate its fire with its infantry "Here-we-are-again" white-lights. But rockets are unsatisfactory things; as a raid commander once reported, "this rocket was an exception, it actually did go off, but along the trench instead of up in the air"; the man carrying light signals in an attack seems always to get hit.

TACTICAL STUDY OF F. A. GROUP

the alert as regards gas. The dugouts were often some distance from the position, a condition which offers many advantages.

(xxiii). *Battle-stations*. The "battle-station table" dealt with Lewis Guns, rifles, the duties of cooks, officer's servants, etc.; it included a scheme for the close defence of the actual position.

"Battle-stations" was the code word used as a warning of attack.

(xxiv). *Wiring-in gun-positions*. The question of wiring-in positions was a very controversial one and arose after the German break-through near Lagnicourt in April, 1917. The authorities wanted wire round every gun position to help the close defence. It can be fairly argued that an attacking force which has broken through the bigger wire obstacles will not be stopped by a few strands round a gun position; but later an idea grew up which contemplated gun-positions as independent strong points and even provided special troops for their defence; this is quite another matter. Some battery commanders¹⁵ liked wire round their positions to keep intruders off, but one photo appeared showing a 6" gun position within a sea of tracks—an example of the mask telling more than the face. The Germans, faced with this same problem, solved it by having one special belt of wire in front of which artillery was not to be emplaced; it was known as the Artillery Protective Line. Nowadays such a line must be tank proof.

(xxv). *Visual*. See para. (v).

(xxvi). *Furniture of O.P.* This list of stores with which O.P.'s were to be furnished was copied from an order by higher authority. It gives some idea of the multifarious duties of a F.O.O., see para. (ii); but in practice it was almost impossible to get this order carried out, however correct in theory. A "Beware" note was simply a printed notice "Beware! the enemy can hear you." Particularly difficult was it to make officers realize the difference between a diary (which is not mentioned here, as it was considered the property of the officer who has to write the daily report) and the "so-called log-book" (which belongs to the O.P., and contains only items of permanent interest). In one Army the O.P. stores ordered to be maintained were so numerous that they required a good-sized inventory-board! It is very uncertain whether the ordinary F.O.O. observed any better for all this regulation.

Still some furniture is necessary, and once the order is marked up by a commander "This is an order to be obeyed," battery O.P.'s are not difficult to administer. When, however, it is a case of a Group O.P. or Brigade O.P., the question is different; the Group or Brigade can provide the furniture, but no power on earth can prevent its disappearance and see to the proper handing over of stores to succeeding F.O.O.'s. This question again crops up

¹⁵ Another battery commander hoped to hide the work on his gun-pits by directing a public track right across his position.

THE FIELD ARTILLERY JOURNAL

when it becomes a question of fortifying O.P.'s; the process is often a dangerous one only to be done at night; one cannot keep a Brigade Staff officer at it continually, while work handed over to a different officer every night usually ends in nothing being done.

The Pointer was to report lateral angles from True North of flashes, etc., for the benefit of the Heavy Artillery.

It must be remembered that every battery had a forward or active position, whence the F.O.O. obtained his normal fire, and a main or silent position, his main fire-power in battle—different ranges, angles, etc.

(xxvii). *Harassing-fire Schemes*. One has to vary these prepared schemes from time to time, the advantage of them being that one has time to reason out the selection of targets; also they save an immense amount of trouble in the nightly harassing-fire wire, but of course it means more defence-papers in the battery defence-file.

(xxviii). *German foremost trench*. The German "observation line" lay at varying distances in front of their Front Line; it was usually manned only at night—by a few piquets which frequently changed stations.

(xxviii). *Trench Mortars*. No Man's Land was so wide that trench mortars could not fire on the enemy's front line; in the Right Group area they were divided into 4 groups:

- (a) One Heavy T.M. (9.45") with a S.O.S. point in No Man's Land.
- (b) Three 6" T.M.'s (Nos. 9, 10, 11) ditto.
- (c) Two ditto (Nos. 7 and 8) emplaced to meet a break through in the Right Battalion area.
- (d) Three ditto 16, 17, 18 ditto Left Battalion area.

Nos. 7, 8, 16, 17, 18 had been registered (in foggy weather) by means of dummy rounds.

The range of T.M.'s had been much increased during 1917 with the arrival of the new 9.45" and 6" (Newton pattern), but the equipment left something to desire. One could not trust the 6", for after a few rounds the stays connecting the mortar to its bed were apt to break away. The T.M. took a considerable time, over a minute at least, to prepare for firing; one could not keep it ready to fire because the charge if exposed to the air deteriorated—hence para. 11 of Appendix IV. These were the most important defects, but the equipment was "rough."

It is not necessary here to review the history of T.M.'s, but it was well on in 1915 before they became standardized. The first D.T.M.O. was appointed early in 1916. The H.T.M. appeared rather later, but before the Somme, as did also the light (3") Stokes Mortar. Perhaps it might be said of the 9.45" *in defence*, as of a certain statesman, that his dignity lay in his ruff rather than his reason. The Stokes Mortar was manned by infantry; the Medium by infantry and artillery, but by this time

TACTICAL STUDY OF F. A. GROUP

they had practically become Field Artillery¹⁶ weapons; the H.T.M. was usually manned by Heavy Artillery personnel, and in February, 1918, H.T.M.'s had become part of the Corps Heavy Artillery.

Controversy reigned for some time as to who should "run" the Heavy and Medium T.M.'s. One school said it should be done by the Divisional General Staff, the basis of their argument being that they were emplaced in the trenches amongst the infantry, that they were employed exclusively against the enemy infantry area, and that infantry had practically always to carry up the ammunition. The other school said that much of a modern artillery bombardment was done by heavy and medium T. M.'s, and that therefore they should be under the C.R.A.; also that the methods of the T.M. were of an artillery nature. What decided the matter seems to have been that unless the C.R.A. ran them, they were never employed at all, because they induced "retaliation" by the enemy, to which our infantry were averse. However that may be, in 1918, while a light 3" was run entirely by the Infantry Brigade, the Heavy and Medium was run by the Field Artillery Group Commander; this took the Group Commander out of his area for at least two whole days every week, for he had to arrange details of every kind with the battalion; one cannot add that such an arrangement automatically brought the Group Commander more than ever in touch with the infantry.

Appendix IV of the Defence Scheme gives a good idea of the stage of development in March, 1918; but centralized control of T.M.'s means as in all other cases a careful system of communications, which was very far from being obtained, as higher authority was most obstinate regarding provision of telephones and wire for T.M.'s, probably owing to lack of telephone material.

The idea of mobile T.M.'s was still but a "pious hope"; the enemy gave us a lesson in March which began to develop in the "100 Days' Battle."

Our H.T.M. (manned by Heavy Artillery) was attached to the Right Group. Nos. 7, 8, 9, 10 and 11 were manned by Y/6 T.M. Battery; Nos. 16, 17 and 18 were manned by the personnel¹⁷ of the 25th Divisional T.M.'s and attached to the Right Group. O.C. Y/6 T.M.B. acted as Controller of T.M.'s in Right Group, though he was not the officer mentioned in para. 1, Appendix IV on the night before the battle. The D.T.M.O. (an infantry officer) lived with C.R.A.

The mortars were well accommodated, with good dugouts, and their emplacements were (it is believed) quite unknown to the enemy, as they were "silent" *and had never been given away*; Nos. 16, 17, and 18 were newly emplaced and were only just ready.

(xxix). *Anti-Tank Defence*. The Divisional Defence Scheme contemplated

¹⁶ The provision of F.A. personnel seemed to present difficulty to the higher authorities; it proved rather a drain on the batteries and the T.M. batteries were apt to suffer from the system adopted.

¹⁷ And very gallant work did they do. See Chapter V.

THE FIELD ARTILLERY JOURNAL

three echelons of Anti-Tank Defence—(a) guns sited to meet the first appearance of enemy tanks (b)¹⁸ guns detailed and prepared for dragging out of their pits should the tanks get through, (c) a battery of the Reserve Divisional Artillery detailed to move out of its billets against tanks. The argument was that our wire was so good that we could stop any *sudden* assault unless supported by enemy tanks.

The siting of the guns, emplaced to meet the first appearance of enemy tanks was of the utmost difficulty. To begin with, there was absolutely no natural cover, so that one had to hide them in the trench system; secondly, in order to meet the tanks early, one had to place them very far forward, owing to the shape of the ground. As a consequence of these conditions, the "anti-tanks" were almost certain to be caught by an enemy preliminary bombardment.

It will be noticed from Appendix V that there were five guns so emplaced:

No. 1 deprived 42nd Battery of a detachment.

No. 2 deprived 42nd Battery of a detachment.

No. 3 deprived 53rd Battery of an 18-pdr. and a detachment.

No. 4 deprived 21st Battery (Left Group) of an 18-pdr. and detachment.

No. 5 deprived 87th Battery of a detachment.

An already slight artillery support was therefore weakened by the separation of one 18-pdr. and 4 detachments. It will be seen that all the guns were either destroyed by the enemy's fire or eventually captured; only a very few of the men got back to their batteries. *But*, the enemy used no tanks; another time he may and probably will; the problem of how to deal with them is a very real one and must be mastered.

(xxx). *Counter-preparation*. See para. (xiii).

(xxxa). Batteries sited at over 5000 \times from their S.O.S. Barrage Line had some of the new 106-fuzed 18-pdrs.

(xxxb). "*Concentrations*" against a break through. Owing to the failure of communications during the battle, it was never possible to put these (or any other) concentrations into force in the Right Group Area.

(xxx). *Ammunition*. Appendix VII was an attempt to summarize in a convenient form a variety of orders by a variety of authorities; different ideas obtained in different areas.

It may be remarked that very little gas was available.

The supply by rail was not a success.

(xxxii). *Maps*. Map No. 1 attached to the Defence Scheme illustrated Appendices III (Harassing fire), IV (T.M.'s), V (Anti-Tank Defence), and VI (CPN). Maps No. 2 and 3 illustrated the organization of Rearward Positions. No. 2 is not forthcoming, but No. 3 is given and No. 2 was very similar—No. 3 shows very well the *linear* grouping as opposed to the *deep* grouping suggested in para. (XV).

¹⁸ In practice there is not the time to do this.

TACTICAL STUDY OF F. A. GROUP

A word about such sketch-maps; they are labor-saving, and indeed in the later stages of the war the "barrage map" was the essential part of the orders for a battery commander. To make these maps, units need draughtsmen, at least 1 per artillery brigade, as well as any allowed to D.A. Headquarters.¹⁹

(xxxiii). *Lewis Guns.* A Lewis Gun had just been issued to each battery, originally for anti-aircraft work. No mention of them occurs in the Defence Scheme, but their employment was considered in the "Battle Station Table." Later, each battery got 4 and the "standing orders" included a ruling as to their distribution, of which mention is made in Part II, Chapter VI.

(xxxiv). *Width of Front.* It will be seen that, excluding anti-tank guns, a group of (at the most) 11 18-pdrs. and 6 4.5" Hows. were supporting an infantry brigade of three battalions. Say, 17 field guns to 2400 bayonets.

The actual S.O.S. barrage contemplated 11 18-pdrs. over a front of 2400 yards, *i.e.*, 220 yards per gun; in an offensive an 18-pdr. generally had a barrage front of 20-25 yards.²⁰

In addition it must be mentioned that the lateral effect of the new 106 fuze had been overestimated; a 6" howitzer (of which there were a good many) covered 200 yards, whereas 50 yards would have been a more correct allotment.

(xxxv). *S.O.S. Policy.* The defence schemes of the time ordered, so far as can be remembered, 10 minutes "intense" in case of S.O.S.; there may have been certain extra instructions—but the optimism of the authorities contemplated ability to act according to circumstances, without however taking the necessary steps to ensure communication. Of one thing one may be certain—and that is that communication in the forward area during the hours following an enemy assault will be trying to the impatient; unless lines are buried, there will be no communication except by runner. Owing to casualties and to the stress of the moment, there are no proper records of what targets were engaged by batteries on March 21st after the S.O.S. period was completed and in the absence of orders from Group Headquarters (owing to breakdown of communication). In the mist not a soul knew what had happened, and no amount of reconnaissance could have led to brilliant independent action until the day was well advanced; that is to say, "action according to circumstances" was out of the question.

That this particular lesson reached home is evident from the fact that in July a new S.O.S. policy was initiated from above. Units were to remain firing on their own S.O.S. lines until otherwise ordered, and it was (normally)

¹⁹ A battery should mobilize with a proportion of tradesmen—tailor, shoemaker, clerk, draughtsman, a few miners.

²⁰ Ludendorff says that on March 21st the Germans had more than one gun to every ten yards.

THE FIELD ARTILLERY JOURNAL

only a very high authority who could "otherwise order." The idea was, of course, that even if your S.O.S. has failed to stop the enemy advanced troops, the latter cannot get on without their support, who will be unable or unwilling to pass the continued S.O.S. barrage. It seems curious that we were not better guided in this matter, for the complaint in so many of our own offensives had been that the leading infantry waves got through, but that later waves were caught by the enemy barrage and that the leaders being unsupported failed to make good. Just as, in the offensive, artillery sub-commanders had the right to take certain batteries out of the barrage for special purposes, so, according to these July instructions, certain artillery units were told off as "swingers," whose fire could reinforce the S.O.S. barrage wherever the enemy's advanced troops had effected successful penetration. But in March, 1918, we had "not got so far"—at least most of us; our energy was absorbed in making somewhat flashy excavations in carefully chosen districts; very little labor we had to do it with, too!

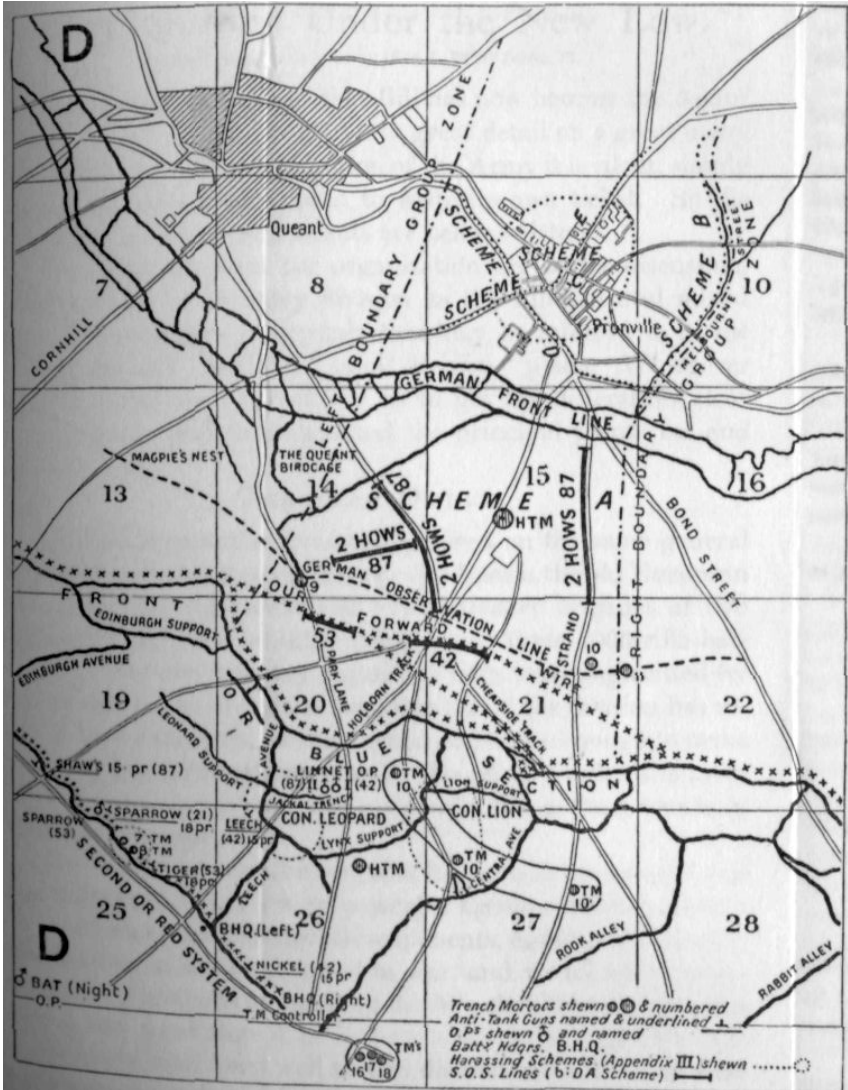
Some authorities were very keen on lines of fire being parallel (within each battery) on the S.O.S. Barrage Line,²¹ their argument being based on the unsoundness of trying to be strong everywhere. This is a controversial point; distributed fire can be brought parallel by a single word of command. On March 20th lines were distributed, by sections, within the battery; but the writer never happened on a formed body of infantry officers who did not rest assured that at the word S.O.S. the Field Artillery,²² if it was efficient, would open an overwhelming fire opposite each bay of every trench-length in the front line.

²¹ As distinguished from the S.O.S. Line of a gun which is perhaps better named "night-line."

²² 11 18 pdrs. to 2400 yards.

MAP NO. 1. $\frac{1}{20,000}$

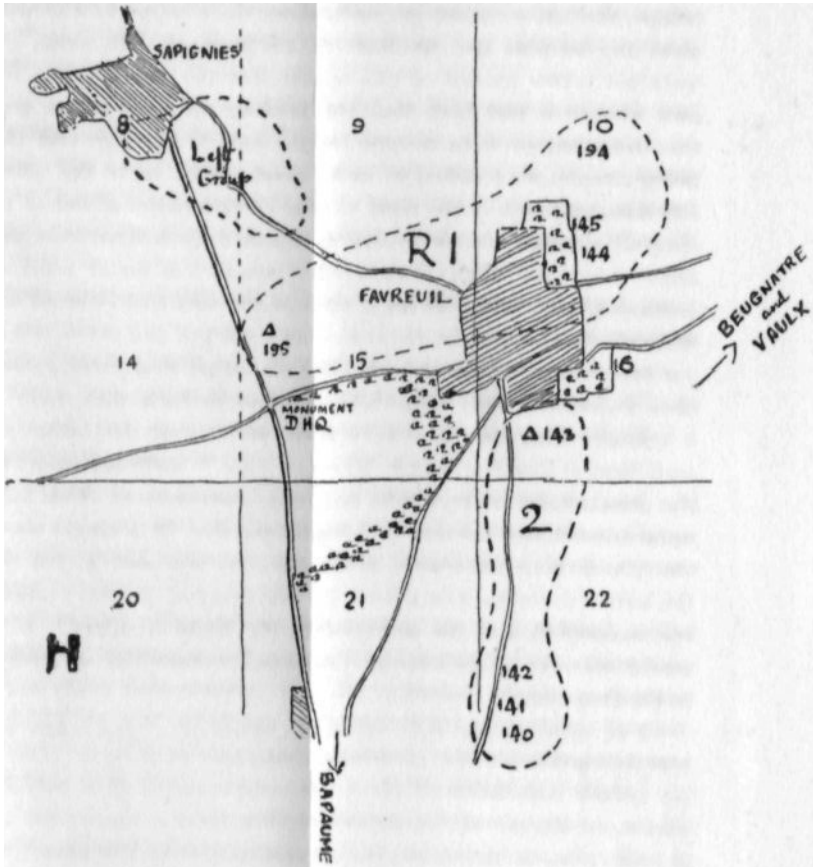
See Appendices III, IV, V and VI Morchies Group Defence Scheme



THERE IS NO MAP NO. 2. ED.

MAP NO. 3.

See Appendix I.



GREEN POSITIONS

Best O.P's

I.7.a.2/8 looking S.E.

I.13.a.5/9 looking N.E.

I.14.a.6/6 looking N.W.

Suggested Brigade Headquarters 2 and R I in Favreuil.

Positions marked but neither filled nor prepared, nor allotted to batteries.

R3 Positions still to be decided March 20.

Organization Under the New Law.

LIEUTENANT-COLONEL OLIVER L. SPAULDING, JR.

THE Army Reorganization Bill has now become the Act of June 4, 1920. That Act goes into great detail on a great many subjects; but on the organization of the Army it is silent, simply telling the War Department to write its own ticket. So the betting ring is open and tickets are being written.

Two general plans for organization are under discussion. Both assume an infantry division as the fundamental mixed unit; the two types of organization may be referred to as the "large division" and the "small division" plans. Whichever may be adopted, it is well for us to get the differences clear in our minds, and to understand the principal points for and against each.

THE LARGE DIVISION

By this is meant a division organized on the same general lines as the one we used in France. Its basis is the old European division before the recent war—two infantry brigades of two regiments each, the infantry regiment of three 1000-rifle battalions. But the infantry regiments have been augmented by the incorporation of special armament; and the division has received heavy artillery, machine guns, and trains enough to make it a complete self-sustaining unit. In other words, it is more like an army corps than like a division, using those words in their historic sense.

But whatever we call it, the unit has certain advantages and disadvantages. It is a very powerful fighting machine; and a single division staff handles all components, fighting and supply. Besides this, it has been tested in war, and we all know something of the methods of handling it. We should be very careful indeed how we change it.

It lends itself very well to two distinct methods of tactical handling—brigades in depth or brigades abreast. In the first

THE FIELD ARTILLERY JOURNAL

method, it has great staying power, since one brigade may pass through the other and continue an advance without interruption. This plan has the disadvantage, however, of using only half the infantry at any one time. In the second method, each brigade works as a temporary small division, the division as a corps; a difficulty here is that if a division reserve is wanted it must be borrowed from some regiment.

The suggestions for a change are all on the ground that the division is too large and heavy, or on the ground that a three-unit organization is more convenient than a two-unit. Let us examine these points.

There can be no question that the division is large and heavy. It is very hard to move it complete; quick movements of divisions in France, even with the French road facilities, could not easily be made with all artillery and trains. It would probably be out of the question to manœuvre this division as a single unit under the conditions to be expected on this continent. What, then, should we do in the case of a campaign on this continent?

Probably there is no single answer to this question. It may be said, however, that the large division may then be regarded as a small corps and handled accordingly. Each infantry brigade may receive a regiment of light artillery and enough train detachments to make it self-sustaining for a day or two; the heavy artillery regiment, motor machine-gun battalion, etc., then become corps troops. This should be a perfectly workable scheme, whether or not it is the best one; it is mentioned merely to indicate that the large division is not necessarily an inflexible one.

Evidently, if the large-division type is to be retained, the division must remain really large. It leaves no room for an organic army corps, since it is really a corps itself. Our so-called army corps in France were in reality armies, judging by all previous and all contemporary foreign standards. Hence, if any material reduction is to be made, it is illogical to do it by lopping off parts of the division. This destroys its great characteristic as a complete and self-sufficient body, makes it a less

ORGANIZATION UNDER THE NEW LAW

efficient army corps without making it a light manœuvring division.

The issue, then, is clear. Our division should be either the large division without serious chances, or a small one built on an entirely different principle. The crucial question is, Can we make a small division which shall give us greater handiness in manœuvre, without losing the hard-hitting power of the large one?

The burden of proof is upon him who proposes a change, so this requires somewhat extended consideration.

THE SMALL DIVISION

The small division does not undertake to be a complete self-contained unit, by the assemblage of a number of which we may build up an army corps or an army. It rather assumes an army corps as an organic unit, and seeks to be *a division* of that corps, able to maintain itself alone for a day or two, and to handle one specific and limited tactical problem, depending upon the corps for support, reinforcement and further supply.

The form of small division which is now proposed uses the three-unit system of organization. This is not an essential point—any kind of organization can manœuvre, when commanded by a man who knows how; but it is a convenient plan, and it brings us back to our own traditions. The framework of the division is three infantry regiments of three 1000-rifle battalions—almost identically our Civil War division, three brigades of three 1000-rifle regiments each, with the addition of a separate commander for all the divisional infantry.

Now, of course, these 9000 rifles are not the equivalent of the 12,000 in the large division; but the small division should not be expected to cover the same front. Give it three-quarters of the front, and can it strike as hard a blow there? There can hardly be a categorical answer to such a question; but we have considered briefly the tactical handling of the large division, and may give a quick impression of the small one.

The three-regiment division would hardly be formed with

THE FIELD ARTILLERY JOURNAL

all regiments in depth; this would hold two-thirds of the infantry out of line, and we have already noted as an inconvenience that the large division so formed holds out half. It might readily be formed with regiments abreast, in which case it would deliver, down three lanes, precisely the same weight of blow as the large division down four, with precisely the same staying power. A more natural use, however, would seem to be with two regiments in line and one in division reserve, the infantry brigadier (or divisional chief of infantry) probably commanding the two regiments in line. This would give a heavier initial blow per yard front than the large division formed in depth; a complete relief of the fighting line, battalion for battalion, would be impossible, but there would be a complete fresh regiment to back two tired ones, and it is hardly probable that all six battalions of those two regiments would be equally exhausted.

Since the small division is intended to operate habitually as part of a corps, its artillery should be kept to a minimum, both in number and calibre of guns, and everything else pooled in the corps. At the same time, the division should have that minimum organically, so that it will not have to appeal to the corps for those guns which it will normally need.

The original proposition takes from the division all the howitzers, and leaves only light guns, and these in the same proportion as before, one battalion per infantry regiment. This accomplishes the purpose of lightening the division, withdrawing all its heavy howitzers and immobile trench mortars. Presumably it is not intended to eliminate the howitzers from the corps, but only to pool them there, for they are certainly needed.

There may be a question, however, whether this assignment does not violate our principle that the division must have organically all such guns as it habitually needs. The allotment, four guns per infantry battalion, is certainly small, compared with our war allotment of six per infantry battalion, and two of these six heavy. No one ever found that this allowance was enough for real offensive action. And can one say that the division can ever dispense with howitzer fire? Is it not one of

ORGANIZATION UNDER THE NEW LAW

our experiences, that infantry always needs support by high-angle fire just as much as by gun-fire?

The total number of pieces of artillery in the division can certainly not be cut below the four per thousand rifles, and the trend of opinion abroad seems to be that even with a small division there should be more than that, including some howitzers. It does not follow that these howitzers must be as heavy as the 155-mm.; perhaps those may go to the corps if we make very sure that they do not get farther away. But the division seems to have a pretty strong case for claiming some howitzers, say about a forty-pounder with good range. These could not attempt to do the destruction work of the 155's, but they could get into woods, which the light gun can not, and supply the shell power which that gun has not, for use against the lighter targets.

In other words, the lightening may be in absolute number of guns, and in their calibre, but not in their proportion to rifles or in omission of the howitzer type. On this theory, the infantry being cut 25 per cent., from twelve battalions to nine, the artillery should be cut about the same, from eighteen batteries to somewhere between twelve and fifteen.

The lower figure might be taken to give nine gun and three howitzer batteries. Since, however, the case of three infantry regiments in line would be exceptional, it might be possible to reduce the field gun batteries to six, or in some other way make room for a battalion of mountain artillery. These batteries could well be employed as light batteries in the earlier stages of the action, taking an advanced position to compensate for their shorter range, and joining in the barrage or other accompanying fire. When their limit for barrage work is reached they could become the first echelon of an artillery advance, or report to the infantry brigadier commanding the front line for use as accompanying artillery.

There is another artillery matter that is in danger of being overlooked in an organization of this type, and that is the plan of reinforcement. The foundation of the scheme is the idea

THE FIELD ARTILLERY JOURNAL

that the artillery organically assigned is a minimum, and will always be reinforced for serious work. Therefore, the headquarters of the artillery command in the division should be so organized as to handle not only its organic minimum force, but with equal ease a greatly increased one. Also, the troops of that command should be so made up as to lend themselves readily to splitting up into a light and a heavy group, each susceptible of orderly reinforcement.

Questions Affecting Artillery*

LECTURE BY GENERAL LE GALLAIS TO THE OFFICERS OF THE SIXTEENTH INFANTRY DIVISION, FRENCH ARMY

[Editor's Note.—The following translation is published in the belief that the opinions expressed are a fair example of French thought upon the present-day problems confronting field artillery officers. That the opinions expressed carry weight which entitles them to our consideration may be gained from the fact that their author is an officer of experience and distinction.]

General Le Gallais, after graduating from the Ecole Polytechnique and being appointed to the field artillery, served in the various grades with that arm until the outbreak of the World War. During his pre-war service he graduated second in his class from the Artillery School at Fontainebleau, and first in his class from the Ecole Supérieur de Guerre. After graduation from the latter school he served upon the General Staff, with the exception of probationary periods of two years each, in the grades of Captain, Major and Colonel.

The outbreak of the war found Colonel Le Gallais commanding the 40th French Field Artillery, with station at Saint Mihiel. Shortly after the outbreak of the war Colonel Le Gallais was promoted to the grade of Brigadier-General, and assigned to the command of the artillery of the 16th Army Corps; later he commanded the 112th Infantry Brigade (56th Division); and finally, in September, 1916, he was assigned to command the 16th Division. He held this command up to the end of the war, and is still in command of it, with station at Bourges.

General Le Gallais is well known in the French Army for his ability as a General Staff officer and a field artilleryman.]

* Translated from *The Revue Militaire Générale*, August-September, 1919.

THE FIELD ARTILLERY JOURNAL

PART I

CONCLUSIONS DRAWN FROM THE EXPERIENCE OF THE WAR

WE have considered, gentlemen, in a previous discussion, the pre-war status of the artillery question, and laid special stress upon the false doctrines that prevailed, the insufficiency of certain matériel, the faults of our organization; all these things weighed heavily upon our army during a great part of the war.

Let us now endeavor to draw a few simple, practical, direct conclusions from the experience of the last five years.

I. *Necessity for New Matériel*

The question no longer admits of doubt.

We must supplement the 75-mm. light field gun with the following:

(a) More powerful field guns of flat trajectory, the present type being the 105-mm.

(b) Field howitzers of great range and power, of the 155-C. Schneider or Saint-Chamond type.

(c) More powerful matériel, which must naturally be less mobile, less easily handled, designed to extend the zone of action of the field guns and light howitzers.

This matériel is of the following type: 155 (heavy), new model; 155 (high-powered Filloux), etc.

Heavy howitzers, mortars, etc., constructed chiefly for the purpose of destroying special objectives—of breaking up distant organizations.

It includes the whole series of high-power mortars or howitzers, from the 220 mm. to the 400 mm.

(d) Special artillery of very long range, which can be used only on railways, and which is capable of carrying destruction and disturbance to a very great distance.

This includes the entire series of high-powered Heavy Artillery, Heavy Artillery (Railway), with flat trajectory.

Everyone is agreed upon these points. Without any doubt, this is one conclusion that has been arrived at.

QUESTIONS AFFECTING ARTILLERY

(e) Finally—and this is one consequence of a long war of position—a special trench artillery is recognized to be indispensable.

Along this line we had provided nothing and foreseen nothing before the war, and even during the first months of the war this was still the case.

It is evident that the Germans, although they certainly did not anticipate such severe trench warfare, had begun to study the question before 1914. At all events, they rapidly perfected their studies and almost immediately brought out trench mortars, the number and power of which they continually increased. We have never been able to catch up with them in this respect; we had almost everything to create, and in spite of praiseworthy efforts, we still found ourselves, to the last, if not disarmed, at least in a condition of manifest inferiority—a condition from which the troops who had to occupy, hold, and defend sectors such as Les Épargés, Maisons-de-Champagne, Main de Massiges, suffered heavily.

We found ourselves disarmed through the lack of this special matériel and the absence of howitzers which, if they had existed, would have supplied in part the lack of trench artillery.

The conclusion to be arrived at is that we must not lose sight of this question; that we must pursue investigations, have a well-ried matériel ready to be constructed in great quantity in case of need, and be prepared for a future which may bring forth surprises.

It would be criminal, if events should place us again in a similar situation, to leave our infantry exposed to a continuous, daily moral and material depression, in face of the powerlessness of the field artillery to reëstablish equilibrium.

II. *Organic Artillery of the Large Units.*

Our large units have stood the test and demonstrated their practical value. They are as follows:

The division, true unit of combat.

The army corps, which is at once an organ of combat, of command, and of coördination; a necessary intermediary between

THE FIELD ARTILLERY JOURNAL

the division and the army, it being impossible for the army commander to exercise command and direction over a number of units in excess of four or five.

The army, which is the organ both of command and of general direction, serving also as a reserve body and having a rôle of chief importance in everything touching the daily needs of the troops—victualing, ammunition, hospital convoy, and the supply of special needs arising in battle for reinforcements of troops or artillery matériel.

Let us see then, in a broad sense, with what artillery these great units ought to be provided.

1st. *The Division*.—It may be stated as a principle that the unit formed by the division should have at its disposal artillery troops capable of following the infantry and supporting it in every position. That is the special characteristic and the *raison d'être* of horse-drawn artillery, and of horse-drawn artillery alone.

Here, then, we have the reason for the necessity of confining within strict limits the calibres with which the division should be provided organically.

In the present state of industry, the only guns that possess the requisite mobility are: The 75-mm. light field piece; the 105-mm. heavy field piece; the 155 (Short) field howitzer.

These calibres are necessary to the division, which must combat the troops, the obstacles, and the artillery of the enemy.

With respect to the 75 and the 155 (Short), there is no dissenting voice. With respect to the 105, opinions are divided, and some would wish to see this piece relegated to the army-corps unit.

That is not my opinion.

I believe that the 105 gun is necessary to extend the zone of action of the 75; the more progress we make, the more improvements that are brought about in the production of steel, the more we may demand of artillery in the way of increasing its power without prejudice to its mobility, which is necessary above all.

It must also be borne in mind that we began with divisions

QUESTIONS AFFECTING ARTILLERY

of four regiments of infantry. The critical situation due to the insufficiency of effectives forced us, in order to preserve both the number of divisions judged to be desirable and the proportion of field artillery necessary in the division, to reduce the divisions to three regiments.

And now we have returned to four regiments.

The experience of the war proves that in sector, as well as in open warfare, one regiment of field artillery of three battalions is insufficient, even for a division of three regiments; how much more so for divisions of four regiments.

A good solution of the problem would be to preserve the regiment of 75's at a strength of three battalions of three batteries, but with batteries of six pieces organized as two half-batteries of three pieces, each commanded by an officer, the battery itself being commanded by an officer with the rank of captain, a small battalion commander, with a second in command. A light ammunition column would, of course, be attached to each battalion.

I can see only advantages in this formation, from every point of view. We should have as a result great flexibility in open warfare; the possibility of mute half-batteries in the war of position, echeloned in depth; well-assured command, and diminution of indispensable dead weight (telephone operators, liaison agents, etc.).

In fine, we have seen our regiments reduced, during a long period of war, from many different causes, to 32 pieces, and the battalions reduced to six pieces. Is that an efficient relation, a suitable proportion of artillery matériel in the unit? Who can say whether, in moments of crisis, we may not again witness a similar decrease of matériel?

In spite of all these good reasons, and others as well, I entertain no illusions on the subject, and I do not believe that we shall return to the battery of six pieces, which was rejected before the war in consequence of incomplete and insufficient experiments, based upon an irrational use of the six-piece battery.

But what must be borne in mind is this: whatever may be the system adopted, thirty-six 75-mm. guns to a division of

THE FIELD ARTILLERY JOURNAL

infantry is a notoriously insufficient number under all circumstances; therefore, we must have:

Either 3 groups of 3 batteries of 6 pieces = 54 guns;

Or 4 groups of 3 batteries of 4 pieces = 48 guns.

My preference is decidedly for the first system, because it gives us more guns and reduces the number of the staff and the accessory services.

In brief, if I were called upon to give an opinion on the composition of a divisional body of artillery, I should advise the following:

Two regiments of field artillery subject to the orders of the general or colonel commanding the divisional artillery, and comprising:

One light regiment composed of three battalions of three batteries of six pieces or four battalions of three batteries of four pieces;

One heavy regiment of field artillery, comprising:

One battalion of 105-mm. guns, composed of three batteries of four pieces;

Two battalions of 155 (howitzers), composed of three batteries of four pieces.

2nd. *The Army Corps*.—I have always said and maintained for the last twenty years that the army-corps artillery was an essential organ in the hands of the commander.

The experience of the war has only gone to prove this contention more decisively.

What should be demanded of this artillery? That is the only question we have to consider.

The army-corps artillery is a mechanism, the function of which is to reinforce the divisional artillery, according to circumstances; to extend the zone of action of the divisional artillery, especially for counter-battery; to accomplish certain destructive operations which the calibre of the divisional artillery does not permit it to accomplish in a satisfactory manner.

From this description of its functions, we deduce that the army-corps artillery should be composed of the following:

Horse-drawn field artillery of long range; the 105-mm. gun

QUESTIONS AFFECTING ARTILLERY

must necessarily be employed, on account of its range and its mobility;

Heavy artillery, long guns, howitzers, relatively light mortars;

Powerful long guns of the 155 (heavy) type;

Howitzers of 155 mm. at least, and preferably of a calibre of about 210;

Relatively light mortars, of 220 calibre, perhaps 270.

All this artillery, which does not pretend to follow close behind the infantry in battle, but goes forward by sudden successive movements, taking advantage of the best routes and the battery positions in proximity to the routes, should, of course, be provided with tractors (except the 105, when there are horses enough).

If my opinion were asked as to a possible composition, I should say:

One regiment of heavy field artillery (two or three battalions of 105);

One regiment of heavy tractor artillery (at least two battalions of 155 heavy);

One battalion of howitzers (three batteries 210);

One group of two batteries (mortars).

We shall take up, further on, the question of the use of the artillery, and we shall see that, contrary to the German method which places the counter-battery artillery at the disposal of the division alone, I should prefer to leave it, in part at least, at the disposal of the army corps.

It is simply a question of calibre and mobility.

My idea is to have a counter-battery artillery that will be powerful, of long range, and therefore heavy and not very mobile. In the division, I would have only easily handled artillery, and I would disembarass it, as an organic unit, of all elements that can not be always counted upon. But then, as an indispensable corollary, the divisional artillery must be strong in light field artillery and howitzers, and have some batteries of 105 for counter-battery work in its zone of action.

THE FIELD ARTILLERY JOURNAL

3rd. *In the Army*.—Only a word about the artillery at the disposal of army commanders.

It is evident that this must be a very powerful, and therefore tractor-drawn, artillery, comprising long guns—155 (heavy) and of greater calibre, howitzers, and powerful mortars.

The cannons and howitzers that are of such calibre as to be relatively easy to handle, will reinforce, according to need, such and such an army corps, and will crush resistance by powerful concentrations of fire. The heavier artillery is necessary for warfare of position, for siege warfare.

Finally, the artillery reserves will be at the disposition of the next higher unit; this will enable us to direct a crushing fire upon selected points, or will assist in arresting a retreat and in establishing the defense upon organized and prepared emplacements. This pertains to the High Command.

There is no doubt that these general artillery reserves at the disposal of the high command ought to be very powerful, comprising not only cannons and mortars of great range and power, but also plenty of field artillery, both light and heavy, horse-drawn and tractor.

In critical moments, when the lines have been more or less deeply penetrated, the troops must be quickly closed up, and lost matériel quickly replaced. Therefore, it is essential that the supreme command have large reserves, divided into two or three general groups, the emplacement of which will depend on the extent of the theatre of operations and on the circumstances.

G. H. Q. alone possesses all the documents and records of experience which are necessary to the outlining of a rational plan for the organization and constitution of these artillery reserves, taking into account the future strength of the mobilized armies.

All that we can say is that powerful reserves are a necessity, and that they should comprise a considerable proportion of light and mobile field artillery.

This is, par excellence, the arm for use in a crisis.

QUESTIONS AFFECTING ARTILLERY

In brief, I will say that the large units—division, corps, army—must be equipped with what they require for the discharge of their regular functions and the ordinary circumstances of combat, and a strong artillery reserve must be formed, placed at the disposal of the high command, and to be drawn upon at need for the reinforcement of the organic artillery formations of inferior units.

III. *Assignment of Trench Artillery*

The organic assignment of the different artillery matériel among the large units corresponds to the different forms of warfare; that is, open warfare and position warfare.

Trench artillery responds to a very urgent need of position warfare, and, I believe, to that need alone.

Neither the Germans nor ourselves have been able finally to solve the problem of rapid transport on the battlefield of this special matériel. However, I do not see the necessity for its use in open warfare; the reason for the existence of trench artillery, and the purpose for which it was conceived, is the destruction of passive obstacles and the demolition of shelters, trenches, and communication trenches.

These are not operations usually required in open warfare.

Therefore, until improvements not as yet foreseen shall have been effected, trench artillery remains a powerful, necessary organ for position warfare, possessing the great advantage of being very inexpensive and easily manufactured.

You know, gentlemen, that the organic assignment of trench artillery has passed through various cycles. At first, a weapon of the army corps (because of the small number available), it later became a weapon of the division, to become yet again a weapon of the army corps, with a tendency even to become a weapon of the army.

We must, in the first place, reach an agreement as to the rôle of this artillery. It is, undeniably, most important in the defensive; it replaces, economically, in many instances, the real artillery, which may be employed more usefully elsewhere.

THE FIELD ARTILLERY JOURNAL

But it is also, and above all, an extremely powerful offensive weapon, because of its great destructive capabilities, its relatively easy installation, and its extreme facility of fire adjustment.

Considered from the viewpoint of the defensive alone, it is clearly desirable to spread out this special artillery in thin formation, because large batteries placed near the first lines would be easily destroyed by artillery fire.

In the offensive, on the contrary, it must be employed in mass, in order to sweep clear by its fire large areas. Suitable measures are then taken to protect it against destruction.

As trench artillery is not a mobile arm, there is no good reason to burden the divisions with an organic assignment of this matériel.

Its use depends upon the conditions prevailing within each sector. The divisions, on the contrary, are independent of the sector; they are transferred and moved from sector to sector. The army corps themselves are not very stable.

Trench artillery, being above all an engine for the sector, whether in the defensive, in case the ground lends itself to its action, or in the offensive when preparing for a great attack, it appears logical to make it a stable organism, attached to the sector, that is to say, to the army, with available army reserves to provide for eventualities.

This point being made clear, it is evident that in the sector assigned to a division, all the trench artillery that it is judged desirable to place there should pass under the command of the general commanding the division, who is responsible for its use.

The command of the trench artillery should not be placed higher than the division simply because the limited range of these weapons does not usually permit the assignment to them of normal or eventual zones of action which would include the front, or portions of the front, of more than one division.

Here we have, gentlemen, another conclusion based on experience.

(To be continued.)

Notes on Maps

BY MAJOR E. H. MARKS, CORPS OF ENGINEERS, U. S. ARMY

THE experience of many officers in the A. E. F. has given them a distorted view of the use of maps, and the practicability of the supply of maps of various kinds.

A great many officers who, on reaching France, served on the stabilized front, found there the excellent "plans directeurs" of the French and British armies, and some jumped to the conclusion that these excellent maps covered all of France, and had been prepared prior to the war. As a matter of fact, the "plans directeurs" existed only over limited areas about fortresses and had not been published. The map system of France prior to the war consisted of the hachured map to 1/80,000 scale supplemented by an old and unpublished cadastral survey. In the theatre of operations many of the 1/80,000 maps were enlarged by means of photography and reproduced on the 1/50,000 scale, and a grid added thereto. These enlarged maps suffered in relative accuracy by having any errors in the original magnified, and moreover the scale was not even then sufficiently large for carrying on operations attendant upon trench warfare and its accompanying conditions of map firing; consequently the French and British prepared the "plans directeurs" to 1/20,000 and 1/10,000 scale from the cadastral maps supplemented by field work. These maps were practically all prepared during hostilities and covered a comparatively narrow strip of territory at the front, and in isolated areas where training was in progress. At a point so close to the stabilized front at Château-Thierry no "plans directeurs" of the immediate vicinity of Château-Thierry existed prior to the occupation of that city by the Germans in 1918. The "plans directeurs" of that vicinity which were subsequently used by the American troops were merely enlargements from the 1/80,000 hachured

THE FIELD ARTILLERY JOURNAL

map, and on which the contours were sketched from the appearance of the hachured maps and the meagre elevations shown thereon. They did not possess that accuracy which a "plan directeur" should have.

The use of the large scale map in stabilized warfare is undoubtedly a necessity, but in a war of movement a map of as large scale as 1/10,000 or even 1/20,000 becomes almost a nuisance to the moving troops.

Many officers who served with G-2 in France vouch for the fact that one officer put in a requisition for a "plan directeur" to 1/10,000 scale of the front, and mounted on linen, so that he could fold it and carry it in his pocket. His pocket would have to have been much larger than the most extreme pocket of a British blouse to have accommodated such a map, and it is even probable that the tonneau of his car would have had to be enlarged to hold it even when folded up.

Opinions have been expressed in certain quarters that the United States should have "plans directeurs" constructed over its area. Looking into a few figures of what such a series of "plans directeurs" would amount to, we find some very interesting facts. If we choose for the unit of our "plan directeur" an area of 6000 yards by 10,000 yards, we will have a sheet approximately 24 inches by 40 inches in size, which is about as large a sheet as one can conveniently handle. There would be 170,000 of such sheets required to cover the area of the United States. If we took one copy of each of these sheets and piled them up, our specimen map would stack up to the height of a twelve-story building, and this without any canvas backing. If we had the canvas backing for more convenient use, you can multiply the above figure by three, or to look at it in another way, if we stacked these maps in piles 10 feet high (without canvas or muslin backing) we would have a solid mass of 10 feet by 12 feet. Our single copy of the map sheets to cover the United States would weigh 24 tons, so to carry our map into the field it would take eight 3-ton trucks. Now, if someone wanted to buy one of these maps for his own use, he could do

NOTES ON MAPS

so at the very nominal cost of about 15 cents per sheet (the cost of a government publication usually being limited merely to the cost of printing and paper but not the engraving). A single set of these maps covering the United States would then cost about \$25,000.

In looking into the cost of the field work to prepare this map a quite conservative figure of \$350 per square mile shows us that it would cost \$907,000,000 to do the work, but after our field work has been undertaken, an engraver or a lithographer must prepare this upon metal, and, of course, four colors would be desired; black for the roads and houses, brown for the contours, blue for the streams, and green for the woods. The cost for doing this engraving would then amount to \$170,000,000, or a total for our map of \$1,077,000,000 before a single copy had been printed.

Now, some will say that it is absurd to talk of doing this for the whole United States. If we take an area, say of 100 miles from our coast and borders and limit our "plans directeurs" to that area, we can divide most of the above figures by four, and arrive at a comparatively close estimate. By adopting a smaller scale for our "plan directeur," say 1/20,000, we can still further cut the above figures, but the cost of the field work for doing the map would not be cut down by more than 40 per cent. of the above figures.

Contrast these figures by what has already been done in the United States in the way of maps. The Coast and Geodetic Survey has been engaged for a number of years upon the necessary fundamental control for maps, and the job is far from complete. The Geological Survey has likewise been engaged upon the preparation of a topographic map, of which most sheets are to a 1/62,500 scale. A total of about 40 per cent. of the United States has been covered by these topographic maps. Many of these maps are in need of revision, and some of them of entire resurvey.

A progressive scheme for the completion of this topographic map of the United States has been made, and if a total of some

THE FIELD ARTILLERY JOURNAL

\$50,000,000 is made progressively between the present time and 1932, we will find our topographic map to 1/62,5000 scale completed, and a large amount of resurvey done. By completed, is meant that a map will exist, for in a country developing so rapidly as the United States, our map will never be completed, and it will be continually necessary to revise the sheets. There seems to be but slight probability that such a scale of appropriation will be adopted in the near future.

The 1/62,500 scale map forms quite a fair map for most military uses, although there may be some question of using it for map firing. Looking into the question of the use for map firing in the future, it is of course necessary for our artillery to be prepared on these lines, for we cannot say that we will never have a condition of stabilized warfare within our territory. In fact, before any enemy could begin to operate in our country it would be necessary for him to reduce the fortifications about some of our harbors, and we can then be certain that stabilized warfare will occur in the reduction of these harbors, consequently "plans directeurs" in the vicinity of these places should be made, and it is quite probable that they will be made. But aside from this it will probably be necessary to prepare our "plans directeurs" after hostilities have commenced, as was done in France. It will also be necessary to prepare "plans directeurs" in the vicinity of our training centres, just as was done in France. This is contemplated, and will undoubtedly be done.

Concerning the adoption of the metric system there are many opinions, but at first blush most officers say "adopt it by all means." The writer also says that, but with the proviso that it be adopted not only for all uses in the Army, but for all uses in the United States. The relative convenience which would accrue to map users by the adoption of a decimal system such as is found in the metric system are large, but infinitesimal when compared to the advantages in all work. So also the cost of changing our maps to the metric system (*i.e.*, with our contour intervals in some multiple of metres), although very great, would be infinitesimal when compared to the cost of the initial

NOTES ON MAPS

adoption of this system in all of our industries. This cost would undoubtedly be very great, and would of necessity be spread over a period of years, but the writer's guess is possibly as good as the next one's, and in his opinion the ultimate advantages to the country would outweigh the initial costs. But for the Army to adopt it or partially adopt it before the entire country does would cause endless difficulties in time of war. This does not prevent our adoption of decimal map scales which for most general uses are much more convenient of application than scales of inches to the mile.

We heard a great deal in France about the Lambert conformal projection and rectilinear grids. A rectilinear grid may be used with other forms of projection, and is not an inherent part of the Lambert system. For full details of the Lambert projection one should consult Special Publication No. 47 of the Coast and Geodetic Survey. In brief, the Lambert projection is especially suited for a map of an area which is greater in extent in an east-and-west direction than in a north-and-south direction. It is well suited to a small-scale map covering the whole of the United States for that reason, and for such a map gives lesser errors of scale than the maps of the entire United States constructed upon the polyconic projection. When we get to the detailed maps, however, the question is different, and local maps on a single Lambert projection of the United States will in certain parts of the United States give prohibitive scale errors.

There is and can be no system of projection which can be applied for detailed maps of local areas to a territory of such size as the United States which will not give distortions in scales and directions. We are bound to adopt some system of zoning. We could choose three zones in an east-and-west direction, and to these apply Lambert projections with an independent grid to each. This would, however, meet with objections. Our coasts would be covered by three different systems of grids and our grid meridians on the coasts would vary between 15° and 20° from our true meridians, thus causing confusion, and moreover

THE FIELD ARTILLERY JOURNAL

we would have to redraw practically all of the maps in the United States to conform to the new system of projection.

The polyconic projection is used far more in the United States than all other systems of projection. This form of projection lends itself to an area of greater extent in a north-and-south direction than an east-and-west direction. If we select zones of 9° extent in longitude, and to each apply a grid, we find that our scale of errors at the edges of any zone are less than .2 of one per cent. If, then, we apply seven of these zones to the area of the United States, and overlapping one degree, we have a system in which we can construct an independent grid for each zone. The advantages of such a system as opposed to the Lambert system are a minimum number of grids covering our coasts—one for the entire Pacific Coast and two for the Atlantic Coast—and but small divergences of the grid meridians from the true meridians, and the highly practical reason that we can apply the grids to present maps in the United States.

Such a system has in fact been adopted in the United States by the War Department. A full description of this grid and its application may be found in the Coast and Geodetic Survey, Special Publication No. 59, a supply of which is understood to have been acquired by the Adjutant General.

The Horse and the War

[*Editor's Note.*—Through the courtesy of Mr. Wayne Dinsmore, Secretary, Percheron Society of America, Union Stock Yards, Chicago, Ill., the JOURNAL is granted the privilege of reprinting extracts from "The Horse and the War," by Captain Sidney Galtrey, British Army.

The British are conceded to be past masters in the art of handling and training the horse, and the following extracts from what appears to us to be the best discussion of the subject yet published, will, we believe, be of interest to our readers.]

CHAPTER X

WORK AT THE FRONT

It is one thing seeing a horse or mule at the front—or shall I say, just at the back of the front?—in the bloom of good health, and quite another seeing him away down the lines of communication in the horse hospitals after he has "cracked up" on active service. The one is at his full strength, and the horse lover must feel heartened as he sees him pulling and hauling and contentedly plodding along war's way while still retaining the grit and stamina to do so. The other, which has begun to fail, is sick and sorry now. The machinery which has kept him keyed up as a category "A" individual runs down with a suddenness which is incredible when once he has started to go the wrong way. He passes into sympathetic management and restful quarters, and in due course we will follow his career during this phase of temporary eclipse. For the present let us keep company with the war-horse or mule which is doing his bit, for the healthy are as in the proportion of 9 to 1 to the sick.

Not long ago I asked a highly placed general officer whose

THE FIELD ARTILLERY JOURNAL

business it is to know all about our animals in the war what impressed him most about the horses and mules at work in France, and he unhesitatingly replied: "Their good condition." Well, you have to see to believe, and I can honestly say that I did not see a single really unfit horse. A very few were probably showing signs of the daily grind, and might have been qualifying for a rest and special feeding at the base hospitals or convalescent horse depôts, but I did not see a case of debility or exhaustion still being retained at the front. And, of course, I saw many thousands of animals.

Why this should be so is still something of a mystery to me. You will pass divisions either coming out of the line for rest or others going up. They seemed to be miles long as the guns, limbers, and transport rumbled and rattled over the paved or newly metalled roads. Without an exception their animals were wonderfully good, and sometimes I thought the mules were better than the horses, and then I would incline to favor the horses rather than the mules. I visited here and there, and quite unannounced, horse-standings of some divisional ammunition column, Royal Field Artillery horses, heavy battery horses, and so on. Some were within shelters just off the roadside, others were among the ruins of a shell-blasted village. I looked first for thin and debilitated horses like some of the wrecks I had made acquaintance with away down the line at the hospitals. I asked for them, when I could not find them, and was told that they did not exist. From where, then, did the hospitals get their debility cases? I can only infer that the authorities concerned do realize that prompt evacuation of the sick and the worn is the best policy, and that to hang on to them at the front too long is to jeopardize the life of the horse or to delay his complete recovery so long that his maintenance while out of action becomes a doubtful proposition from a financial point of view.

Again I would emphasize what I wrote in a previous article,

HORSE AND THE WAR

namely, that gunner officers, infantry transport officers, D. A. C. officers, and the N. C. O.'s working under them have undoubtedly acquired from experience a far better understanding of certain first principles essential to proper management of horses in the field. The excellent results are what I saw. The horse advisers have obviously done well, and in that sense the experiment of establishing them has been proved a success, even though it is true that here and there intrusion was not exactly welcomed at the outset. And, of very real importance, I would specially note once more the great good following on the improved standings and the provision of shelter and screens, however rough, against wind and weather. It follows that a horse which must stand in mud and slime until his fetlocks disappear is not going to remain well long. He will develop foot trouble like laminitis, and "grease," the scourge of heavy, hairy-legged horses, is inevitable and must, indeed, cause great loss of usefulness. So you will understand what an advance has been made by the improvement of standings and how it has reacted on the animals.

Of course, it is not always possible to provide what every man knows is desirable. Supposing an advance takes place to a depth of a mile or two, or even more, what then? Horses attached to the guns, horses in the transport with supplies, pack mules with food and ammunition for the infantry—they cannot remain where they were. They must make a corresponding move on, and then, of course, they have to desert their old shelters and enter a "No Man's Land." Such a land, too! A land of horrors underfoot, the whole drab face of the earth nothing now but a racked and scourged wilderness of shuddering pits and water-laden shell holes. Then is the time when the stoutest-hearted horse and the plodding, uncomplaining "muley" are tried to "cracking point." Their next bivouac is on the mud, which is the beginning of most troubles and the original cause of the streams that trickle week by week into the

THE FIELD ARTILLERY JOURNAL

reception veterinary hospitals and those other hospitals that radiate from them.

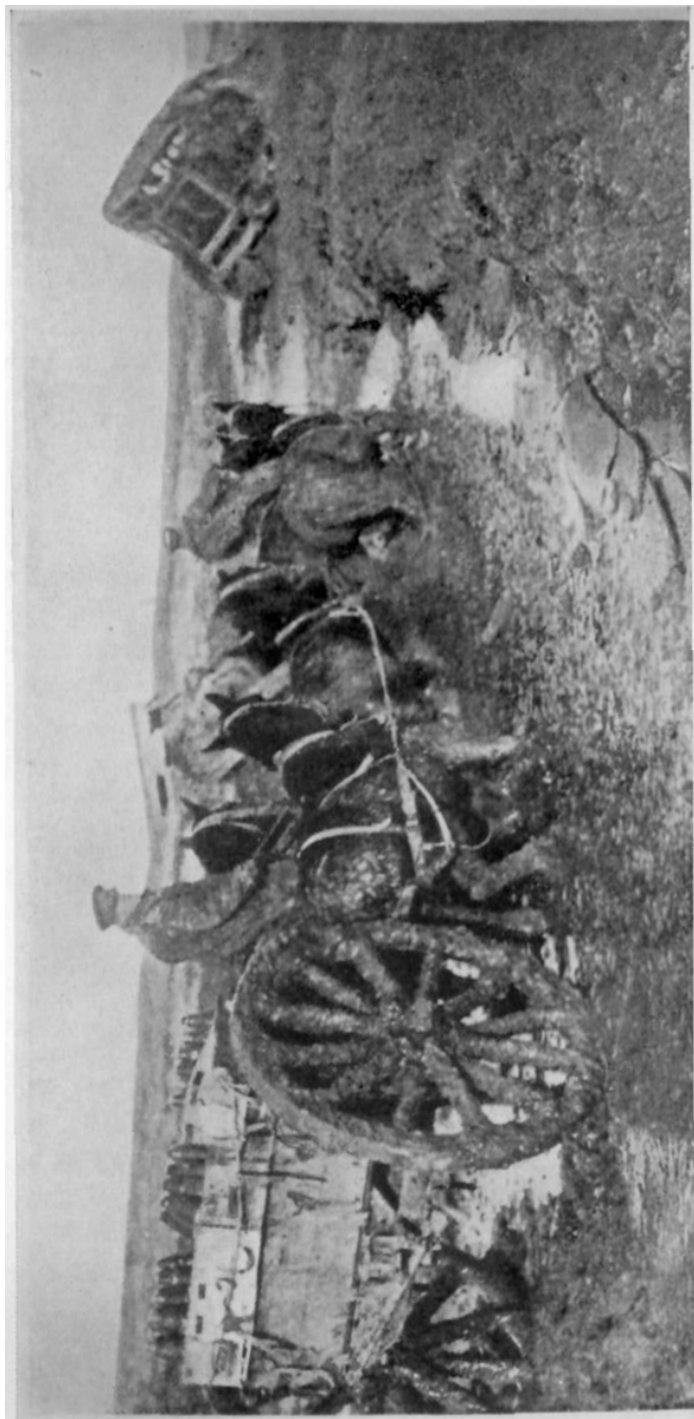
I have heard folk at home, who have never seen these things and therefore do not know, express astonishment that horses and mules are still a vital force in the prosecution of modern warfare. The motor lorry, the steam wagon and the caterpillar tractors, they say, must have supplanted the horse. To some extent they certainly have done so, and it is a reminder that but for them no nation or assembly of nations could have carried on war on the gigantic scale it now is had they all the horses in the world at their command. We have to remember that this is a unique war of enormous, unparalleled magnitude, and that horses are being employed on a scale which could never have been dreamed of. They must still continue to do what motors cannot do until the time comes when war will be made wholly in the sky and under the earth.

In a previous chapter it was mentioned that at the time of writing there were in the neighborhood of half a million horses and mules engaged with the British armies in France. In the month of February there were just 100,000 with the particular army I visited—approximately three horses to one mule. At one time there were with this army about 150,000 animals, every one being urgently required; but I need scarcely point out that any fluctuations must be a matter of adjustment of the Higher Command according to the general situation. Let me try and convey to the reader some idea of what the 100,000 were doing. First and foremost, the roads by day were a revelation. They were a revelation in the splendid control of the traffic, in the distinction made between fast- and slow-moving vehicles proceeding in the same direction.

Take the Field Artillery proceeding up the line in relief, or, perhaps, coming out for rest and a clean-up, or movement elsewhere. There were the 18-pounder guns, the 60-pounder guns, a siege battery of still heavier guns of the "How"



A TEAM OF GALLANT AMERICAN GREYS CHARGING THROUGH MUD WITH SUPPLIES FOR THE FRONT LINE.



EXPERIENCES IN MUD, WHICH IS A PERNICIOUS CARRIER OF DISEASE AMONG HORSES. BUT THE SHELLS MUST GET TO THE BATTERY POSITIONS.

HORSE AND THE WAR

description, and with them all, their limbers and transport; light draught horses, mostly of American origin of that greatly admired Percheron-graded stamp—the stamp that has proved his excellence as a war-horse in France over and over again—were in the lighter field gun, or there were teams of mules, pulling stoically and philosophically at their own gait as if nothing else in the world mattered. There were heavier Percheron-bred teams from the United States in the heavier guns, all in clean and hard condition, and then, perhaps, variety would be given to the long unending procession by the appearance on the scene of some howitzers of certain calibre, each with a team of ten heavy draught horses. A big gun of the kind would require more horses to move it in rough ground, but ten amply sufficed along the level, well-laid roads behind this part of the line.

And what else depends for their movement on horse and mule haulage in the vast scheme of war-making as it is to-day? A divisional train would come along made up of General Service wagons, limbered wagons with heavy or light draught horses or mules, playing their part. An infantry transport might be bringing up the rear of a battalion on the march, and you would notice its wagons, its travelling kitchens smoking and emitting the savory odors of the coming meal, its water-carts, and its pack animals. Or, again, a machine gun company's transport of limbered wagons is on the move, and still another unit you recognize as the cable section of a signalling company. So all day and every day movement and push and drive go on, passing in different ways, like a limitless frieze, but all intent on arriving at the same objective—the winning of the war.

Think, therefore, how much depends on the hundreds of thousands of equine helpers and the necessity of keeping them in health and strength. Most of them had still on their long winter coats, some were partially clipped, a few only were fully clipped; for there is a strong belief now among those

THE FIELD ARTILLERY JOURNAL

who should know that the most complete clipping of war-horses and mules at the beginning of winter is both a folly and a cruelty, since it must deprive them of the warmth provided by Nature. They do say that the losses of the winter and spring 1916-17 were assisted by the clipping which was general, and the laws of logic and nature would seem to confirm the theory. But it is a point on which the expert and the veterinary specialists do not quite agree, and therefore there has been something of a compromise during the 1917-18 winter with certainly vastly improved results. The point made by the Veterinary Service, however, is quite intelligible. They say that the growing of a long coat hides mange and other serious skin troubles until it is too late, when eventually detected, to effect a speedy cure. Remount officers and others say that total clipping must cause great wastage from debility and death, and that it is better to clip, if at all, in the late autumn or very early winter. I am sure the veterinary officers agree that it is undesirable to deprive animals of their winter coats. It therefore becomes a question of arriving at the lesser of two evils, and I am sure the compromise of the fourth winter of war has been the right and sane one.

The voices of the guns, which some miles back were but a murmur borne on the light wind of this late winter's day, had hardened into menace and hateful insistency as one drew nearer to what is so lightly and yet so significantly alluded to as "the line." At disjointed intervals the "heavies" were sending their screaming messengers of death away into the haze of the gray distance when one "quiet" day I looked in on some animals whose quarters were actually closest to our line. Here I saw field artillery horses in waiting; further away were the horses of a heavy battery; and then there were the horses of a D. A. C. section to see.

Here were examples of the horse shelters dotted all over the devastated country, and I need scarcely add that they were within the range of Boche gunfire. But they have what advantages

HORSE AND THE WAR

of immunity can be derived from camouflage, while the men tending them live in huts similarly guarded or in dug-outs. Enemy visitations at night from the air are not unexpected; but when our men think of danger in that way they have also the comforting knowledge that our brave boys in the air are "strafing" and doing as much and more o' nights behind the enemy lines.

And the war-horse and his ever-constant associate, the mule, just go on living their lives as unconcernedly as if the country were not scarred and burned so that its appearance is ugly, sinister and repulsive. They cannot discriminate between a village which is dust and ruin and a church which was once a monument to civilization and Christianity and is now but a skeleton of tottering walls standing in mute condemnation of human hate and savagery, and a village and church which stand whole and beautiful in the pale sun of this winter's day. Our dumb helpers may live in the ghastly ruins of what was once a prosperous town, where the cries of little children at play mingled with the peaceful work-o'-day lives of their elders. Death and devastation made it a hell, the awful fires of which have not yet flickered out.

So when you go out beyond and survey the duck-board tracks which lead to where our men are bearing the real burden and dangers of war, you think of our war beasts of burden that night after night traverse that foul and shell-torn country amid the loathsome vapors of the guns in performing their share in "carrying on." Can you wonder that there is real affection for the horses and mules, and they are indeed the friends of man at this tremendous crisis?

Open warfare, an Army in retreat, a war of movement in which horses and mules helped bravely to stem the torrent which threatened to rush through the gap in the barrier! There were the Cavalry troop horses which essayed the rôle assigned to that

THE FIELD ARTILLERY JOURNAL

arm of the Service and they did not come out unscathed. The gun horses moved the guns from position to position or brought them to the rear when our magnificent men fell slowly back, fighting always grimly, heroically, defiantly. The roads were black with streams of horse-drawn transport of all kinds, salving this, safeguarding that, and in countless ways preserving intact the mass of equipment and belongings of a still unbroken Army.

What days and nights those were! Many a brave gun horse and many a tough old mule may never turn their heads to the West again; for some would fall by the wayside, stopped by shell or dropped from exhaustion. Have you not read in the vivid stories of the war correspondents of shell-riddled villages with only a few dead horses remaining to indicate the red murder of the guns? They, too, seem to tell their stirring tale of sacrifice without which our heavily pressed Forces would not have escaped the attacking masses. That surely is true, and when, either now or years hence, you come to read of the defeat of great German Armies in their plans to crush and batter the British out of existence, you will perhaps spare a grateful thought for the horses and mules which in their thousands made our salvation possible.

They have suffered their share, as was inevitable. They suffered again in our triumphant Autumn advances of 1918. The wounded, like the wounded among our heroic fighting men, have been sent to fill the hospitals. The exhausted and the debilitated from over-work and exposure have been sent "down the line" to rest. And from hour to hour, day to day, it is still going on—toil, sacrifice, and honor—and just as the men are found so also are the animals to reinforce the battery and wagon lines, the Cavalry units, and the thousand odds and ends of an Army that must still rely on man's best friend.

HORSE AND THE WAR

CHAPTER XV

PERCHERON HORSES IN ENGLAND

THERE arrived at a large Remount Depot in the South of England, about two years after the start of the war, a number of Percheron stallions and mares from France; the object of those intimately interested in the coming of these animals being to found a distinct breed of this type of draught horse in the United Kingdom. The Government are not the direct purchasers of these horses, but through the Remount Service they have given every encouragement and facility to certain private breeders to exploit their patriotism in this way. This serious introduction of the Percheron breed to England is a matter of much significance to breeders and users of draught horses, and must not be ignored. There may be prejudice and possibly active opposition to the introduction, but there is also support and a welcome to the horses, emanating as it does from a small but influential and growing body of Englishmen who have come to the deliberate conclusion that for military purposes hereafter, and for general purposes at all times, the type is a desirable one for us to develop.

Why have they come? The question is one which opens the way to a simple statement of facts. That statement, if it is to be frank and convincing, must bear on the experiences and lessons derived from the horsing of the guns and transport during over three years of war. I have endeavored to show why the light draught horse from Canada and the United States is the real horse of the war. It was shown how our great Armies and those of our Allies had been primarily equipped in regard to horses by the marvellous crowds of animals that had been brought across the Atlantic. And the virtues of the type—great endurance, fine physique, soundness, activity, willingness to work, and almost unflinching good temper—were expatiated on with some enthusiasm. Their introduction to the United Kingdom

THE FIELD ARTILLERY JOURNAL

was foreshadowed as being an inevitable outcome of experiences during these three years of great trial and stress for horses.

Fortunately for the Allies, the Percheron-bred horse was available in great numbers; and, to be sure, great numbers were wanted, and may be still. The horse supply of the United Kingdom, by comparison, represented but an infinitesimal quantity of the whole. None was better than the riding-horse, because for the most part the preëminent British thoroughbred was conspicuous in the strain. But the draught horse is the real horse of the war, and in this vital respect the resources of our country were hopelessly inadequate and it must be added, disappointing in regard to results. The heavy draught horse has been chiefly of the Shire-bred type, the impressive cart-horse of the fine size, weight and feathered legs fostered by the Shire Horse Society. One must be perfectly honest and say they have failed to stand the strain, exposure and hardship imposed by modern warfare. The fact is beyond all argument. It is the unanimous opinion of all who have been concerned with them, and it is the fact above all others which has primarily influenced that semi-official movement which we now see initiated on serious lines in favor of introducing the Percheron breed to this country. It is why these stallions and mares have just landed here, and why in the years to come the event will be regarded as epoch-marking in the history of horse breeding in this country.

As to how the development of the breed will proceed in the near future is a question which does not arise here. No doubt a scheme has been drawn up. What has been found lacking and is urgently required is a type of draught horse which will best meet the exacting demands of modern warfare, and, having from experience found that the Percheron is the best, he is naturally the one selected for propagation in this country. After all, it is not surprising that the Shire horse has not come up to expectations. In the Norman days, which probably mark his

HORSE AND THE WAR

origin in England, he was, indeed, the war-horse of the period, since he was used by the knights when heavy armor was worn. And so heavy were the knight and his armor that together they were reckoned to weigh 32 stone. The Shire horse of to-day must, one supposes, be even an enlarged edition of the Norman age, and as such he has not made an ideal transition from the plough and heavy wagon to the horse lines in the open and the big guns in the mud of Flanders and the Somme valley. His constitution has cracked and he has been predisposed in an alarming degree to "grease" and kindred leg ailments, as well as serious respiratory troubles. He has therefore convinced the authorities that the war-horse of the future, if he be forthcoming in this country, must be found in another direction.

Again, we may take it that the pioneers of the Percheron movement in England are hopeful that users of draught horses, chiefly farmers, will take kindly to the newcomer. Will they? It is a question which remains to be answered. Optimists, who point to the breed's overwhelming vogue in agriculture in France, Canada and the United States, have no doubt on the point. Others prophesy failure on the grounds that the farmer will not forsake the Shire and Clydesdale to which he and his fathers and forefathers have uninterruptedly been accustomed. We may take it there is no intention that the newcomer should supplant the famous English cart-horse, whose vogue has extended over the centuries. His position is too secure in our day to be assailed by the advent of a hundred or more true-bred Percherons. He will continue to pull and haul on the land and he will flourish on his abundant rations and the warm stable, which are so essential to his good health. The Percheron, if he should come into favor with the agriculturists, will assuredly do so on his merits.

Here let me interpose some extremely interesting notes conveyed to me in a letter from Mr. Wayne Dinsmore. He has had long experience with all the different draught breeds on the

THE FIELD ARTILLERY JOURNAL

range in western South Dakota, and for seven years was on the Staff of the Iowa Agricultural College at Ames, where as associate professor he taught classes in the history and development of all draught breeds. This is what he says:

"It may interest you to know that the production of so large a number of admirable artillery horses in the United States has been due to the breeding up of small mares by the use of Percheron sires and to the conditions under which a large proportion of these animals are reared. Small Western mares, weighing from 800 to 1000 pounds, have been bred to Percheron stallions. The get, if liberally fed and reared under farm conditions, would mature at 1400 or 1500 pounds, but in virtually all cases the colts have been foaled on the open range and have grown to maturity without any feed other than that obtained from the dam and native pastures. The result is that such colts have actually matured at 1100 to 1207 pounds. The half-blood females of this kind have been again bred to Percheron stallions, and their produce, reared under the same general conditions, have matured at from 1250 to 1500 pounds, depending on the amount of nourishment available where they were reared. A very large proportion of the horses which have gone for artillery purposes are such three-quarter blood Percherons, reared without any feed other than that which they obtain on pasture, and the outdoor life which such horses have developed under has made them exceedingly hardy and able to endure unfavorable climatic conditions. The endurance of Percherons is proverbial, and it has been accentuated by reason of the conditions under which these horses have been reared. Even on the farms in the great Middle West a very large proportion of the horses are reared in this manner; for it is unfortunately true that very few of our farmers feed foals, yearlings and two-year-olds liberally enough on grain and hay, in addition to pasture, to make possible the full development in size and strength. Some cross-breeding has, of course, been done, and

HORSE AND THE WAR

in addition to this the progress upward from the small foundation has oftentimes been retarded by reason of the fact that many of our Western ranchmen have not used pure-bred Percheron sires, but have been prevailed upon, on account of financial reasons, to purchase and use grade Percheron stallions carrying three-fourths or seven-eighths Percheron blood. There are many such grade stallions produced in Illinois and Iowa, where breeding has been long continued, and a very large number of such grade horses have been sold for use on Western mares. These have made marked improvement, but of course the gain has not been as great as where pure-bred sires have been used, and for this reason it not infrequently occurs that at least four crosses of Percheron blood are to be found in animals purchased for artillery or transport purposes.

"One thing which has retarded American horsemen in producing good horses is the fact that the demand for Percheron stallions has been so great that a good many which should properly have been castrated have actually been used for service. Colts occur in all breeds that are not up to standard, and it has too frequently happened that animals deficient in feet or legs, particularly with regard to position of hind legs, have been sold for breeding purposes for the reason that the farmer could get twice as much for them when raising two, if he sold them as stallions, as he could obtain for them if he were to castrate said colts and keep them until maturity. Under the circumstances, you cannot blame farmers for permitting the colts to be sold. This is one explanation for the fact that quite a good many horses are not as perfect in their underpinning as Percheron men would like to have them, but this is gradually being eliminated, as we are now producing more Percheron sires of the right stamp and our buyers are steadily becoming more discriminating in their selections.

"The one thing that has added more to the popularity of Percheron horses than any other factor is the fact that the

THE FIELD ARTILLERY JOURNAL

Percheron sire is extraordinarily prepotent, stamping his characteristics upon females of any size or breeding. Ranchmen of long experience who have reared thousands upon thousands of horses report the get of Percheron stallions always possess the characteristics of the sire, regardless of what the dam may be, and that the colt, whether from a large or small mare, is a compact, thick, powerfully muscled, serviceable horse, saleable whether he be large or small.

"I do not wish your English readers to gain the impression that Percherons are useful only for siring artillery horses, for as a matter of fact they are primarily a draught breed. A sire should stand at least 17 hands, have depth of chest equal to one-half of his height, and be well proportioned throughout, weighing in breeding condition around a ton. The best females usually stand around 16.2 to 16.3 hands, are likewise deep-bodied and roomy in the middle, and weigh from 1750 to 2000 pounds, although we have some mares that are larger. Those I speak of, however, are considered the most typical.

"In contrast to the desirable results obtained from crossing Percheron sires on mares of any type or breeding, other heavy breeds have not crossed kindly on so wide a variety of females. If crossed on very small mares the get lacks proportion, are heavy headed, awkward in underpinning, and in all instances lack the deep, roomy middle, easy-keeping qualities and extreme hardiness characteristic of the Percheron grades.

"I have written thus fully because I believe these items will interest you, and I am sure that you will find ample confirmation of my statements from the horses actually in service in France. Typical Percheron horses are as good in the underpinning as horses of any breed, bar none.

"The Percheron horse will not only produce the best artillery horses the world has ever seen, but grades carrying three-quarters or seven-eighths Percheron blood will, if properly grown out, make draught horses of real draught character and

HORSE AND THE WAR

size that will outwear others in hard city service. This is one of the particularly noteworthy characteristics of the breed, as has been demonstrated in American cities. They have gone into stables, have worked side by side with other geldings, have kept in condition on less feed, and have outlasted them by years."

After all, it is something quite substantial in his favor that none better is needed in France and North America. And it is also deeply significant that individuals associated with the Army Remount Service, men who have been with horses and studied them all their lives, should have been converted to the Percheron-bred draught horse. These officers were admittedly prejudiced against them at the outset. It has been a kind of creed with every Englishman that the horses of no other country are as good as those of his own. It is a belief handed down from generation to generation, and it will be understood, therefore, that the notion was far too deeply rooted to be shaken by anything but the most convincing proof. If these prominent English judges of horses were not convinced, they were at least made to doubt their old beliefs. Everything that has happened in connection with the remount side of the war has gone to prove the urgency of instituting at once an Army horse supply in this country which shall be based on those lessons. Therefore it cannot be too clearly understood that the movement which has brought about the introduction of the Percheron to this country is dictated by no desire to harm existing breeds and the interests connected with them, but to found the right war-horse for the time to come. We may hope that after this hell on earth there will be no wars, but wise administrators must be prepared for anything, and least of all for a sudden reformation of the world and its peoples. If the Percheron should also fulfil agricultural requirements and ordinary draught purposes in commerce, so much the better. His coming will more than ever have been justified.

(Conclusion)

CURRENT FIELD ARTILLERY NOTES

Submerging a 75-mm. Self-propelled Mount

[*Editor's Note.*—The following letter and accompanying photographs are of interest in connection with the article published in the March-April number of the JOURNAL entitled, "A Successful Experiment in Submerging a Gasoline Motor."

Medicine Creek is a fair example of the streams that divisional artillery would be called upon to cross in probable changes of position in battle.]

The Editor, FIELD ARTILLERY JOURNAL, Washington, D. C.,
through the C. O., Fort Sill, Okla.

Photographs of Self-propelled Caterpillar Mount Submerged

1. Attached hereto are two photographs of the 75-mm. self-propelled caterpillar mount running submerged in Medicine Creek, Fort Sill, Okla. In the March-April number of the FIELD ARTILLERY JOURNAL there appears the Proof Officers' Report of the original experiment on submerging a gasoline motor, as performed at Aberdeen Proving Ground. For the study of the Field Artillery Board, the Ordnance Armament Shop at this post waterproofed the mount shown in the photos, and has successfully demonstrated its submarine qualities for the Field Artillery Board, Lt.-Col. W. I. Westervelt, Ord. Dept., and Col. A. F. Casad, Dept. Ord. Officer, Southern Dept.

2. It is of interest to note that the material used in this experiment came entirely from salvage, with the exception of two check valves, which cost \$6.50. The copper boxes enclosing the magneto and carburettor were made from old pole pads, rubber gaskets were improvised from worn-out inner tubes of tires, the breather pipe was originally a kerosene can, and the balance of the material consisted of some salvaged pipe fittings, some shellac and friction tape.





CURRENT F. A. NOTES

3. The general ideas of the job were inspired by the report of the original experiment at Aberdeen, but the details of execution were worked out here. A factory job would no doubt be a great improvement on our work, as we were limited on material, but the results of our experiment substantiate the claim that it is practical to operate a gasoline motor under water.

F. W. BOWLEY,
Lt.-Col., Ord. Dept.

German Opinions on Heavy Field Artillery and its Assignment to Divisions.*

It is known that, like ourselves, the Germans have assigned organically heavy field artillery to their infantry divisions. In France the organization program of the heavy field artillery, dated May 30, 1916, recognized the necessity of giving each infantry division two battalions of 155-mm. howitzers. Evidently this program could not be completed for some time; the note of General Headquarters, dated July 12, 1917, assigned provisionally, one battalion of howitzers organically to each division in place of the two battalions intended, and this organization continued in effect up to the time of the armistice.

The German Army on its side had already arrived at an analogous organization, and during the period extending from October 1, 1917, to the spring of 1918, their 150 divisions, which were intended to be used in the projected grand offensive, were each given a battalion of heavy artillery; this battalion being a mixed one, consisting of two batteries of 150-mm. howitzers and one battery of 100-mm. guns.

It seems interesting to make known the thoughts which have led our adversaries to adopt this organization, and publish some extracts from two articles which appeared in the *Artilleristische Monatshefte* of November-December, 1917,¹ under the signature of Major-General Von Richter and Lieutenant-General Rohne.

* Translated from the Revue D'Artillerie, January, 1920.

¹ See, in number 131-132, November-December, 1917, of the *Artilleristische Monatshefte*, page 153, the article entitled—"Zur Unterstellung Schwerer Artillerie unter die Division."

THE FIELD ARTILLERY JOURNAL

OPINIONS OF GENERAL VON RICHTER

GENERAL OBSERVATIONS ON THE EMPLOYMENT OF HEAVY FIELD ARTILLERY

When one speaks of the heavy artillery assigned to troops of the first line, it is generally understood to mean under this designation the battalions of artillery armed with heavy field howitzers which, at war strength, are composed of four batteries, each containing four pieces, eight caissons, one observation cart and a certain number of supply wagons. These battalions belong to the foot artillery. Originally they were destined, with other formations of this arm, to enable the first-line army to capture the barrier forts which had already been established by the French after 1870–1871, and to advance upon the territory in their rear. Their pieces were expected to follow the army and not be advanced unless for use in case of necessity against enemy works; there was at that time no intention of using them in a war of movement.

It was in 1877–1878 that the fortifications established by the Turks against the Russians, and defended with success, suggested the idea of creating an artillery capable of high-angle fire with a view of combating effectively the garrisons of this sort of works. The results of these studies was the adoption in the field artillery of the 105-mm. howitzer, Model 1898. . . . Again in 1900 there was seen the need for the employment in a war of movement of a howitzer of 150 mm., which had been put in service in 1893. This howitzer was so modified in 1902 as to make it easier to handle and to increase its rapidity of fire. Finally, driver companies were assigned to regiments of foot artillery.

At this time the commanding general of an army corps retained control of the disposition of the battalion of howitzers assigned to his corps. He was thus able to hold them in reserve in order to engage them at the point where he sought the decision, or in the march of approach he could apportion them to the different routes followed by the division which seemed best able to use them.

CURRENT F. A. NOTES

As long as the heavy howitzers fired only percussion shell the burst effect of which was limited (40 metres on each side in a lateral sense and 20 metres towards the front and rear), they gave small results against troops in movement; but since they have fired time fuzes, better results have been obtained.

A decisive effect is to be expected, on the other hand, from these howitzers against immobile targets whose range can be determined accurately or with a fair degree of accuracy. In this category belong artillery definitely located, infantry behind cover, and especially strongly-organized points of support. As a result of the actual experience of war, the howitzer has gained for itself a place with first-line troops. Even though it generally abandons to the field artillery the rôle of attacking movable objects, it will, nevertheless, frequently be called upon to supplement the action of the field guns in the frequent cases where the power of the field guns is insufficient or their characteristics unsuitable. This was also true even after the introduction of the new field guns, Model 1916, and the light howitzers, Model 1916,² and the increased power which resulted from the design of these new models.

Side by side with the field guns, the heavy howitzers should strive to emulate the latter, support the infantry and make it possible for them to break up the enemy's positions. They assured us at the beginning of the war of a superiority in the artillery combat; our adversaries, in fact, either carried with them a heavy army artillery less powerful than ours or they did not make it play a decisive rôle, and thus contributed to the rapid success and overpowering effect of our troops. Due to the power of their means of transport, which is always maintained even in unfavorable conditions of supply and climate, the mobility of the heavy howitzer seemed to have been sufficient, in spite of the great efforts they cost. There has never been a complaint that their numerous ammunition vehicles lengthened unduly the column of route and thereby retarded the deployment of the infantry.

² (See description of this gun and howitzer in the field Artillery Journal for September-October, 1919—Editor).

THE FIELD ARTILLERY JOURNAL

ASSIGNMENT OF A BATTALION OF HEAVY ARTILLERY TO THE DIVISION

Up to this time, the howitzer battalions not being an organic part of the infantry division, the division commander could not exercise command over them; consequently, they were not closely connected with the infantry and field guns with which they were called upon to cooperate in combat. The heavy artillery is now actually passing through a crisis analogous to that through which the field artillery passed in 1899; it was necessary to struggle for years in order that it might aspire to serve with the combatant forces near which it ought to find its first employment.

The war has accelerated the evolution of the howitzer battalions and, in the future, neither the high command, the infantry nor the field artillery will be able to disregard the heavy howitzers in the composition of the division.

COMPOSITION OF THE HEAVY ARTILLERY BATTALION

Since it is believed that the time has come to incorporate the heavy howitzers in the division, it goes without saying that they will form part of the artillery brigade, which basically contains two regiments of field artillery, and will be under the command of the artillery brigade commander. The only question is, What is the proper number of heavy howitzers to be assigned to the division, and whether it would not be advisable to adopt, in addition to the howitzer, heavy flat trajectory guns?

In reply *a priori* to this last question, it is sufficient to recall the many advantages possessed by long-range guns firing shrapnel, as was clearly shown in the course of the war.

The army which provided itself with weapons of this kind was able at long range to interfere with the movements of the enemy's troops, force them to seek cover, retard progress and disturb distant cantonments; the army which was unprovided with such weapons was incapable of defending itself.

The field artillery, it is true, was supplied during the course of this war with 77-mm. guns, Model 1916, capable of great

CURRENT F. A. NOTES

range, but they did not possess the range nor the efficiency of the 100-mm. guns.

NUMBER OF HEAVY GUNS TO BE ASSIGNED TO THE DIVISION

In that which concerns the importance of the heavy artillery to be assigned to the division, numerous projects have already been published, particularly that one which gives to each division a battalion of three batteries of heavy howitzers and joining this battalion to the existing battalion of light howitzers in order to form a regiment; the division would have, besides, either one or two regiments of two battalions of three batteries of field guns.

Finally, there is a project which emanates from General Rohne; it also provides for a regiment composed exclusively of heavy artillery and consisting of two battalions, each containing two batteries of heavy howitzers and one battery of heavy guns.

Of these different projects those which advocate the combination of light and heavy howitzers in the same regiment are not acceptable, for instruction in their use and employment rests on essentially different principles and unity should exist in the regimental cadre.

Assuming the composition of a regiment of heavy artillery for the division, as proposed by General Rohne:

This composition would, consequently, bring the number of pieces of heavy artillery in the corps to 48, instead of 16, an increase of 200 per cent. It is difficult to agree that such an increase is justified by the lessons of the war. From this point of view there are two considerations which cannot be passed over in silence.

One treats of the large number of carriages that would be necessary, thereby causing an inadvisable lengthening of the column of route. The other is relative to the expense involved in providing the powerful means of transport necessary for adequate ammunition supply.

At the beginning of this campaign of 1914 the 16 heavy

THE FIELD ARTILLERY JOURNAL

howitzers of the army corps seem to have sufficed for all needs. This would still be the case in the future, the more so, if, as seems to be expected, the number of light howitzers is increased at the expense of the field guns. Even if the light howitzer, Model 1916, is not as efficient as the larger calibre (*i.e.*, the heavy howitzer) it approximates fairly well to it.

I arrive now at the project which advocates giving each division a battalion of two batteries of heavy field howitzers and one battery of 100-mm. guns; each battery consisting of four pieces.³ If the actual number of field batteries remains the same, since it has been definitely decided to reduce the number of pieces to four per battery, the army corps will not have at its disposition more than a total of 120 pieces, this being 40 less than it would have to-day. The heavy artillery will thus be increased 50 per cent. It remains to be decided whether the number of ammunition carriages and supply wagons assigned to this artillery should be increased in the same measure or the ammunition supply of the first échelon should be diminished.

This project is not entirely satisfactory in what concerns the heavy artillery; it actually only foresees in this arrangement the value of a battalion, although the regimental organization offers incontestable advantages from the standpoint of instruction and utilization in combat.

It would here be expedient to examine the possibility of giving each division a regiment composed of a battalion of two batteries of heavy guns, each battery having four pieces. Battalions of two batteries have existed before in the field artillery, and never caused any trouble. In this case the heavy artillery would receive an increase of 100 per cent., and the army corps would have at its disposition 128 pieces of artillery; that is to say, in spite of all, 32 pieces less than at the beginning of the war.

In the last two projects which have just been examined, the number of pieces of artillery suffered, with respect to the number of rifles, an altogether inadvisable reduction.

³ This is the allotment which has been definitely adopted.

CURRENT F. A. NOTES

If the plan so long discussed, of forming the army corps of three divisions, is carried out, the corps will be enriched by 60 or 64 pieces, and the total number of pieces of artillery would be increased to 180 or 192 pieces, instead of 120.

So the actual number would not be exceeded, and the relation between the number of pieces of artillery and the number of infantry battalions of the army corps of 6.4, which it is actually, would be brought to 6.7 or 7.1, assuming that the increase in the infantry would be two battalions. Then that the relation 6.7 would again seem inadvisable by reason of the importance taken by the artillery in the course of the present war, the relation 7.1 would signify, on the contrary, a too considerable increase of artillery in relation to the principal arm, the infantry.

If it is not decided to have an army corps of three divisions, it would be necessary to create a certain number of new field batteries armed with light howitzers, and to bring one of the regiments of divisional field artillery up to three battalions with nine batteries.

It remains for us to consider what is accomplished by the measures taken for our adversaries on the east and west, this should have considerable influence on the organization of our artillery. What this influence will be cannot be foreseen.

Opinions of General Rohne are a part of the above article and follow here:

OPINIONS OF GENERAL ROHNE

To the above-mentioned plan, which fully deserves consideration, I will allow myself to add a few observations.

On the question of knowing whether the battalion should, in the future, be composed of guns and howitzers, or should contain, as up to the present, only one kind of piece, there exists no difference of opinion between General Von Richter and myself.

On the other hand, General Von Richter regards the heavy artillery, of which I propose to allot to the army corps—12 batteries of four guns each, making a total of 48 guns—as too

THE FIELD ARTILLERY JOURNAL

much, and is content with one-half or two-thirds of this number, as long as the army corps will possess only two infantry divisions, as before the war. But if the army corps, eventually, should be composed of three weaker divisions, it would receive, according to General Von Richter's plan, 36 or 48 heavy pieces, which would give it the three-fourths or the same quantity of heavy artillery as in my plan.

In laying down the above principles I have yielded to the impressions, produced by each great war, that there is need of an artillery as effective as possible, even if the mobility should suffer slightly. This plan would place at the disposal of the army corps 96 light and 48 heavy pieces, making a total of 144 guns. The total number of pieces would thus be less by 16 than that corresponding to the organization before the war, but this disadvantage would be largely compensated for by a better organization (batteries of 4 pieces with greater provision for ammunition), and by the greater effectiveness of the heavy pieces.

At the outbreak of the war the French artillery was considerably weaker in proportion to infantry; 30 light batteries and 3 heavy batteries were allowed for 30 battalions of infantry, or 4.4 guns per 1000 rifles, against 6.4 in the German army. Now, I have never been aware that on the French side the lack of artillery made itself felt. To this particular I will add that the French army corps, although employing a smaller number of pieces, had a greater number of batteries abundantly supplied with ammunition.

ALLOWANCE TO THE DIVISIONS IN AN ARMY CORPS OF THREE DIVISIONS

It is less easy to answer the question of knowing how much of the heavy artillery should be assigned to the divisions with reduced effectives in an army corps of three divisions. There is a choice between 3, 4 or 6 batteries. In the case of 3 batteries, each division would have at its disposition a battalion composed of two howitzer batteries and one gun battery.

CURRENT F. A. NOTES

The weight of the heavy artillery would be, with respect to the infantry, weaker than in the army corps of two divisions. When in this last case there would be 6 batteries for 12 battalions, in the case of three division corps there would only be 3 batteries for 9 battalions; that is to say, for the whole corps, 5.33 pieces per 1000 rifles.

In the case of 4 batteries a regiment of two battalions of two batteries each might be allotted to each division. Each division would then have at its disposition 9 light and 4 heavy batteries, with a total of 13 batteries or 52 pieces, and the corps, of 156 pieces. This would give 5.78 pieces per 1000 rifles, an entirely satisfactory proportion.

In the case of 6 batteries, each division would receive a regiment of 6 batteries, in all, 15 batteries or 60 pieces, making 180 pieces for the corps. This would be 6.7 pieces per 1000 rifles, a proportion which appears too strong, especially as two-fifths of the pieces would be heavy.

REDUCTION OF THE AMMUNITION SUPPLY PROVIDED FOR THE HEAVY BATTALION

General Von Richter, on account of the great need of munitions for the heavy artillery, nevertheless maintains a prejudice against the strong increase which I have proposed. He does not declare himself on the subject of the possibility of a reduction of the ammunition supply for the heavy artillery.

I am of the opinion that this reduction is indispensable, and should even be made on a very large scale.

Up to the present it was provided in the batteries and the combat trains:

For a field gun { $2\frac{1}{3}$ caissons or 258 rounds = in round numbers to 1700 kgs. of projectiles.

For a light howitzer { $2\frac{1}{3}$ caissons or 168 rounds = in round numbers to 2600 kgs. of projectiles.

For a heavy howitzer { 4 carriages carrying ammunition or 126 rounds = in round numbers to 5200 kgs. of projectiles.

THE FIELD ARTILLERY JOURNAL

This proportion corresponds approximately to the normal consumption, and has proved sufficient for the needs of the heavy artillery.

It is only in the composition of the ammunition column that any important difference is produced. In this case you can only estimate on the number of ammunition carriages and not on the number of rounds and weight of projectiles, for the latter are not made known.

In the artillery munitions sections provision is made for each field gun and for each light howitzer of 1½ carriages; for each heavy howitzer, 8½ carriages. The supply of the heavy howitzer is thus six or seven times as great as that of the light pieces.

This proportion has been fixed, without doubt, in consideration of the principal missions which were foreseen before the war for heavy howitzers and which consisted in subduing the barrier forts of the French eastern front.

These resisting objectives, which should be combated, exact naturally a more considerable consumption of ammunition than the less important objectives met in campaign, but to accomplish this end the assignment of heavy artillery to the division is not necessary; it will be sufficient to organize special units which will be provided in an adequate manner with munitions without burdening the troops of the first line. If for the heavy howitzers assigned organically to the division we plan to keep in the munition sections about one and one-half or two ammunition carriages per heavy piece, this allowance should be ample, and the fear of overburdening the field troops would thus lose its force.

The United States Field Artillery Association

PROPOSED AMENDMENTS TO THE CONSTITUTION

WASHINGTON, D. C.,
December 31, 1919.

The Secretary, United States Field Artillery Association,
Washington, D. C.

SIR:

In conformity with Article IX of the Constitution of the United States Field Artillery Association, the undersigned, being active members of the Association, hereby propose certain changes in said Constitution for the following principal reasons:

(a) At the time of the adoption of the Constitution of the Association there were no officers of the Field Artillery Section of the Officers' Reserve Corps. There are now approximately eight thousand of these officers, all of whom were in the Field Artillery of the United States Army during the World War, and a considerable number of whom are subscribers to the FIELD ARTILLERY JOURNAL. It is believed that the service and interest of these officers merits the privilege of active membership in the United States Field Artillery Association, and representation upon the Executive Council of the Association.

(b) It is believed that the natural interest in Field Artillery matters of those persons who served in the Field Artillery of any of the United States forces during the World War should entitle them to the privilege of associate membership in the United States Field Artillery Association.

The proposed amendments to said Constitution are clearly set forth as follows:

1. It is proposed to amend Section 2, of Article III, by

THE FIELD ARTILLERY JOURNAL

inserting the words "and commissioned officers on the active list of the Field Artillery Section of the Officers' Reserve Corps" between the words "District of Columbia" and "provided" in line six of said Section, so that said Section shall read, when amended, as follows:

Sec. 2.—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 and commissioned officers on the active list of the Field Artillery Section of the Officers' Reserve Corps; 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.

2. It is proposed to amend Section 3, Article III, by adding thereto the following sub-paragraph:

"(g) All persons who, in any war, served in any capacity in the Field Artillery of any of the forces of the United States Federal Government," so that said Section shall read, when amended, as follows:

Sec. 3.—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,

AMENDMENTS TO F. A. CONSTITUTION

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 Marine 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 hereinafter provided for.

(g) All persons who, in any war, served in any capacity in the Field Artillery of any of the forces of the United States Federal Government.

3. It is proposed to amend Section 1 of Article VI by striking out the word "five" in line two of said Section and substituting therefor the word "nine"; by striking out the word "three" in line two of said Section and substituting therefor the word "five"; by inserting a comma after the word "army" in line three of said Section; by striking out the word "and" in line four of said Section; and by inserting the words "and two officers of the Field Artillery Section of the Officers' Reserve Corps" between the words "militia" and "to" in line four of said Section, so that said Section shall read, when amended, as follows:

Sec. 1.—The Executive Council shall be composed of nine active members, five of whom shall be officers of the regular army, two officers of the organized militia, and two officers of the Field Artillery Section of the Officers' Reserve Corps, to be elected biennially for a term of two years by a majority vote, 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 FIELD ARTILLERY JOURNAL

4. It is proposed to amend Section 3 of Article VI by striking out the word "Three" in line three of said section and substituting therefor the word "Five," so that said Section shall read, when amended, as follows:

Sec. 3.—The Executive Council shall meet from time to time, at the call of its senior member present in Washington. Five members shall constitute a quorum for the transaction of business.

Respectfully submitted,

E. P. KING, JR., Col., F.A.	C. P. GEORGE, Col., General Staff.
JOHN B. ANDERSON, Lt. Col., F.A.	J. F. BARNES, Major, G.S.
W. C. POTTER, Col., F.A.	CLIFT ANDRUS, Lt.-Col., F.A.
R. E. LEE, Col., F.A.	M. CHURCHILL, Brig.-Gen., G.S.
G. R. ALLIN, MAJOR, F.A.	D. F. CRAIG, Major, F.A.
T. W. WRENN, Major, F.A.	MANUS MCCLOSKEY, Col., F.A.
WILLIAM E. BURR, Lt. Col., F.A.	WM. BRYDEN, Major, G.S.C.
T. D. SLOAN, Col., F.A.	MAXWELL MURRAY, Col., F.A.
W. W. HESS, JR., Major, F.A.	WM. J. SNOW, Maj.-General.
C. S. BLAKELY, Major, F.A.	OLIVER L. SPAULDING, JR., Lt.-Col., F.A.
E. T. SMITH, Col., F.A.	J. N. GREELY, Col., F.A.
F. W. HONEYCUTT, Col., F.A.	H. W. BUTNER, Lt.-Col., F.A.
H. D. HIGLEY, Lt.-Col., F.A.	

WASHINGTON, D. C.
December 31, 1919.

The Secretary, United States Field Artillery Association,
Washington, D. C.

SIR:

In conformity with Article IX of the Constitution of the United States Field Artillery Association, the undersigned, being active members of the Association, hereby propose certain

AMENDMENTS TO F. A. CONSTITUTION

changes in said Constitution for the following principal reasons:

It is believed that no good reason exists for the requirement of the Constitution that the Secretary-Editor and the Treasurer of the Association shall be active members of the Association. Since the policy and records of the Association and the editorial policy of the FIELD ARTILLERY JOURNAL are under the close supervision of the Executive Council, the members of which are required by the Constitution to be active members of the Association, and since the Executive Council selects the Secretary-Editor and the Treasurer, it is desirable that the Constitution be amended so as to permit those offices to be held by retired officers. It is necessary that the Secretary-Editor and the Treasurer should be stationed in or reside in Washington. As officers on the active list are constantly changing station, the number of troublesome changes in the officers of the Association will probably be diminished by making retired officers eligible to hold these offices.

The proposed amendments to said Constitution are clearly set forth as follows:

1. It is proposed to amend paragraph number three, of Section 2, of Article VI, by inserting the words "or associate" between the words "active" and "members" in line two of said paragraph, so that said paragraph, when amended, shall read as follows:

3. A Secretary-Editor, to be selected from its own members, or other active or associate members of the Association, and who shall be an officer of the Regular Army.

2. It is proposed to amend paragraph number four, of Section 2, of Article VI, by inserting the words "or associate" between the words "active" and "members" in line two of said paragraph, so that said paragraph, when amended, shall read as follows:

THE FIELD ARTILLERY JOURNAL

4. A Treasurer, to be selected from among the active or associate members, and who shall be an officer stationed or residing in Washington, D. C.

Respectfully submitted,

(Signed)

JOHN B. ANDERSON, Lt.-Col., F.A.	F. W. HONEYCUTT, Col., G.S. MAXWELL MURRAY, Col., F.A.
WILLIAM E. BURR, Lt.-Col.,	WM. J. SNOW, Maj.-General.
R. E. LEE, Col., F.A.	OLIVER L. SPAULDING, JR., Lt.- Col., F.A.
E. P. KING, JR., Col., F.A.	J. N. GREELY, Colonel, F.A.
T. D. SLOAN, Col., F.A.	W. S. BROWNING, Col., G.S.
W. C. POTTER, Col., F.A.	H. W. BUTNER, Lt.-Col.
T. W. WRENN, Major, F.A.	ALFRED A. STARBIRD, Lt.-Col., F.A.
CLIFT ANDRUS, Lt.-Col., F.A.	DWIGHT E. AULTMAN, Col., F.A.
D. F. CRAIG, Major, F.A.	M. E. LOCKE, Major, F.A.
MANUS McCLOSKEY, Col., F.A.	C. D. HERRON, Lt.-Col., F.A.
M. CHURCHILL, Brig.-Gen., G.S.	A. S. FLEMING, Col., F.A.
WM. BRYDEN, Major, G.S.C.	A. J. BOWLEY, Col., F.A.

BOOK REVIEW

Field Artillery Instruction, by Arthur H. Carter and Captain A. V. Arnold. G. P. Putnam & Sons, New York. Price \$6.50, postage 25 cts.

This book is a revision of the "Black Book" issued by the Field Artillery Central Officers' Training School, Camp Zachary Taylor, Ky., during the war. This book was a collection of the various schedules, instruction pamphlets, and training bulletins published used for instruction at the school. The revision is improved in form and is well illustrated with cuts showing the execution of movements described in the text, the adjustments of harness, etc.

The book is designed to meet the needs of R. O. T. C. students and other "beginners" in Field Artillery and will well fill these requirements, forming a foundation for further study by consolidating the fundamental knowledge required in one volume.

The following subjects are included: Physical Instruction—Dismounted Drill—Military Courtesies—Matériel—Drill of the Gun Squad—Fire Discipline—Field Gunnery—Conduct of Fire—Communications—Orientation — Topography — Reconnaissance — Horses and Care of Equipment—Entraining and Detraining. For the use of instructors the schedules used at the F. A. C. O. T. S. are included in the form of an appendix.

It is practically impossible for a book of this kind to be entirely up to date, owing to the constant changes in matériel and methods. This book, however, is so basic in the manner of treating the various subjects included that it will be useful for a much longer time than other more technical and detailed studies.

Index to Current Field Artillery Literature

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

- AIR SERVICE.—The great vital question of national defense. Gen. F. G. Stone. Brief exposition of German Army System summarizing four cardinal requisites for provision of expansion to war footing. Parliament presented with estimates for navy, army, and air force. (*The Nineteenth Century*, February, 1920, p. 286.)
- ARMIES.—Great Britain: The reconstruction of the British Army, by Maj. Gen. Sir F. Maurice, K. C. M. G., C. B. (*Contemporary Review*, March, 1920, p. 317.)
- ARMIES.—France: Concerning the French military organization. (*Revue Militaire Suisse*, January, 1920, p. 5.)
- ARMIES.—Great Britain: Our post-war Army. Small force's big task, by Mr. Churchill, Secretary of War, Great Britain. (*The Naval and Military Record*, February 25, 1920, p. 115.)
- ARMIES.—India: The British Army in India. (*United Service Gazette*, January 29, 1920, p. 58.)
- ARMIES.—United States: The Army and the people, by Maj. Gen. D. C. Shanks. Regular Army never popular with the people. Receptions to 27th and 77th New York Divisions and 165th Infantry. (*Infantry Journal*, February, 1920, p. 623.)
- ARMIES.—Social life and customs. Suggestions in regard to the considerate treatment of enlisted men, by Secretary Baker. (*Army and Naval Journal*, March 16, 1920, p. 810.)
- ARMY SERVICE CORPS.—Great Britain: Some notes on the antecedents and origin of the R. A. S. C. (*Royal Army Service Corps Quarterly*, January, 1920, p. 22.)
- ARTILLERY.—The passing of permanently emplaced artillery, by Lieut. Col. Homer R. Oldfield, C. A. (*Journal of the United States Artillery*, April, 1920, p. 316.)
- ARTILLERY.—European War—Great Britain: Artillery at Anzac in the Gallipoli campaign, April to December, 1915, by Brig. Gen. C. C. Owen, C. B., C. M. G. The training, landing, attacking (on Aug. 6), summary of campaigning through August, September, and October, and final withdrawal on January 9. (*The Journal of the Royal Artillery*, March, 1920, p. 535.)
- AVIATION.—"Aviation of the future." New designs, speed, higher altitudes, landing fields, some of the things necessary. (*Aircraft Journal*, February 21, 1920, p. 3.)
- CANTIGNY.—Up the line from Cantigny, by Capt. Joseph Mills Hanson. The first of 10 chapters dealing with "Just what the Americans did on the battle lines of France." (*The Independent*, March 27, 1920, p. 463.)
- EUROPEAN WAR.—"Victory fights of 1918." (*United Service Magazine*, January, 1920, p. 261.)
- EUROPEAN WAR.—The Kaiser's battle. The Picardy offensive of March, 1918. Ludendorff's purpose, objective. The battle field. First phase. Foch is called. The flood is dammed. The result. (*Review of Reviews*, March, 1920, p. 273, map.)
- EUROPEAN WAR.—Salonica: History of operations in Salonique (Oct. 12, 1915-Nov. 13, 1918). (*Revue des Deux Mondes*, February 1, 1920, p. 561.)

INDEX TO CURRENT LITERATURE

- FIELD GUNS.—The accompanying gun, 37 mm., by Lieut. Col. Franklin T. Burt, Infantry. A proposed gun carried by Infantry units and used especially against machine-gun nests. (*Infantry Journal*, April, 1920, p. 834.)
- FLAGS.—China: The five stripes of China's flag. History of the flag of China, by Charles H. Sherrill. (*North American Review*, April, 1920, p. 517.)
- FORTIFICATIONS.—The effect of tanks on permanent fortifications, by Brevet Maj. M. F. Grove White. Discussion of development of the tank for future wars and what will be necessary to combat it. (*The Royal Engineers Journal*, April, 1920, p. 185.)
- FRENCH, LORD.—Lord French and the Marne. Comments on an article in Anglo-French Review by Gen. Palat. (*United Service Magazine*, March, 1920, p. 444.)
- GALACIA.—The German break through in Galacia, May, 1915. Battle of Gorlice. Narrative based on monograph "Gorlice-Tarnow," No. 21 of series published by General Staff, Berlin, with map. (*United Service Magazine*, March, 1920, p. 455.)
- GENERAL STAFF.—United States: General Staff, United States. The part played during the war by the General Staff in Washington, and the development of staff work in the American Expeditionary Forces. (*Atlantic Monthly*, April, 1920, p. 539.)
- INFANTRY DRILL AND TACTICS.—The essential principles of war and their application to the offensive Infantry tactics of to-day, by Capt. H. H. Liddell Hart. (*United Service Magazine*, April, 1920, p. 130.)
- KRUPP.—Krupp's as it is to-day. From the Manchester Guardian. (*The Living Age*, March 6, 1920, p. 582.)
- MECHANICS.—United States: Openings for Army trained mechanics. (*Commerce Reports*, March 25, 1920, p. 1709.)
- MILITARISM.—Militarism and morality. The German conception of both and of their relative value, by Maj. Gen. Sir. Geo. Aston. (*The Fortnightly Review*, April, 1920, p. 611.)
- MILITARY SERVICE.—United States: The will to serve. The soldier and the service, by Kenneth MacNichol. (*National Service*, March, 1920, p. 148.)
- NATIONAL GUARD.—United States: The National Guard come back. Present reorganization plans will give the State soldiery a bigger place than ever in our scheme of national defense, by J. S. Rixey Smith. (*The Home Sector*, April 3, 1920, p. 3.)
- OFFICERS' RESERVE CORPS.—United States: Reserve Officers' Training Corps, by Maj. Pearson Menoher, General Staff Corps. (*The Cavalry Journal*, April, 1920, p. 70.)
- PHOTOGRAPHY.—Aerial photography as applied to topographical surveys, by J. B. Mandeville, Chief Engineer, of Philips Gas & Oil Co. (*Aerial Age Weekly*, March 29, 1920, p. 87.)
- PHYSICAL TRAINING.—United States: Lest we forget. The physical advantages of Army life, by Henry Wysham Lanier. (*The World's Work*, January, 1920, p. 275.)
- PRISONERS OF WAR.—Germany: Recollections of a prisoner of war in Germany. (*Revue des Deux Mondes*, February 1, 1920, p. 539.)
- PSYCHOLOGY.—Psychology of command, by Col. Eli A. Helmick. (*Infantry Journal*, March, 1920, p. 749.)
- RAILROADS.—Railroad artillery in France, by Saunderford Jarmen, Lieutenant Colonel, United States Army, C. A. C. (*National Service*, March, 1920, p. 139.)
- SUPPLIES.—United States: Procurement of quartermaster supplies during the World War, by A. L. Scott. (*The Historical Outlook*, April, 1920, p. 133.)
- TRACTORS.—Artillery motorization as related to caterpillar traction, by George W.

THE FIELD ARTILLERY JOURNAL

- Dunham. (*The Journal of the Society of Automotive Engineers*, March, 1920, p. 161.)
- TRAINING.—The human side of troop training. The necessity and benefits to be derived from compulsory military training, by Col. H. A. Finch, C. E. (*Infantry Journal*, April, 1920, p. 841.)
- TACTICS.—A study in troop frontage, by Col. J. N. Greely. (Illustrations.) (*Infantry Journal*, March, 1920, p. 779.)
- TANKS.—Drill and tactics.—Coöperation of tanks with other arms, by Brig. Gen. Rockenback. Tactical employment of light tanks. Tactical employment of heavy tanks. (Illustrations.) (*Infantry Journal*, February, 1920, p. 662.)
- TRANSPORTATION.—First-line transport in peace and war. (*The Royal Army Service Corps Quarterly*, January, 1920, p. 59.)
- TRANSPORTATION.—Some transportation considerations in the modern battle. (*The Royal Army Service Corps Quarterly*, January, 1920, p. 51.)
- TROOP FRONTAGE.—European War. A study in troop frontage. Table giving proportion of divisional corps and army troops to infantry rifles. (*Infantry Journal*, March, 1920, p. 779.)
- UNITED STATES.—Company administration: preparation, disposition, and filing of company records, reports and returns. Wash. Govt. Print. Office. 1919. 140 p.
- UNITED STATES.—Emergency officers' Army list and directory. Wash. Govt. Print. Office. 1920. 80 p.
- UNITED STATES.—Personnel specifications (commissioned), Construction division of the Army. Wash. n.p. 1919, 95 p.
- UNITED STATES.—Air Service Office. Physical examination for flying. Wash. Govt. Print. Office. 1919. 16 p.