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BATTERY E, 8TH F. A. CROSSING KOLEKOLE PASS  
FOR THE FIRST TIME IN HISTORY, ON JULY 3, 1930. A BATTERY WENT FROM SCHOFIELD  
BARRACKS, H. T., OVER THE PASS TO WAIANAË  
(See Page 548)

# THE FIELD ARTILLERY JOURNAL

VOL. XX

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No. 5

## THE NEW TR 430-85, GUNNERY FOR FIELD ARTILLERY

By MAJOR C. G. HELMICK, F. A.

THIS article is a discussion of the main points of difference between the 1922 edition of the TR 430-85, and the revised edition which is soon to be issued to the service.

### ARRANGEMENT

In the revision, three main objects were kept in view. The first was to arrange the text so that information could be found easily; the second to bring procedure up to date; and the third, to present the subject matter in a manner which would be suitable for the student with a meager military background, such as the majority of officers who would be called upon to use the text in any great emergency.

The principal criticism of the old text was that information could not be found readily. An analysis showed that this was due largely to mechanical arrangement.

In addition to the mechanical arrangement, it was found that the heading "Terrestrial observation of fire" caused confusion. Although observation is a controlling factor in the procedure of conduct of fire, it is the *procedure* resulting from the type of observation which is the essential element. In the new text, the characteristics of observation and the details of procedure under a definite set of conditions are placed in one subdivision.

The following is a comparison of the arrangement of the old text and the new:

Section	OLD REGULATIONS	Part	NEW REGULATIONS
	Introduction		Introduction
I.	Elementary principles of ballistics.	I.	Elementary ballistics and dispersion
II.	Dispersion.		
III.	Firing tables.		
		II.	Effects of projectiles.
IV.	Corrections.	III.	Preparation of fire.
V.	Preparation of fire.		
VI.	Terrestrial observation of fire.	IV.	Conduct of fire
VII.	Conduct of fire.		

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- VIII. Fire in battle.
- IX. Conduct of fire by aerial observation.
- X. Flash, sound, and high burst ranging.
- XI. Visibility and dead space.
- XII. Tables.
- XIII. Glossary.
- V. Records.
- Appendix.

Placing several of the sections of the old text in one part in the new, allows a better grouping of information, since each part can thus be better subdivided.

The general methods given in the new text do not differ materially from those set forth in the old, although details of procedure have been changed. The detail differs little from the later editions of Field Artillery School Notes. The main points of the new text are discussed briefly below.

### INTRODUCTION

The introduction gives a brief summary of the requirements of effective artillery fire, and indicates the scope of the text. There is included, for the officer studying alone, a suggestion of the order in which the subject matter should be taken up.

### PART ONE. ELEMENTARY BALLISTICS AND DISPERSION

This part is divided into four sections, a general paragraph on definitions and scope, interior ballistics, exterior ballistics, and dispersion.

*Interior ballistics.* This section is a brief description of elementary artillery matériel, to show its action, and the precautions necessary in firing. The discussion is not theoretical.

*Exterior ballistics.* This section is similar to the same section of the old regulations. Definitions have been simplified, and a number have been eliminated. Some of the ones eliminated are: angle of departure, line of departure, angle of incidence, objective plane, jump, slant burst range, and burst interval. Point of fall has been replaced by level point. Only the definitions which are used in practical firing have been retained.

A brief reference only is made to firing tables, since a description of their use is given in each firing table.

*Dispersion.* This section is a short discussion of the cause and effects of dispersion, the meaning of probable error, and a description of probable error for range, direction, height of

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burst, and on slopes. The details of probability, and the application of dispersion to artillery fire are covered in the Appendix.

### **PART TWO. EFFECTS OF PROJECTILES**

There is a French saying—"The weapon of the artillery is the projectile." The object of this part is to give the power and limitations of the different types of projectiles, to help the artilleryman to use his "weapon." There is a very brief description of each type of projectile, to aid in understanding the action and effect.

A change from previous usage is that a 75-mm. shell, when used with a fuze which gives the best fragment action, has an effective radius of 30 yards. This is based on results obtained from experimental firing by the Field Artillery Board at Fort Bragg.

### **PART THREE. PREPARATION OF FIRE**

This part is divided into three sections, General, Rapid, Deliberate.

*General.* In this section is a brief description of the general mechanics of laying, the data necessary to cause the piece to be laid, the types of laying, and the characteristics of rapid and deliberate preparation.

*Rapid.* This section is divided into a number of paragraphs, which cover the preparation of all elements of data necessary for laying.

In "Direction, General" are discussed the terms used, the measurement of horizontal angles with the instruments available in the battery, and the direct methods of laying for direction, such as laying on a visible target, lining in, and laying on an airplane.

In "Determination of direction from the OP" are covered the methods of determining the data for laying the piece when the BC is some distance from the battery. The following principal changes have been made in this paragraph.

a. The term "parallax" has been eliminated, and "offset" substituted.

b. The symbol for the measured angle has been changed to *M*.

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c. The obliquity angle (Q) is measured from the OG line instead of from the normal to that line, making the obliquity factor the sine of the obliquity angle, instead of the cosine. This simplifies the use of obliquity factors, and makes their use more accurate.

d. Only one method of determining the firing angle from the OP is described, the one called the "parallel method" in the old text. The direction and sign of offsets are given by formula, but visualization is emphasized.

e. Details of determining the firing angle mechanically by means of the BC telescope and the aiming circle are described and illustrated with diagrams.

f. The usual methods of approximation in the computation of the firing angle are given, as well as the details of determining direction using the compass and aiming circle, and when making shifts from a known point.

In "Distribution" are given the details of determining deflection difference. The parallel sheaf is taken as the basis of computation of deflection difference. Deflection difference for sweeping fire, scissors sweeping and the open sheaf are covered.

Other paragraphs cover the determination of site, the selection of projectiles, charge and fuze, the pieces to fire and method of fire, the determination of range, and the units of announcement of data.

In "Minimum range", the factor of safety to insure fire clearing the crest is changed from the present teaching of Field Artillery School Notes, which prescribe  $1\frac{1}{2}$  forks at the quadrant elevation which just clears the mask, to 2 forks at the range of the mask. This conforms to practice in other services, and simplifies the procedure.

*Deliberate preparation of fire.* This section is devoted to a description of the instruments and equipment, and their use; a description of maps, grids, and firing charts; the method of locating points by inspection, traverse, intersection, resection; and determining basic data from maps, charts and air photos. The introduction to the firing tables is supplementary to this section. Changes in nomenclature and in the order of computation have simplified the determination of corrections.

## PART FOUR. CONDUCT OF FIRE

The principal changes are in this part of the regulations. Here are included all procedure and information dealing with conduct of fire, no matter under what conditions the fire is conducted. The part is divided into eleven sections. The characteristics of observation are given in each paragraph dealing with the procedure required rather than grouping the characteristics in one part, and procedure in another.

*General.* In this section are discussed the elements which are of common application to all types of fire, such as appearance of bursts, the general principles of observation, and the types of conduct of fire.

*Axial conduct of fire.* This section is divided into five paragraphs covering the major divisions of procedure when the observer is on or near the line of fire.

In "Precision", the principal changes are:

a. The term "trial fire" has been replaced by "adjustment" and the term "improvement fire" has been included in "fire for effect." This eliminates special terms for precision fire.

b. The trial range or elevation is the center of a one fork bracket, with *one sensing* at each limit, instead of two.

c. The procedure for determining the adjusted range or elevation is stated so that values of  $\frac{1}{2}$  need not be assigned to target shots.

d. The procedure for determining the adjusted range automatically takes into consideration all previous groups of fire for effect.

These changes, which are of details and not principles, simplify procedure, save ammunition in the long run, and save time. There may be a slight sacrifice of accuracy under some circumstances, but the gain outweighs the loss.

In "Percussion bracket" there are no essential changes. For any fire requiring bracket adjustment, it is assumed that the tactical situation requires fire for effect when one sensing at each limit on the bracket, a target hit, or a mixed or bracketing salvo has been obtained. The procedure of fire for effect insures covering the proper area in case the target is not in the

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bracket determined. This simplifies procedure, and saves time and ammunition.

In "Time bracket", the principal changes are in procedure and the method of adjusting the height of burst. Procedure is identical with that for percussion bracket. The adjustment of height of burst is based upon the proportion of graze bursts, instead of upon the measurements of individual bursts. While this method is not so accurate theoretically as the old, it is adapted to all types of conduct of fire, is simpler, and relieves the BC of a number of measurements which tend to take his mind from the adjustment of other elements.

In "Direct laying" are covered the principles of conduct of fire when the target can be seen from the battery.

*Lateral conduct of fire.* In this section, the principal change is in nomenclature. The terms "angle  $i$ ", "Phi" and "Omega", which were taken from the French at the time of the World War, are strange to the ordinary person unfamiliar with higher mathematics. These terms have been a hindrance to many students, particularly when the subject of lateral conduct of fire is first studied. To the Frenchman, the term *angle  $i$*  means the *angle of inclination* of the observing line to the piece-target line; *Phi* means  $p$ , the shift at the *piece* necessary to bring a shot back again to the observing line after a one fork range change; *Omega* means  $o$ , the angle at the *OP* between shots differing in range one fork. These analogies are mainly useful when the terms are being learned. In order to have similar terms which would be more familiar to the American ear, the following are used:  $T$  for *angle  $i$* , since this angle is the target offset, called  $T$  in preparation of fire;  $s$  for *Phi*, denoting the deflection *shift* necessary to bring a shot back to the observing line after a range change of 100 yards;  $d$  for *Omega*, denoting the *deviation* seen at the *OP* between shots whose range differ by 100 yards. It will be noted that  $s$  and  $d$  are determined for a range change of 100 yards (termed  $c$ ), instead of for a fork. This makes it simpler to determine  $s$  and  $d$  from tables when the fork is not necessary in the early steps of the procedure.

In "Precision" are given the details of the procedure of precision fire, both when the observing angle is small, and when it



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is large. The new methods of precision range adjustment simplify the lateral procedure. Small T procedure is closely related to axial procedure, and large T procedure is simpler than in the old text.

In "Bracket" is given definite procedure for handling bracket fire, the changes in axial range adjustment and the adjustment of height of burst making the procedure simpler than in the old text.

*Combined conduct of fire.* This section describes the procedure of conduct of fire when there are two or more observers, at least one of which is not on the piece-target line. The term is broader than the same one used in the old text, including bilateral as well as the old combined.

In "General" are discussed the methods of range adjustment when the distance of the shot from the target is known.

In "Axial-lateral" is discussed the procedure when there is one axial observer and one lateral. The procedure is similar to that of the old text with combined observation.

In "Bilateral" are described two methods of procedure. The first is the "diagram method", which replaces the index method of the old text. By means of a diagram which may be drawn free hand if necessary, the deflection may be adjusted in three shots. The method, which is adapted from the French, is more accurate and quicker than the index method. The second method, called the "Chart method", is the same as the graphical method of the old text.

*Transfer of fire.* In this section have been combined the old subjects of "transfer of fire" and "witness target", with a number of changes in nomenclature.

A transfer of fire is defined as "an adjustment on a point which bears a well known relation to the target, and the determination, from this adjustment, of the data to shift fire to the target". When the relation between the target and the point adjusted upon is determined from the map (old transfer of fire), the procedure is called a "map transfer". When the relation was determined from previous firing (old witness target), the procedure is called a "record transfer". The adjustment upon a point after firing on a target with air observation, or other means which may not

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be available later, is called a "record of fire" (old witnessing the fire). The term "check point" is used to replace both "auxiliary target" and "witness target" of the old text. It is so named because data are checked by fire on the point before firing on the target.

The principles of procedure are the same as in the old text. The K method is used for both map and record transfers, the V method (old V-Vo), only for a map transfer.

*High burst transfer.* In this section are given the details of procedure when a transfer of fire is desired from a point in the air determined by the lines of sighting of two observing instruments. The procedure is based upon the use of instruments available in the battery, and methods which can be used without outside assistance. The procedure is that given in recent Field Artillery School Notes.

*Adjustment with observing units.* The procedure for the battery commander when working with observation units is given in this section. No details of the methods used by the observing units are given.

*Conduct of fire with air observation.* The procedure used when adjustment is made from sensings of an air observer is given in this section. Changes from the old text are of details, to reduce the time of getting fire on the target.

*Targets.* This section is a technical discussion of the attack of targets from the point of view of the battery commander.

In "General" are discussed the terms used in the designation of missions, first as to the intensity of fire desired and second as to the tactical results desired from the fire. Here is given the information which the battery commander should receive when he is assigned a target; the advantages and disadvantages of observed fire, transfer of fire, and unobserved fire; the general types of targets which will be encountered and methods of attacking them; the rates of fire, manner of resting pieces, and the methods of fire appropriate under various conditions.

In "Fire for destruction" are discussed, somewhat in detail the methods of attacking various types of targets for destruction. Definite numbers of rounds are not given, since the factors controlling this are too varied to be covered in a general discussion.

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In "attack of personnel in the open" are covered details of attacking Infantry, Cavalry and other personnel in the open.

In "Personnel manning matériel" are discussed the attack of tanks, motor transport, artillery, machine guns and Infantry howitzers. The silencing of the matériel is dependent upon placing effective fire upon the personnel manning the matériel.

In paragraph on "Smoke" is given the procedure for building up smoke screens.

*Schedule fires.* The term "schedule fires" embraces all fires which are arranged beforehand, to be fired upon a time schedule or upon signal. These fires, from the point of view of the battery commander, are of two kinds, fire on an area and fire on a line. The term "Concentration" indicates that fire is to be on an area, "Barrage" that fire is to be on a line. A paragraph is devoted to concentrations, one to standing barrages and one to rolling barrages. There is little change from the old text except in the rolling barrage. In this type of fire, the elevation bounds are constant between critical lines, instead of having the distance between lines of fire constant. This makes the computation of barrage data more rapid, and less liable to error, with little sacrifice in accuracy.

### PART FIVE. RECORDS

In this part are discussed the details of finding dead space, determining visibility, making panoramic sketches, and the kind of information which should be recorded in the battery data book. There is little change in this part.

### APPENDICES

These are four in number, and comprise useful information which does not properly belong in the foregoing parts.

*Dispersion.* In this section are given the principles of dispersion which it was thought inadvisable to give the student until he could appreciate their application to fire. Here are discussed the principles of probability, their application to artillery problems, and the derivation of the procedure used in the text. Type problems are used for illustrations, and the whole subject made as simple as possible.

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*Calibration.* This is a discussion of the details of calibration firing, and the application of calibration corrections.

*Convenient forms.* Forms which are useful for recording the results of conduct of fire or for computing data are given as a guide and help to the service.

*Glossary.* In the glossary are given definitions of the principal terms used in gunnery for Field Artillery. Many terms which relate to a particular type of preparation or conduct of fire are not included, since reading of the text under the desired heading will give the explanation desired.

### CONCLUSION

The present text is essentially a rearrangement of the previous regulations, with a view to placing related information together where it can be found readily. Descriptions of procedure are in detail, supplemented as much as possible with drawings and diagrams. A greater use of type problems, particularly in preparation of fire, would have been desirable, but was prevented by the length of the text. A constant effort has been made to simplify terms and procedure.

Much of the detail used in the text may be unnecessary for thoroughly trained officers, but it is hoped that it will fill the need of the National Guard, the R. O. T. C. and the untrained officers who may be called upon to use the text in time of emergency.



# INFANTRY-ARTILLERY LIAISON IN COMBAT

By MAJOR LLOYD E. JONES, FIELD ARTILLERY

**T**HIS article deals with the handling of Infantry-Artillery liaison personnel of the divisional Field Artillery in the past. Based on these experiences and probable developments for the future in matériel, mechanical transport, and tactics, this study suggests changes in organization, equipment and training within divisional Field Artillery to effect a better solution to the problem of Infantry-Artillery liaison.

## ORGANIZATION

At the beginning of the 19th century, the effective range of the musket was about 100 yards. Under these conditions, decisive combat in the assault came by means of the bayonet. Cooperation between the arms involved no difficulties at this time. The Artillery was, in effect, physically present with the Infantry, either in front of their line, on its flanks, or in the intervals of the line. With the improvements in the musket in 1814 and radical changes in 1851, co-operation between the Infantry and Artillery commenced to be lost. The Artilleryman could no longer expose animals and personnel to the improved and efficient fire of the musket. The separation of Infantry and Artillery on the battlefield had begun. As the range of the bullet increased the Artillery had to emplace itself farther in rear of the rifleman, with consequent increase of Artillery range and difficulties of Artillery co-operation.<sup>1</sup>

From 1851 to 1914 the growing potentiality of small arms fire continued still farther to separate the Infantry from its Artillery and at the same time this factor demanded an ever-increasing ability of the Artillery to support against the bullet. In the meantime, the machine gun had appeared. During the South African War, Artillery-Infantry co-operation was all but lost, and as a result of the Russo-Japanese War, the whole problem of Infantry-Artillery co-operation was thrown into bold relief.<sup>1</sup>

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<sup>1</sup>"On Future Warfare"—Col. J. F. C. Fuller, C.B.E., D.S.O. U 103 F 951—(1928) 116763(2)

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Out of the World War came the Artillery lesson that to the success of penetrating attacks two factors are necessary; the concentration of great masses of Artillery to prepare initially the way; and a rapid following up by the Artillery of direct support, operating in close liaison with the assault.

For the future, until an offensive weapon is developed to neutralize the power of the enemy's automatic small arms, this task will continue to fall to the Artillery and the problem of Infantry-Artillery co-operation will remain as important as it was in the World War.

Much has been written on the subject of Infantry-Artillery co-operation in the past and the field has been covered from many angles. This article seeks to show wherein our failures have occurred in a solution to this question in the past, and from these facts draw conclusions as to what changes in organization, equipment and training are necessary for the future.

A solution to the problem of liaison involves in general, three factors, as follows:

Personnel provided in the appropriate Artillery units specifically for the purpose.

Equipment, particularly signal equipment, for the use of liaison-personnel.

Training of liaison personnel, and Artillery and Infantry commanders in their duties of co-operation.

Until the reorganization of 1920, never in our Field Artillery had liaison personnel as such been provided, except the one officer allowed the Artillery battalion for this purpose under 1927 Tables of Organization used in the American Expeditionary Force. Our light artillery was armed about 1905 with the first modern, relatively long range, indirect fire weapon. The technical characteristics of this weapon were such as to make it apparent that it would fire from rearward positions and that some means would have to be devised for keeping in touch with the needs of supported Infantry. Training manuals of this era seemed to recognize this need and provided that "to insure effective co-operation such officers (Artillery reconnaissance officers) generally accompany the commanders of the attacking Infantry lines, in order to keep the Artillery commander informed

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as to changes in the tactical situation and as to the co-opation desired of the Artillery by the Infantry."<sup>2</sup>

Essentially the same language is used in drill regulations governing the tactical employment of Field Artillery as late as 1916.<sup>3</sup> An examination of the liaison means available to the artillery battalion and regimental commanders will show the impossibility of their tasks. The inadequacy of officers will first be shown. From 1911 until May, 1917, the Field Artillery operated under the same tables of organization covering commissioned and enlisted personnel available to Artillery battalion and regimental commanders for the purpose of liaison, communication, observation and reconnaissance.<sup>4</sup> Each of these commanders had available only a reconnaissance officer under these tables. This officer was also the adjutant. No staff Officer whose entire attention could be devoted to the tactical employment of the unit was provided for either commander. Exactly how this one staff officer, combining the duties of adjutant, reconnaissance and liaison officer, was supposed to carry out his duties in combat was never quite plain to those who at that time gave this matter serious consideration.

Although the telephone was in use during the period mentioned, no thought seems to have been given to the extension of Artillery lines up behind the Infantry, since in the regimental and battalion headquarters only two telephone operators were authorized in each. It was intended that runner communication be used entirely between the Infantry front line and the supporting Artillery. There were available to the regimental commander at this time 15 men and to the battalion commander 16 men for their respective tactical functions of liaison, communication, observation and reconnaissance.<sup>4</sup> In this situation matters stood up to August, 1917. Considering that the basic mission of the Artillery has never changed for the past hundred years, it is believed that up to this date neither the necessary personnel nor physical means was provided within the Field Artillery for solving the problem of Infantry-Artillery liaison.

<sup>2</sup>Drill Regulations for Field Artillery, 1911, page 287.

<sup>3</sup>Drill and Service Regulations for F. A., 1916, p. 56, par. 1588, and p. 58, par. 1592.

<sup>4</sup>Tables of Organization, Appendix No. 1—Drill Regulations for Field Artillery, 1911.

Tables of Organization, U. S. Army, 1914.

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A slight improvement in the situation was noted in the creation of a regimental headquarters company in tables of organization published in May, 1917.<sup>5</sup> The two officers of this company became available to the regimental commander for tactical employment. No change in the battalion staff was made. The enlisted personnel and communications equipment for use of the battalion and regimental commanders still remained entirely inadequate, these undergoing practically no change.

On August 8, 1917, as a result of the United States participation in the World War, a new organization was published for the light Field Artillery.<sup>6</sup> These tables retained the basic organization of batteries, battalions and regiments, which had been in effect for many years, but increased the personnel of all headquarters enormously, and likewise added certain material means of communication. The regiment at this time was given three additional staff officers; one reconnaissance, one telephone, and one radio officer, and to the battalion was added, one reconnaissance, one telephone, and one liaison officer, the latter appearing as such for the first time in our Field Artillery organization. No specific enlisted personnel was provided for liaison employment. The enlisted personnel for tactical employment, as authorized in these tables, was divided as follows:

	Reconnai ssance	Communi cations	Observa tion	Total
Regimental				
Headquarters.....	7	24	5	36
Battalion				
Headquarters.....	7	23	4	34

Except for minor changes, limited for the most part to administrative personnel, or Field Artillery operated through the World War based on the above allowances of headquarters personnel.<sup>7</sup> How well it met the requirements of combat may be judged from actual experiences as covered in the paragraphs to follow.

An examination will first be made of the general methods employed and the amount of personnel required in prosecuting these methods to a successful conclusion. The system employed, in general, was about as follows: Each Infantry regiment in line

<sup>5</sup>Tables of Organization, U. S. Army, May 3, 1917, page 12.

<sup>6</sup>Tables of Organization, Series A, August 8, 1917.

<sup>7</sup>Tables of Organization, Series A, Jan. 14, 1918, as corrected in the A.E.F. to December 1, 1918.



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was provided by the supporting Artillery battalion with a large liaison detail under an officer, known as the chief of liaison. This officer stationed himself at the command post of the Infantry regiment and distributed his personnel as required by the situation. In the defensive sector taken over by the 1st Division in Picardy in April, 1918, Infantry units were ordered to be furnished with the following liaison personnel by the supporting Artillery:

<b>To the Battalion (Infantry)</b>	<b>To the Regiment (Infantry)</b>
3 Noncommissioned officers.	1 Liaison Officer, Chief of Liaison.
2 Telephone Operators.	1 Officer in reserve.
2 Signallers, visual.	1 Officer with each front line battalion of the regiment.
2 Runners.	8 Noncommissioned officers.
	22 Telephone Operators.
	12 Signallers, visual.
	22 Runners.

In addition to this personnel each Infantry brigade headquarters was provided with an officer, two telephone operators and two signallers (visual).<sup>8</sup> The division at this time was disposed with two brigades, four regiments and six battalions in the line.<sup>9</sup> Thus the required liaison personnel furnished, in this situation, by the two light Artillery regiments of the division was:

Officers .....	16
Enlisted Men .....	318

These figures are rather striking when it is considered that only four liaison officers and no enlisted men were specifically provided for liaison in the tables of organization for divisional Field Artillery effective at this time. In the situation under discussion the method of communication was by a direct wire from the chief of liaison at Infantry regimental headquarters to the front line Infantry battalion or battalions, and a second line to the headquarters of his Artillery battalion or grouping. Runner posts along the wire line between the chief of liaison and the front line battalions were organized and similar posts ran to the Artillery battalion or grouping command posts. These posts were manned by both telephone operators and runners. Projector

<sup>8</sup>Journal of Operations—Personal Diary, Lieut. Butler, 1st F. A. Brig. Vol. XI, World War Records, 1st Division.

Operation Orders and Memoranda, 1st F. A. Brigade, April 19, 1918; Vol. IX, World War Records, 1st Division.

<sup>9</sup>A Study in Battle Formation—Historical Branch, War Plans Division, 1920, page 12.

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communication supplemented and paralleled the wire lines.<sup>10</sup> The plan was in case the telephone line was cut the most advanced stations were to send runners to the next rear station until a point was reached from which telephone communications could be secured.<sup>11</sup> The employment of this great number of officers and men was made necessary by the nature of the situation, the great danger to communications by shell fire from large masses of Artillery, and the desire to give timely protection to the Infantry in their inelastic defense of trench warfare. The Artillery of the defense was greatly reinforced under such circumstances but, in general, the liaison personnel was drawn from the organic Artillery of the division holding the front.

An examination of the use of Artillery liaison personnel in an advance shows the same need for a great amount of personnel on this duty. In the St. Mihiel operation, the 1st Division attacked with brigades abreast, regiments abreast, with a total of 5 battalions in assault.<sup>12</sup> In light guns the division had an Artillery regiment for support of each Infantry regiment.<sup>13</sup> Thus Artillery liaison personnel was available from four Artillery regiments, subject to the objection of employing such personnel from non-organic units. The plan of liaison was much the same as that used in the defensive at Cantigny. The liaison personnel employed was as follows:<sup>13</sup>

	Officers	Men
6th F. A. ....	5	45
7th F. A. ....	3	42
76th F. A. ....	5	45
122d F. A. ....	3	42
	16	174
	Officers	Men
Average per F. A. Battalion .....	2	21 plus
Average per Inf. Battalion in Assault .....	3 plus	34 plus

Since the amount of liaison personnel required depends primarily upon the number of Infantry battalions and regiments of the division in assault, and not upon the amount of Artillery in

<sup>10</sup>Operations Orders and Memoranda, 1st F. A. Brig., April 19, 1918, Vol. IV, World War Records, 1st Division.

<sup>11</sup>Operations Orders and Memoranda, 1st F. A. Brig., Memo. No. 34, February 1, 1918, Vol. IX, World War Records, 1st Division.

<sup>12</sup>A Study in Battle Formation—Historical Branch War Plans Division, 1920, page 11.

<sup>13</sup>Operations Orders and Memoranda, 1st F. A. Brig., World War Records, 1st Division; Vol. IX, Operations No. 275, Hq. 1st F. A. Brig., September 10, 1918.

## INFANTRY-ARTILLERY LIAISON IN COMBAT

support, it is thought the above figures might be fairly compared with the division tabular allowance for liaison personnel of that date, which amounted to 4 officers and no enlisted men. A report by one Artillery regimental commander after this operation indicates the sufficiency of the liaison personnel actually employed. He reports that "liaison was maintained throughout with the Infantry (front line)<sup>14</sup> and with the elements of the regiment (Infantry)."<sup>15</sup> In October, 1918, during an advance in the Meuse-Argonne, the 7th Field Artillery had the following personnel serving on liaison with the Infantry:<sup>16</sup>

	Officers	Enlisted Men
With one Supported Brigade .....	1	0
With two Supported Regiments .....	2	16
With two Supported Battalions .....	2	16
	5	32

The enlisted men were divided equally between telephone operators, linesmen, signallers (visual), and runners.

Soon after the end of the World War, a Board of Artillery Officers, of which then Brigadier General Andrew Hero served as president, was convened in the A. E. F. for the purpose of making recommendations to the Commander-in-Chief on certain matters affecting Artillery organization, training and other matters. One of the phases of the work of this board was liaison and liaison detachments. Many experienced Artillery commanders of the A. E. F. reported to the Hero Board. A few of these reports will be quoted:<sup>17</sup>

"There should be an additional staff officer in tables of organization for each battalion commander for liaison."

"Staffs of regiments should have at least 7 liaison officers—lieutenants. Experience demonstrated that where a regiment was supporting an Infantry brigade, it was necessary to have one liaison officer at the Infantry brigade headquarters, one at each Infantry regimental

<sup>14</sup>Words in parentheses are the author's.

<sup>15</sup>Report, Commanding Officer, 6th F. A. to C. G., 1st F. A. Brig., September 18, 1918.

<sup>16</sup>Memo. on Liaison, Hq. 7th F. A., Oct. 12, 1918, World War Records, 1st Division, Vol. XI.

<sup>17</sup>Appendix 9, The Hero Board; A. E. F. Records, Section (AGO).

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headquarters and at four Infantry battalion headquarters."

"The table of organization does not allow the proper number of liaison officers with the Infantry. There should be five liaison officers in each Artillery regiment."

"The Artillery battalion requires two liaison officers instead of one as now allowed, the regiment requires two—none at present allowed."

"I recommend that tables of organization be revised so as to permit the liaison personnel, both commissioned and enlisted to be doubled. My own battalion was for 31 days within 2,000 meters or less of the Infantry. During that period we supported 3 different divisions and 8 different regiments of Infantry. These were constantly relieved, whereas my liaison officers, their runners and so on, remained constantly with the Infantry elements."

"During the entire period from October 29 to November 11 this regiment was in support of an Infantry brigade. I detailed to Infantry brigade headquarters, 1 officer and 4 runners. With each regiment of Infantry, I also had an officer and 2 runners, and similarly I had one officer and four runners with each Infantry battalions in line, the usual formation being two battalions in front line."

This officer summarizes his employment of his liaison personnel during the period mentioned as 8 officers and 26 men at all times, and proceeds:

"I strongly recommend that additional officers and enlisted men be attached to Artillery regiments and trained for these duties."

Many other opinions were expressed to the Hero Board along the same lines as the above. A number of officers recommended the grade of captain for liaison officers.

The Hero Board in its report made a recommendation as follows:

"That the Chief of Liaison, at least in each regiment should be a captain.

## INFANTRY-ARTILLERY LIAISON IN COMBAT

That the liaison officers and detachments now provided for be doubled in strength. Properly carried out liaison work is at least as exhaustive as the work of the Infantry and sufficient personnel should be provided to insure proper relief."<sup>18</sup>

A further recommendation was made for placing one captain and one first lieutenant in each light Artillery regiment and two lieutenants in each battalion as liaison officers.<sup>19</sup> This operated to increase the then tabular strength from 2 to 6 liaison officers within the regiment.

In connection with this same matter The Superior Board on Organization and Tactics stated in its report, "This Board believes that the uncertainties of battle, the certain wastefulness of matériel, the enormous difficulties of liaison required a liberal view of what comprise the permanent needs of a division. The division must have resources at hand which will enable it to win."<sup>20</sup>

The adequacy of liaison personnel in the appropriate headquarters of Field Artillery units depends upon the authorization for first, officers, and secondly enlisted men, qualified in communications and reconnaissance. During the World War, though no liaison enlisted personnel, as such, was authorized, the Field Artillery<sup>21</sup>, commanders drew men for this duty from their personnel designated for communications and reconnaissance, augmented in some cases by drafts from batteries. The strength of communications personnel as authorized in Artillery battalions and regiments, during the World War is shown in an earlier paragraph. Actually this personnel appears larger than it really was.

Excluding reel cart drivers, mounted orderlies, motorcycle and bicycle messengers, the men left to function on all wire, radio, and visual communications, including that for liaison were:

In the battalion.....	12
In the regiment.....	13

The reconnaissance elements provided were adequate since,

<sup>18</sup>Report of Hero Board, A. E. F. Records Section (AGO), Section IX, par. 44-45.

<sup>19</sup>Ibid, Section II, par. 5.

<sup>20</sup>Report of Superior Board on Organization and Tactics; AEF Records Section (AGO), page 108.

<sup>21</sup>Tables of Organization, Series A, January 14, 1918; Table 14.

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under the conditions in France, Artillery commanders had little employment for scout personnel. The result was that the reconnaissance group in its entirety could be assigned to liaison duty. If a study is made of the amount of liaison personnel actually employed in important operations and compared with the total strength authorized for communication and reconnaissance, the conclusion must be that the tables of organization failed by a wide margin to make provision for this important duty in the Field Artillery battalion and regiment. Evidence as heretofore presented affecting the inadequacy of the two liaison officers per regiment is conclusive as regards that phase of the question.

In the reorganization of 1920, certain radical changes in the organization of Field Artillery headquarters units were made. The most important of these was the creation of a Battalion Headquarters Battery from the previous battalion section of the regimental headquarters battery. Regimental and battalion staffs were increased. Leaving the one liaison officer in each Artillery battalion, two were authorized for the staff of each regiment, making a total of four within the regiment. In accordance with recommendations of the Hero Board, the communications personnel was increased. In summary, this reorganization is shown in the following tables in so far as it authorizes reconnaissance, communications and observation personnel in the regiment and battalion.<sup>22</sup>

	Reconnaissance	Communications	Observations	Total
Regimental Hq.	7	28	6	41
Battalion Hq.	7	22	4	33

Of the above communications personnel, the following, under the new table were intended to function on technical communications; wire, radio, and visual:<sup>23</sup>

In the battalion.....	17
In the regiment.....	21

Thus in the reorganization of 1920, as published in Tables of Organization, 1921, communications personnel available to the Artillery battalion and regimental commander was considerably increased. This result was effected, in part, by a redistribution of tactical duties to individuals of the regimental and battalion headquarters batteries and in part by an increase of the authorized

<sup>22</sup>Tables of Organization, January 20, 1921; Tables 34 W and 37 W.

<sup>23</sup>Training Regulations 430-155, par. 36 and 39.

## INFANTRY-ARTILLERY LIAISON IN COMBAT

strength for these units. This augmentation of communications personnel had a very favorable reaction on the liaison problem within the divisional Field Artillery.

After the Tables of Organization, 1921, became effective, for the first time in the history of the Field Artillery, individuals of the headquarters of battalions and regiments were designated for liaison duty. The provisions of these tables still govern the organization of liaison personnel. The plan of the Field Artillery based on these tables and latest training regulations is to have available in each divisional Artillery regimental and battalion headquarters battery a detachment or liaison section of nine enlisted men divided into five reconnaissance, three communication specialists, and a motorcyclist. Thus there are now three such sections in a regiment, a total of 27 men, and four liaison officers for duty with them. The liaison officers are distributed one in each battalion and two in the regimental headquarters.

The adequacy of the present prescribed liaison sections should be examined in connection with figures already presented which show the amount of such personnel employed in important operations during the World War. Thus, in the Cantigny defensive of the 1st Division, the divisional Artillery had 16 officers and 318 enlisted men on liaison duty and in the St. Mihiel offensive the same number of officers and 174 enlisted men. At the present time the total liaison personnel within the divisional Field Artillery brigade is 8 officers and 54 enlisted men. While it is admitted that exact or even approximate conditions of the World War may never again occur, yet it forms the last event from which lessons may be deduced from experience and its guide posts can not safely be ignored. Liaison personnel will have a very high casualty rate. The expected percentage of casualties is impressive, particularly in line guards. One Field Artillery battalion, during the late war is known to have lost 26 men during a period of two days in the effort to keep its telephone lines, principally its liaison lines, in operation. Still another had six liaison officers successively fall as casualties during a period of a little over one week.<sup>24</sup>

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<sup>24</sup>Liaison between Infantry and Field Artillery within a Division—Major C. M. Busbee—The Field Artillery Journal, Vol. 18.

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It is therefore believed, that the amount of liaison personnel as now provided within the divisional Field Artillery is hopelessly inadequate to carry out this difficult mission under conditions which approximate in any way those of the World War. Success or failure of the liaison problem is determined, largely, on the adequacy of the liaison personnel sent to the Infantry battalions. Under our present training policies, a liaison detachment from the supporting Artillery battalion accompanies each attacking battalion, or stations itself with each front line battalion on the defensive. Recalling that there are at present three liaison detachments available with the Artillery regiment an examination should be made of the sufficiency of these detachments independent of their strength, employing again the conditions developed during the World War. The number of battalions employed initially in contact in various operations of the A. E. F. was as follows:<sup>25</sup>

	Battalions		Battalions
42d Division:		September 27, 1918	4
September 2, 1918	4	September 28, 1918	3
October 14, 1918	4	80th Division:	
October 27, 1918	3	September 26, 1918	2
30th Division:		October 4, 1918	2
September 29, 1918	4	91st Division:	
October 9, 1918	3	September 26, 1918	3
October 17, 1918	2	October 28, 1918	3
27th Division:		79th Division:	
October 17, 1918	2	September 26, 1918	4
35th Division:		2d Division:	
September 26, 1918	2	July 18, 1918	4
2d Division—( <i>Continued</i> )	Battalions		Battalions
September 12, 1918	2	Picardy, April, 1918	6
Mont Blanc, Oct. 1918	2	Cantigny, May, 1918	3
November 1, 1918	4	Montdidier Defensive	4
26th Division:		July 18, 1918	4
September 12, 1918	4	September 12, 1918	5
October 23, 1918	2	October 2, 1918	4
November 7, 1918	4	October 8, 1918	8
1st Division:			
Ansauville Sector, Jan, 1918	3	November 6, 1918	4

Of the above cited cases, all except three operations were offensive in nature. These attacks were, in general, all penetrations on a narrow front and as will be noted in a majority of the cases, 4 battalions were employed on the front of the division. Quite a normal formation was brigades abreast, regiments abreast and

<sup>25</sup>A study in Battle Formation—Historical Branch, War Plans Division: Verified in many of the cases cited by examination of appropriate division orders.



## INFANTRY-ARTILLERY LIAISON IN COMBAT

battalions in column within regiments. Since the Artillery battalion is the normal unit of support for the Infantry regiment, it probably seemed quite logical during the reorganization following the war to make available to the Artillery battalion commander, one liaison detachment for employment with the front line Infantry regiment which was supported by his battalion, on the premise that this regiment would attack normally with only one battalion engaged at any one time. In order to take care of the unusual case a third liaison detachment was placed in the Artillery regiment with the two liaison officers previously mentioned. The availability of the regimental liaison detachment to either Artillery battalion commander during an operation is extremely doubtful since the regiment will have need at all times for some liaison personnel in making and maintaining contact with the supported brigade. Thus presumably on the basis of war experience, we have given the Artillery battalion commander definite responsibility for liaison with the supported Infantry regimental commander, and the battalions of the latter's regiment in contact with the enemy. It seems unthinkable that we should continue to believe that this Artillery battalion commander can adequately carry out this mission with a group of one officer and nine enlisted men. Even with only one battalion of the supported regiment engaged at any one time, relief from this arduous duty must be provided for, and casualties foreseen. One sufficiently large liaison detachment per Artillery battalion would probably have sufficed during the World War, assuming adequately trained replacements always available to meet casualties. Possibly some such situation as the continuous penetrating attacks of the Western Front may occur again, but such operations will always be preceded and followed by operations wherein frontages of the regiment of Infantry will be greater than they were at any time during our participation in the World War. The Artillery battalion in typical open warfare of movement will often be called upon to support the Infantry regiment employing initially two battalions in the front line. It is believed that in 50% of all cases liaison will be required with at least two front line Infantry battalions of the supported regiment, and regardless of the formation, liaison

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must be maintained with the Infantry regimental commander. The problem on a defensive front usually provides ample time for improving and perfecting communications. The most difficult phase of liaison is in the advance during war of movement. For any type of operation, however, the Artillery battalion should have available two liaison sections of adequate strength. This is the very minimum with which it can operate, and provides no reserve. Improvisation of extra personnel as at present contemplated, involves crippling other essential tactical elements of the battalion headquarters battery and savors of our failure of the past to meet this highly important question with a practical solution. Present developments in mechanical transport, thought along the lines of mechanized forces, larger Infantry battalions, divisional guns with super-long ranges, make it now desirable for the Artillery to become accustomed to firing from positions even further from the Infantry front line than in the past. Now is the time to teach the lesson of how to maintain liaison contact based on today's doctrines, tactics and equipment. It cannot, however, be taught without adequate personnel to solve the problem in a practical way.

The present authorized liaison detachment (one to each battalion and regiment of light Artillery) consists of:

1 Liaison officer	2 Telephone operators
1 Sergeant (scout)	1 Line guard
1 Corporal (scout)	1 Motorcycle messenger.
3 Privates (scouts)	

With the present limited equipment authorized for the employment of the detachment, this personnel suffices, except for line guards and runners. It should be noted that the individuals allotted make provision for only one form of technical communication, the telephone. In this connection certain experiences of the World War, should be noted.

"There was never a lack of good liaison officers, but the difficulty was in keeping in communication with him."<sup>26</sup>

"Liaison is always more or less imperfect unless good telephonic communication is maintained. With linemen (line guards) at intervals of about one kilometer along the wire, communication is very good and

## INFANTRY-ARTILLERY LIAISON IN COMBAT

a well-laid line even in a heavily shelled area is dependable."<sup>26</sup>

"Liaison was maintained throughout (St. Mihiel Operation) with the elements of the regiment (Infantry). Every means of communication possible was to be used, phone, projector, radio, and runner."<sup>27</sup>

"As to the attack (May 28th, Cantigny) made by the 1st Division, the telephone lines were continually being repaired and it was a great difficulty to keep them in order. The only communication that was heard at all times was the T. P. S. (earth telegraphy) and radio."<sup>28</sup>

"It is recommended that steps be taken to better establish liaison with the Infantry and between the Artillery units by perfecting the use of the T. P. S. (earth telegraph) and radio. During the attack on Cantigny the telephone lines were frequently cut and it was necessary to employ runners."<sup>29</sup>

"During any serious attack either by our own troops or by the enemy, telephone lines will be cut, and all forms of visual signalling are unreliable or cannot be used for lack of visibility."<sup>30</sup>

"Effort might well be begun now to enlist the services of American inventors, who have produced so much in the field of communications, to provide our armies with a device which will work under battlefield conditions from the first line Infantry to the Artillery."<sup>31</sup>

The last quoted report was made after the regiment had employed projectors, telephone, radio and runners in the Cantigny operation.

Thus it appears that our liaison detachments, as at present organized, are able to establish only one type of communication

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<sup>26</sup>Hero Board, Appendix No. 9.

<sup>27</sup>Report, C. O., 6th F. A., dated Sept. 18, 1918, on the St. Mihiel Operation. World War Records, 1st Division, Vol. IX.

<sup>28</sup>Report of a Liaison Officer with the 18th Infantry at Cantigny—Same source.

<sup>29</sup>Report by a Battalion Commander, 7th F. A. on liaison during Cantigny operation—Same source.

<sup>30</sup>Memo. 199, 1st F. A. Brigade, June 13, 1918, based on experiences in artillery-infantry liaison at Cantigny—Same source.

<sup>31</sup>Letter, C. O., 6th F. A., June 3, 1918, "Deficiencies in infantry-artillery liaison at Cantigny."—Same source.

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from front to rear. Based on experiences during the World War, this procedure will certainly be dangerous and men must be added to these sections for visual signalling, radio, and runner communication in addition to an augmentation of line guards. These matters will be given further attention in the discussion of liaison detachment equipment later in this memorandum.

As commanding officer of an Artillery battalion at the Infantry School, during a period of two years, the writer employed the present authorized liaison detachment. All such employment was in connection with tactical exercises of the Academic Department, involving a war strength Infantry regiment (less one battalion). All problems were drawn by the school to show typical combat formations of the regiment under various conditions. In nearly all these exercises it was found that the Artillery battalion was required to support two Infantry battalions, and accordingly establish liaison with each. The only means available was the one detachment. A second detachment had to be improvised by detailing a staff officer already engaged on his staff duties and detaching such enlisted men from the Headquarters Battery as were available. Again improvisation had come to the front. During the World War, as a result of faulty liaison organization, battalion and regimental commanders called for heavy drafts of battery personnel to assist them in this tactical function, a situation accountable in no small way for the poor condition of animals often reported. The writer is convinced that, under the present organization of the division, an Artillery battalion must have not less than two liaison detachments organized as indicated in Exhibit 1. Open warfare, not involving deep sustained penetrations against a zone defense will see the Infantry regiment more often deployed with two battalions in assault than in any other formation, occasionally one and seldom three will be so employed. Even with two detachments, no provision is thereby made for relief, and no personnel provided for contact between the Infantry regimental and Artillery battalion commander under those conditions which prevent these commanders from occupying command or observation posts in the same vicinity.

## INFANTRY-ARTILLERY LIAISON IN COMBAT EQUIPMENT

The question of equipment, particularly signal equipment, for liaison detachments is of vital importance. In general it may be stated that during the World War the equipment furnished for this critical mission was inadequate in quantity and diversity. Little, if anything, has been done since the war to add to Artillery tables of equipment the missing items. The German view on this matter should be examined:

"The preservation of communications and liaison between Infantry and Artillery is of decisive importance. It is impossible to depend with certainty upon the maintenance of wire communications. Communications should therefore be assured by employment of optical means, radio nets, runners and carrier pigeons and in this manner it will be possible to get along temporarily in case of emergency without the wire net. It appears that the radio has most notably demonstrated its efficacy."<sup>32</sup>

And from some of our own units:

"The recent operations against Cantigny demonstrated the necessity of more practice with other means of liaison than telephone and carriers."<sup>33</sup>

"The liaison between sub-grouping commanders and Infantry battalion commanders was effected almost entirely by telephone. Attempt was made to operate the projector but visibility prevented. The telephone was the most useful means. The radio was used to advantage at times. In the advance, one Artillery liaison officer used to hand barrows with twisted cable."<sup>34</sup>

And further in reporting on liaison to the Hero Board, an experienced regimental commander in the A. E. F. reported:

"Each (liaison section) should have a completed enlisted detail of signalmen, linesmen, operators and runners

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<sup>32</sup>Chief of the Gen. Staff of the Armies in the Field (Ludendorf), published Aug. 8, 1918—Ia/II No. 9635. German 5th Army Annex to War Diary, Operations Document No. 293.

<sup>33</sup>Memo. Hq. 1st Div., May 31, 1918—Field Orders, 1st Div., World War Records.

<sup>34</sup>Letter, Hq. 6th F. A., June 3, 1918 to C. O., 1st F. A. Brig., World War Records, 1st Division, Vol. IX.

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with the necessary equipment. Too little use made of projectors. The wire furnished this detail should be light, wound on reels, carried on light two-wheeled carts."<sup>35</sup>

Thus it appears that as a result of problems in Infantry-Artillery liaison during the World War came the lesson that liaison detachments should have all means of communication, but should also distrust them all. As a matter of fact, liaison detachments at this time had no vehicular means of laying wire, and no radio authorized. Their equipment was telephones and projectors. Wire either had to be laid by hand from improvised spools or by heavy, horse-drawn reel carts.

In examining our present situation we find that our equipment for liaison sections is essentially the same as prescribed in 1918 tables. Breast reels, carrying about 40 yards of twisted pair wire have been added, which are of no service on account of the small quantity of wire carried. Our teaching is that an Artillery battalion supporting an Infantry regiment establishes contact with the assault battalion or battalions of the regiment. To each battalion engaged is sent a liaison officer and detachment. Under ordinary circumstances the liaison line will run from the Artillery battalion command post to the vicinity of the assault Infantry battalion command post. The initial installation of this line may at times be entrusted to the heavy reel cart of the Artillery battalion, but it carries only four miles of wire and has its own command lines to put in. Even if these liaison lines can be put down with the battalion reel, there is left to the liaison detachment no means of moving forward with the command group of the Infantry battalion, which will frequently, if not always, move forward during combat prior to the time that any Artillery vehicle could be sent forward to extend the liaison line. In connection with this problem, it is interesting to note that we conceive of the Artillery battalion command post and the supported Infantry regiment being in the same locality. The Infantry regiment connects by telephone to its battalions using one mule or small, hand-drawn carts, and

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<sup>35</sup>Report to Hero Board of Col. W. H. Dodds; Report of Hero Board, Appendix 9, AEF Records Section, AGO.

## INFANTRY-ARTILLERY LIAISON IN COMBAT

the Artillery which must parallel this line, is forced to employ a six-horse reel or lay it by some improvised means. Thus, with our present equipment, it will be difficult for liaison sections initially to establish wire communications with an attacking battalion, and impossible to extend this line as the battalion advances. It is believed that until some means is found to lay the liaison line Artillery battalion to Infantry battalion, the liaison problem will remain, as it has in the past, unsolved.

The present Training Regulations on this subject set forth very clearly the communications difficulty of the liaison mission. "Of all the lines of signal communication in the division, those connecting the Artillery with the attacking Infantry are the most difficult to establish and maintain. No effort should be spared to maintain telephone lines as long as it is possible to do so, but it will often be necessary to rely on radio, visual signaling, messengers, etc."<sup>36</sup> The main dependence of the Artillery for its signal communications to the Infantry is placed, accordingly, in the telephone and this arm's main effort must be, for the present, a development of the means to assure this communication. Thus, it appears, that the Field Artillery is relying primarily on the telephone, but has no satisfactory means of laying liaison lines; secondarily, on the radio without giving to liaison details a radio set, and on visual signaling without placing such personnel in liaison detachments.

The solution of the liaison wire problem lies along one of two lines; the development and adoption of a small one-horse-drawn wire cart, or the employment of a pack animal with suitable attachments for carrying wire on the present pack saddle. It is interesting to note that liaison detachments of the German Army are equipped with a small horse-drawn cart for laying the liaison line.<sup>37</sup> It is believed the following experiences justify considering the adoption of a pack animal for solving the wire problem of liaison detachments. In reporting on the operations on the St. Mihiel Offensive, an Infantry regimental commander, on September 19, 1918, wrote:

"Communications has not been as satisfactory as it

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<sup>36</sup>Tactical Employment of F. A. T-R 430-105, paragraph 178.

<sup>37</sup>Report of Major General Wm. D. Connor, Commandant, The Army War College, on Observations of German Army, 1929.

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might have been. This was caused in a large measure by a lack of wire. It is strongly recommended that two or three pack animals, with necessary aparejo be supplied, upon which can be transported the signal section telephone equipment. At present the regiment is using captured M. G. hand carts for the transport of wire."<sup>38</sup>

It is interesting to note the result of this recommendation. The same regimental commander, in reporting on the operations of his regiment October 1 to 11, 1918, says:

"The liaison with forward battalions throughout the offensive was excellent, telephonic communications being maintained almost continually . . . This satisfactory condition of communication was due in a large measure to the amount of wire that was transported by the pack mules furnished the signal section for that purpose."<sup>39</sup>

The wire problem of a liaison section serving with an Infantry assault battalion is very similar to the problem of the Infantry regiment in keeping up the wire communication to that battalion. It, therefore seems that profit could be derived from the above experience of a regiment in combat, and that experiments should be conducted to determine whether the solution to the problem lies in this direction.

During recent years, at several army stations where Field Artillery and Infantry have worked together in combined training, problems have brought out the inability of the Artillery battalion to maintain liaison wire contact with supported Infantry, particularly during movement. The deficiency lies in the difficulty surrounding the laying of the initially required liaison lines, and further, in the impotency of the Artillery with present equipment in extending these lines as the attack goes forward. As a result of this discovery, experiments were conducted in the Field Artillery Brigade, 2d Division (specifically within the Headquarters Battery, 1st Bn., 12 F. A., during 1926-28) and by the Headquarters Battery, 83d F. A. Battalion at The

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<sup>38</sup>Detter C. O., 28th Infantry to C. G., 1st Division, Sept. 19, 1918. World War Records, 1st Division, Vol. XII.

<sup>39</sup>Letter, C. O., 28th Infantry, to C. G., 1st Division, undated. World War Records, 1st Division, Vol. XII.



## INFANTRY-ARTILLERY LIAISON IN COMBAT

Infantry School in 1928-29, to develop a special wire-laying vehicle for liaison details. In each of these experiments the cart found most satisfactory was made by modifying a standard Ordnance machine gun cart, at a very small expense. In the absence of provisions for such an item of essential equipment in Field Artillery tables of equipment, other Field Artillery organizations have built and are using such a cart. During the 3d Corps Area maneuvers, October 12th to 19th, 1929, at Fort George G. Meade, Maryland, the 1st Battalion, 16th F. A. employed two reels of this type. Upon completion of the maneuver the battalion commander in an informal report to the Chief of Field Artillery, said:

"From the experience gained in this maneuver it is thought that these modified machine gun carts are the solution to many communication problems confronting the liaison officer in the past."

And further:

"Advantages of the liaison reel cart:

Capable of carrying 2 miles of 11 strand wire.

Capable of picking up wire.

Chest on each cart affords carrying space for such articles as breast reels, tools and radio, if used.

Capable of laying wire at the trot, which is very valuable, in rapidly moving campaigns or maneuvers.

Very sturdy and can withstand the wear and tear of maneuvering over rough ground.<sup>40</sup>

It is not within the province of this article to make conclusions on the choice of technical equipment, and none will be attempted as between the liaison wire pack animal wire cart. It is believed, however, that the adoption of one or the other should be considered at an early date, for only by bridging the present serious gap in Infantry-Artillery wire communications can the Infantry hope to be supported, as it should be, with the full power of its Field Artillery.

The liaison lines from Artillery battalion to Infantry battalion

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<sup>40</sup>Report made by Maj. (Courtland) Parker, 16th F. A. to Chief of Field Artillery.

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can be considered as being normally in an area subject to violent hostile Artillery fire and accordingly their liability to interruption is very great. The following World War record very well expresses the situation:

"During any serious attack either by our own troops or by the enemy, telephone lines will be cut, and all forms of visual signaling are unreliable or cannot be used for lack of visibility. Runners cannot transmit information with sufficient rapidity for its timely use on account of intense shelling. Earth telegraphy and radio will operate when other means fail."<sup>41</sup>

Our light Field Artillery in the World War was radio equipped as follows:

In the regiment: Sending and receiving sets.

In the battalion: Receiving sets.

The need for an extension of this equipment was early recognized since the battalion receiving set, without the ability to acknowledge or send messages, was practically useless. However, nothing was ever done about it. The need for a certain and dependable means of Infantry-Artillery communication is reflected in the following reports:

"It is recommended that steps be taken to better establish liaison with the Infantry and between the Artillery units by perfecting the use of T. P. S. (earth telegraphy) and radio. To insure this the following is felt necessary:

Equip all artillery units down to and including battalions with sending and receiving sets.

Frequent practice with T. P. S. and radio and utilization of the same at times other than merely during emergencies."<sup>42</sup>

And following the Soisson Offensive, July 18-22d:

"It is believed that our inventors can, if the necessity is properly shown, devise an instrument whereby communication can be effected from the front to the rear under almost all circumstances. The present material

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<sup>41</sup>Memo. No. 199. 1st F. A. Brig., June 13, 1918. "Conclusions on Reports of Defects in Infantry-Artillery liaison at Cantigny.

<sup>42</sup>2d Ind., Letter Hq. II/Bn., 7th F. A., June 1, 1918; Maj. Franke.

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of liaison, diverse as it is, does not meet the needs of an attack.<sup>43</sup>

Profiting by these experiences, our light Artillery regiment and battalions now have been provided each with two different types of two-way radio sets,—one for work within the Artillery net and one for entering the Infantry net. Each of the present sets will likely be superseded in the near future, but the general scheme of having within each Artillery regiment and battalion a different type set for the Artillery net from that used by the Artillery in working with the Infantry will be retained. Under present conditions an Artillery battalion supporting an Infantry regiment can communicate by radio (SCR 77-B) with that regiment or with any of its battalions. This is a step forward since the World War, but it is believed a radio set should be included as a part of the equipment of Artillery liaison detachments. The preceding paragraphs of this article set forth the difficulties of the liaison officer's problem in maintaining touch with his Artillery battalion. Considering his importance as a link in the Infantry-Artillery team, no equipment should be denied him which will offer any amelioration to his arduous task. The question at once is raised of adding about eight radio sets to the already burdened division radio net, and there is some question as to whether with present equipment, wave bands can be allotted to liaison detachments. The answer to this is that sets can be designed to make channels available for liaison detachments. It is believed that the present radio equipment should be issued for liaison detachment communication. Such a set employed, at present, by a liaison detachment accredited to an Infantry battalion could be assigned the same wave band employed by that battalion in working with the Artillery battalion and by proper coordination there would be no interference. This is, of course, to be considered only an improvisation until suitable technical equipment can be provided. The principles to be adopted are, first that radio personnel and equipment should be in liaison detachments, and secondly, that this means of communication is to be considered as quite normal. Numerous tests

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<sup>43</sup>Letter, C. O. 6th F. A. to C. O., 1st F. A. Brig., August 1, 1918, "Report on Operations south of Soissons" (Major Courtland Parker).

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have been conducted with radio equipped liaison detachments. The results of one of the most recent are quoted:

"During a portion of the maneuvers, when the tactical situation permitted, one radio set (77-B) with operator, accompanied the liaison detachment and set up in close proximity to the Infantry battalion command post. This set proved very valuable in sending routine reports which would ordinarily congest the single liaison line. It was also particularly valuable when communication by telephone became impossible for various reasons, such as a broken line, telephone out of order, etc. But under ordinary conditions, when telephone communication was functioning the radio would not be used for messages requiring great rapidity of transmission."<sup>44</sup>

The question of transportation of a radio set for liaison detachments deserves consideration. The solution to this is dependent upon the adoption for the detachment of a wire carrier of some kind, either a cart or pack animal. If a cart is adopted, ample space can be provided for the set. Should the animal pack transport be decided upon for carrying wire, a second pack animal can be provided for radio transport.

It should be noted that the German Army has adopted a combined radio telephone-telegraph set for use of liaison detachments. This set, which has a telephone range of 5 and a telegraph range of 10 miles, can be transported by two men. The equipment is still in the experimental stage and the trend is towards the development of a still lighter set. The same type set is issued for use of the Artillery battalion and Infantry regiment.<sup>45</sup>

Projector equipment is provided in present equipment tables in sufficient quantity for use of liaison detachments. The personnel to operate such equipment is not at present provided and should be given special attention.

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<sup>44</sup>Report, C. O., 1st Bn., 16th F. A. on operation of liaison detachments, 3d C. A. Maneuvers, October, 1929.

<sup>45</sup>Report of Major General Wm. D. Connor, Commandant, The Army War College, on Observations of German Army, 1929.

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The trend of present developments in Artillery materiel, troop mechanization, and likely Artillery support of tank attacks, all seem to presage continuity of the tendency of Artillery to operate physically separated from its Infantry by even greater distances than has been the case in the past.

That the future holds even greater problems in Infantry-Artillery liaison than the past there seems little doubt. A greater Artillery range without the means of liaison to use the increased mobility of the shell to the better performance of our close support is useless. Mechanized vehicles to assist, if not even carry the Infantry forward, are futile if Artillery support is lacking when the objective is gained. Excellent liaison under these probable conditions of the future will be just as essential as it was during the last war, and more difficult to execute satisfactorily. The answer to the problem of the future lies for the Artillery in the radio telephone. Even today there are few drawbacks present in radio which are not likewise present in line telephony. The lack of secrecy is one of radio's worst enemies, but in liaison communication, secrecy would make little difference and even so, line telephony is itself not altogether secret. Radio may fail, but if this occurs we are no worse off than with our lines cut by shell fire. The bulk of radio apparatus as compared to the telephone is admitted, but the telephone requires bulky wire reels and many linesmen to accompany them.<sup>46a</sup> The following comments of distinguished French officers are pertinent:

*General LeGallais.*

"When the wireless telephone shall have become capable of rapid, sure practical use, the question of liaison within the Infantry and Artillery will have made a great step forward."<sup>46</sup>

And further:

*General Herr.*

"In the domain of technical progress we should pay especial attention to rapid and incessant perfection of transport and means of communication. These means

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<sup>46</sup>Questions Affecting Artillery—General Le Gallais, French Army, Field Artillery Journal, July-August, 1920.

<sup>46a</sup>Journal of Royal Artillery, April, 1926. "Does Radio Telephony offer a Possible Solution to the Main Artillery Problem of the Day."

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serve man in peace as well as war and are naturally the object of constant research. The Artillery profits directly from all improvements in either. The day when the wireless telephone will be perfected, the capital problem of liaison between Infantry and Artillery will, perhaps, be solved. And do not many of the problems of tactical combat come back to this simple question of liaison?"<sup>47</sup>

### TRAINING

In speaking of the tremendous Artillery strength employed in some operations of the World War, Sir Douglas Haig said:

"The massing of the guns alone, however, could not have secured success without the closest possible combination between our batteries and the infantry they were called upon to support . . . An intelligent understanding of the other man's job is the first essential of successful cooperation."

The last sentence of the above quotation sums up very well the whole problem of Infantry-Artillery liaison. The question is in no way a one-sided one; in other words, all the responsibility for proper liaison does not fall on the Artillery. Cooperation carries with it a dual function in which two parties serve. The most important lesson from the experience in France, it is believed, was the absolute necessity for a mutual sympathetic understanding between the Infantry and Artillery of the needs, powers and limitations of each other. Many reports made to the Hero Board indicated that even at the end of the war the problem had not been solved. Some of these reports follow:

"More attention should be paid in peace time training to liaison in all its details. Trained liaison officers should be provided along with the necessary details, and these should be kept up to strength and in a state of efficiency at all times."<sup>48</sup>

"Liaison officers to be of service to the Infantry and value to the Artillery, need special training, and the detail

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<sup>47</sup>Field Artillery: Past, Present and Future—Gen. Herr, French Army; Reprint in F. A. Journal, January-February, 1929.

<sup>48</sup>Report to The Hero Board of Lieut. Col. W. H. Rucker, 16th F. A., Report of Hero Board, Appendix 9, AEF Records Section, AGO.

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of an officer who has not had such training is of little use."<sup>49</sup>

"Much is to be learned in our army regarding liaison and liaison officers. Good or even fair results were the exception. The only solution I know of is to educate the Infantry to a better appreciation of the powers and limitations of Field Artillery and for the Artillery to send as liaison officers, officers of sufficient rank, capacity and personality to properly represent the Field Artillery."<sup>50</sup>

The problem divides itself into two phases:

Training of Infantry and Artillery during times of peace to meet the demands of liaison.

Action taken in time of war to make this training effective.

The best possible training is that acquired through actual association of the two arms in field exercises, or maneuvers. In connection with this it is interesting to note a recommendation of The Superior Board:

"That Artillery be stationed in the same general locality with the groups of Infantry and Aeronautics with which it is to fight so that combined training may often be practiced and the habit of cooperation acquired."<sup>51</sup>

Unfortunately the present peace time distribution of units of the Regular Army, does not, in general, permit the combined training contemplated in the above quoted recommendation of The Superior Board. At few stations of the army does one now find Infantry and Artillery both in the same post available for work together at all times. During the summer training period when both armies are assembled in corps area or other training centers, the activities of the two arms usually center around the training of civilian components of the army. Except in a few cases such civilian training is very limited in its scope, and offers little opportunity for field exercises designed to teach Infantry-Artillery

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<sup>49</sup>Ibid, Brig. Gen. G. A. Wingate, 52d F. A. Brigade.

<sup>50</sup>Ibid, Col. Harry G. Bishop, then Brigadier General.

<sup>51</sup>Report of Superior Board on Organization and Tactics, UA 10 U 3 1919, page 61.

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cooperation, and to illustrate its difficulty. Few opportunities exist, under present-day conditions, for vividly portraying to the Infantry the problem of the Artillery,—its powers and limitations. The same may be said with reference to the Artilleryman's opportunity for gaining first hand information of the arm it is designed to support. Artillery commanders, their liaison officers, and reconnaissance, officers should be taught to recognize the battle formations of Infantry when seen from their observation posts, be familiar with the methods of the Infantry in the use of cover, have a good general knowledge of the methods of the smaller Infantry units in employing fire and movement, be familiar with Infantry methods in the organization for defense, and be entirely familiar with the powers and limitations of all the weapons of the Infantry. In short, these concerned Artillerymen must know Infantry and understand its language. On the other hand the Infantry, particularly battalion and company commanders, should be familiar with the basic powers and limitations of the Artillery, such as frontages which can be effectively covered by a battery, potential sustained rates of fire of the various calibers, together with their limiting maximum effective ranges, the necessity for Artillery observation, the probable time required for the Artillery to go into action and deliver effective fire from march formation, have a good appreciation of the necessity for economy in the expenditure of Artillery ammunition considering its supply difficulties, and understanding the importance of and difficulties involved in installing and maintaining the Artillery wire net, with particular regard to those communications connecting the Artillery and supported Infantry.

The training of Infantry commanders in the employment of Artillery liaison personnel is coordinate in its importance with the training of this personnel within the Artillery. The Infantry battalion commander who in combat receives a liaison detachment from a supporting Artillery battalion must know how to use this personnel to the best advantage, and should employ it as a component of his battalion team.

In view of the present peace time conditions, it is manifestly very difficult to give to Artillery and Infantry officers the required



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practical training desirable to make each cognizant of the other's problems. The special service schools of these arms each attempts to give the student a well rounded idea of the problem confronting the other arm. The illustrations often are entirely theoretical. In no way does an officer secure such a good practical working knowledge of an arm as by service with it. It is believed we could with profit have a large number of young officers of Field Artillery serve for a period of one year with an Infantry company, and a like number of Infantry officers serve with a battery of Field Artillery.

Second only in importance to the initial basic training of Infantry and Artillery in liaison are the measures taken in war to make this training effective. In war the fundamental training in liaison between Infantry and Artillery should commence by the attachment of liaison officers in training centers to the Infantry commands they will later serve in combat. It is obviously better for them to live with the Infantry and go daily to the instruction of their Artillery detachments, than to live with their own organization and have only rare visits to the Infantry which later is to be served in combat. The same principle holds true for any situation later encountered at the front. In this connection it should be noted that the Superior Board reported:

"The Infantry and Artillery which are to work together in combat must train together and live together to the greatest possible extent.

To the lack of cooperation between the combat arms many tragic incidents are to be ascribed."<sup>52</sup>

It is interesting further to note the measures taken by one division in this connection during training in the winter of 1917.

"Send liaison officers to the Infantry brigades and regiments to be permanently attached thereto. The purpose of permanent attachment is to establish such close and cordial relations between the Artillery and its Infantry and such mutual understanding that the two arms cannot fail to cooperate effectually in any phase of an action. They must acquaint themselves with all Infantry officers."<sup>53</sup>

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<sup>52</sup>Report of Superior Board on Organization and Tactics, page 36.

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Later the Artillery brigade of this division invited the Infantry to send one officer to each battery for a tour of duty while the brigade was at the front in support of the division<sup>54</sup>, and lectures on liaison were conducted within the brigade for Infantry officers. These lectures continued for several days with the objective of reaching all Infantry officers.<sup>55</sup>

Training along other lines than those above discussed have their part in perfecting a solution to the liaison problem. Among these might be mentioned the training of Artillery battalion commanders in command liaison, that is the methods of retaining their units in hand and at the same time associating themselves with the supported Infantry regimental commander at a mutually occupied command or observation post; the training of battery commanders in the rapid echelonment of their observation posts forward close up behind the attack, and lastly, the training of Infantry battalion commanders in the use of liaison personnel. Too often in peace time maneuvers has the writer seen liaison officers either entirely ignored or given so little information by Infantry battalion commanders that liaison details were unable to proceed with a satisfactory solution to their problem. All the factors involved in this special liaison training of commanders revert again to the same point, the necessity for the commander of each arm understanding the other's problem. The combined training of our Infantry and Artillery, while much better now than it was prior to 1917, is not, today, so good as it was in 1920. Under the present conditions of a widely scattered Regular Army the tendency is now growing for the Infantry and Field Artillery to get farther and farther apart and many valuable lessons learned by each may soon be forgotten for lack of work with each other. These arms can be kept together, in a measure, by the policy of exchange of officers.

## CONCLUSIONS

Since our adoption of the modern light field gun, never have

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<sup>53</sup>World War Records, 1st Division. D 609 U 53, 1st U 5, 1928, Vol. XI. Memo. 1st F. A. Brigade, December 30, 1918—Diary Lieutenant Butler.

<sup>54</sup>Memo. No. 30, 1st F. A. Brigade, January 29, 1918.

<sup>55</sup>World War Records, 1st Division. D 609 U 53, 1st U 5, 1928, Vol. XI. April 13, 1918—Diary Lieutenant Butler.

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the appropriate Field Artillery headquarters been provided by tables of organization with an adequate personnel for satisfactorily establishing and maintaining liaison with the Infantry.

The present tables of organization not only authorize insufficient personnel for Infantry-Artillery liaison, but the personnel provided is not properly distributed. It is believed that the divisional Field Artillery regiment now has more personnel than required and that the battalion of the regiment has far less than will normally be essential.

The personnel and equipment authorized for Artillery liaison detachments should contemplate the employment of all forms of technical communication, namely, telephone, radio, telegraph and visual signaling (projectors).

Under present conditions, Field Artillery liaison detachments cannot meet the requirements of their mission, due to the lack of suitable means for initially laying the essential wire lines to the Infantry and for keeping these lines abreast of supported Infantry in an advance.

For the future, considering the trend of the present along the line of mechanization, the ideal solution to the Infantry-Artillery liaison problem lies in the development of the radio telephone. Without the radio telephone, the Artillery support from rearward positions of mechanized fast moving attacks will be impossible. At the same time this means of communication would solve many of the Artillery problems of the present.

The solution to the training of both Infantry and Field Artillery commanders in their liaison duties lies in combined maneuvers of these arms under sound tactical situations, and in no more efficient or impressive way can the difficulty of the liaison problem be presented.

Present-day conditions in the Regular Army render very difficult the combined practical training of Infantry and Artillery commanders in their duties of combat cooperation.

The present deficiencies in training can partially be met by two expedients:

The exchange of an appreciable number of officers, annually, between the Infantry and the Field Artillery.

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The detail, annually, of an appreciable number of officers of Field Artillery to take the courses at The Infantry School and the same measures to be pursued with reference to sending Infantry officers to the Field Artillery School.

### RECOMMENDATIONS

That existing tables of organization for Headquarters and Headquarters Battery, 75 mm. Gun *Regiment*, Horse Drawn, (Table 34W) and Headquarters and Headquarters Battery, *Battalion*, 75 mm. Gun Regiment, Horse Drawn (Table 37W) be revised as follows:

Delete from the headquarters and regimental headquarters battery (Table 34W), all liaison personnel except one liaison officer.

Form within the battalion headquarters battery, two liaison sections, organized as shown in Exhibit 1.

These sections are to constitute "the liaison platoon" and to be so carried in tables of organization.

That a suitable radio telegraph set for each battalion liaison detachment be authorized. Under present conditions this set could be the SCR 77-B.

That a suitable means for laying liaison wire lines be provided. Exhaustive experiments are recommended to determine the relative merits of the small cart shown in Exhibits 3 to 8, as compared to a wire pack animal.

That, if possible, the design of the portable radio telephone now employed by the German Army for liaison detachments, be secured and that development of such a set for our service be placed on early priority.

That the War Department General Staff make a study of the practicability of annually placing one Infantry officer on duty for one year with each battery of Field Artillery in our service, and that a like number of officers of Field Artillery be attached for a like period to Infantry companies.

That upon the reorganization and reequipment of liaison detachments as recommended, War Department training directives

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## EXHIBIT 1.

### PROPOSED LIAISON PLATOON

To be incorporated in Headquarters and  
Headquarters Battery, Battalion, 75 mm. Gun (HD).

1	2	3	4	6	5
	Platoon Headquarters	First Liaison Section	Second Liaison Section	Total Platoon	REMARKS
Captains	ah 1			1	a. Platoon Commander and Chief of Liaison.
First Lieutenants		h <sub>1</sub>	h <sub>1</sub>	2	
Total Commissioned				3	
Sergeants				2	b. If pack reel is adopted this figure will be 2—1 pack reel, wire, 1—pack, radio set.
Scout		h <sub>1</sub>	h <sub>1</sub>		
Corporals				4	
Scout		h <sub>1</sub>	h <sub>1</sub>		
Radio		h <sub>1</sub>	h <sub>1</sub>		h. Mounted on horses, 2 horses provided for each officer.
Privates, first class and privates				24	
Driver		b <sub>1</sub>	b <sub>1</sub>		NOTE: The net effect of this change compared with Tables of Organization 37W will be as follows: To each artillery battalion headquarters battery is added 2—Officers (1 Captain—1 Lieutenant). 22—Enlisted Men. 24—Horses, riding. 2—Horses, draft or 4—Mules, pack, The regimental headquarters battery under Tables of Organization 34W will be as follows: 1—Officer (1 Lieutenant). 9—Enlisted Men. 11—Horses, riding.
Line Guards		h <sub>3</sub>	h <sub>3</sub>		
Operator, radio		h <sub>1</sub>	h <sub>1</sub>		
Operator, telephone		h <sub>2</sub>	h <sub>2</sub>		
Orderlies		h <sub>2</sub>	h <sub>2</sub>		
Scouts		h <sub>3</sub>	h <sub>3</sub>		
Total Enlisted		15	15	30	
Aggregate	1	16	16	33	
Horses, draft (if cart is adopted)		1	1		
Horses, riding		16	16		
Total horses		17	17	34	
Mules, pack (if pack reel is adopted)		2	2		

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require Corps Area and Department commanders to conduct annual maneuvers designed for the sole purpose of providing training in Infantry-Artillery cooperation, and that at all stations where Infantry or Artillery are stationed together this training be carried on throughout the year.

That a much larger number of officers of Infantry and Field Artillery be permitted to attend the special service school of the other's arm.

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## TYPE PROBLEMS

*Target Description:* Machine gun fire coming from the vicinity of a bushy green tree at the head of a ravine. *Mission:* Neutralization. *Type:* Time bracket axial. *Matériel:* French 75 mm. Model 1897. *Visibility:* Excellent. *Wind:* Direction L to R. Initial data obtained: Deflection: BC Scope. Range: Range finder. Initial commands:

Initial Commands:

Aiming Point. Radio Tower, Direct rear.  
Plateau 2 Drum 50  
On No. 2 close 5  
Site + 5  
Kr. 35  
Battery Right

Commands	Range	Rd. No.	Sensings	Sheaf (from OP)	Remarks	
Battery Right	4200	1	A ?			Sheaf should have been opened 5 greater than parallel, and sensing would have been obtained.
		2	G ?			
		3	G ?			
		4	G ?			
Left 15 Up 5	4200	5	A ?			Sheaf should have been converged on adjusting point.
		6	G ?	x		
		7	A +			
		8	G +			
On No. 4 close 5	4000	9	A -			Should have opened on an interior piece to cover area on both sides of the adjusting point. (Note: The executive will fire 5 volleys in the following order 4000-4100-4200-4150-4050).
		10	G -			
		11	G -	xxx		
		12	G -			
On No. 4 open 8 Up 5 Btry. 1 rd. Zone	4200 4200			Cease Firing		

### SUMMARY

Errors in initial data: Deflection 10 mils; first shift in deflection 5 mils; range 100 yards or 2.4%. Time from identification of target to announcement of 1st range 55 sec.; average sensing and command 9 sec.; total for problem 3 min. Ammunition expended 12 rounds. Classification: Satisfactory. General comment: This problem was well handled except for final distribution.

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*Target Description:* Infantry weapons, in the vicinity of a clump of bushes, holding up and inflicting losses on friendly Infantry. *Mission:* To be neutralized immediately. *Types:* Percussion bracket lateral (small T). *Matériel:* French 75 mm. Model 1897. *Visibility:* Excellent. *Wind:* Velocity 15 mph; direction L to R. Initial data obtained: *Deflection:* shift measured from base point with field glasses and corrected. Range

estimated. Observer on the right.  $T=150, R=4, r=3 \frac{r}{R} = \frac{3}{4}, s = \frac{15}{4} = 4$

Initial commands:  
 Base Deflection Right 140  
 Site+5  
 Shell Mk. 1, Fuze long  
 No. 2, 1 round  
 4000

Commands	Range	Rd. No.	Deviations viewed from OP <i>but not</i> announced	<i>Sensings</i> Rn. Def.	Remarks
No. 2 1 rd.	4000	1	(45 Right)	?	Deflection sensing need not be announced. To get on line $\frac{3}{4} \times 45 = 34$ Use 35.
Left 35	4000	2	(15 Left)	?	Factor of $\frac{3}{4}$ is slightly large $\frac{35}{60} = .6$ $.6 \times 15 = 9$
Right 10	4000	3	(Line)	- -	Estimated data calls for 400 yard bounds. Required shift to stay on the line is Left $4 \times 4 = 16$ Use 15.
Left 15	4400	4	(5 Left)	-	Factor to stay on line is slightly large. Use 10 mils for next 400 yard jump.
Left 10 Right 5	4800	5	(Line)	+ +	
Battery		6		?	Bring in battery
Right	4600	7		-	when splitting
		8		+	- 400 yard bracket.
		9		?	
Left 3 On No. 2, Open 3 Btry 1 rd. Zone	4500 4700				Direction is slightly short. Open sheaf is desired.

### SUMMARY

Errors in initial data: Deflection 55 mils; 1st shift in deflection 20 mils; Range 600 yards or 13%. Time from identification of target to announcement of 1st range 40 sec.; Average sensing command 10 sec.; total for problem 5 min. Ammunition expended 9 rounds. Classification: Satisfactory. General comments: Time excellent, poor estimation of range.



## TYPE PROBLEMS

*Target Description:* Machine gun fire coming from the vicinity of a rocky ledge.  
*Mission:* Neutralization. *Type:* Percussion bracket axial. *Matériel:* French 75 mm. Model 1897. *Visibility:* Excellent. *Wind:* Direction R to L. *Initial Data obtained:* Deflection: Aiming circle. Range: Estimated.

Initial Commands:  
 Compass 4250  
 On No. 2 close 5  
 Site 0  
 Shell  
 Fuze long  
 No. 2  
 1 round

Commands	Range	Rd. No.	Sensings	Sheaf (from OP)	Remarks
No. 2, 1 Rd.	3600	1	?		
Right 30	3600	2	-		With wind from right the 1st shift was too small.
	4000	3	?		Should have shifted 5M, havseen the round at 3600.
Right 5	4000	4	+		
Battery left	3800	5	+		Officer firing properly gave an initial deflection which practically converged his sheaf.
		6	+		
		7	-		
		8	?		
On No. 2 Open 6 Btry. 1 rd. Zone	3700 3900			Cease Firing	Having obtained overs and shorts at 3800, he accepted that as the center of a 200 yd. bracket and included 100 yds. over and 100 yds. short.

### SUMMARY

Errors in initial data: Deflection 35 mils; first shift in deflection 5 mils; range 200 yards or 5.3%. Time from identification of target to announcement of 1st range=1 min. and 5 sec.; Average sensing and command=7 sec.; total time for problem=3 min. and 37 sec. Ammunition expended 8 rounds. Classification: Satisfactory. General comment: An excellent problem.

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*Target Description:* Infantry deployed in battle formation along a crest. *Mission:* To break up organization and inflict casualties. Cover as much front as possible without sweeping. *Type:* Time bracket lateral (small T). *Matériel:* French 75 mm. Model 1897. Wind: velocity 10 mph; Direction R to L. Initial data obtained: Deflections: estimated shift from base point; Range estimated. T=150 mils. Observer on right. R=3600.

$$r=2400. \frac{r}{R} = \frac{2.4}{3.6} = \frac{2}{3}, S = \frac{15}{3.6} = 4$$

Initial commands:

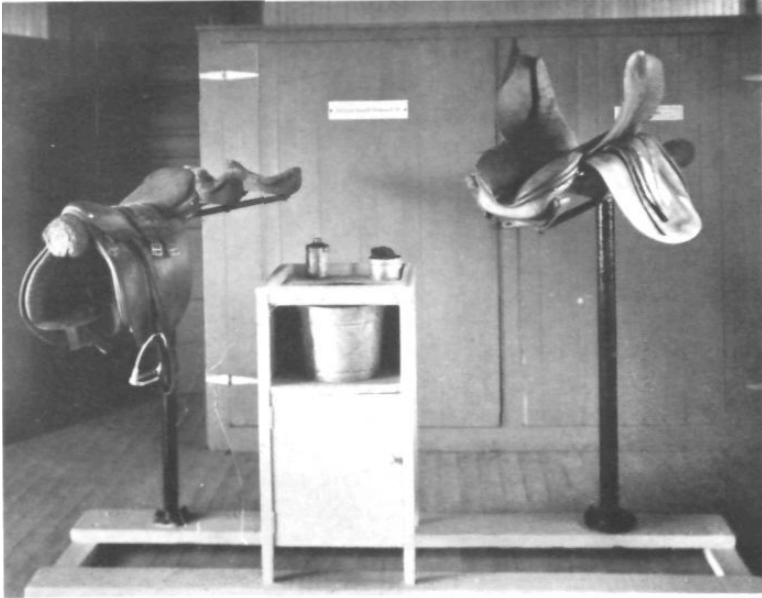
Base Deflection Left 80  
Site+5  
Corrector 35  
No. 2 one round  
3600

Commands	Range	Rd. No.	Deviations observed but not announced	Sensings Rn. Def.	Remarks
No. 2. 1 round	3600	1	(40 Right)	A ?	2/3×40=27 Use 25
Left 25 Down 10	3600	2	(Line over)	G +	400 yard jump called for. To stay on line Right 16 Use 15.
Right 15 Up 5	3200	3	(5 Left)	G -	Right 15 was not quite enough.
Left 5 Up 3 Battery Left	3400	4 5 6 7	(Sheaf satisfactory, deflection correct)	A - G - A - A ?	Indicates a mean height of burst, correct for effect.
On No. 2 Open 4 Up 2 Btry 1 rd. Zone	3400 3600				Open sheaf (100 yards between flank bursts) is desired. Should not have raised corrector.

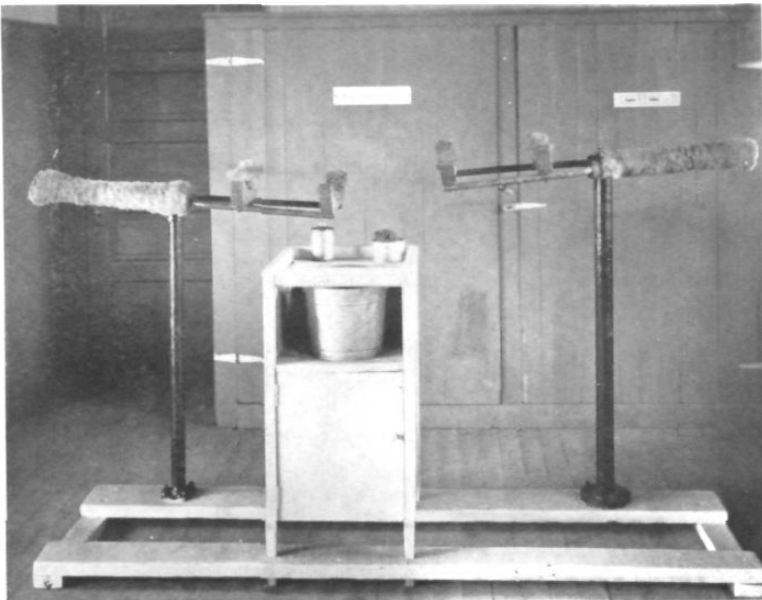
### SUMMARY

Error in initial data: Deflection 15 mils; first shift in deflection 10 mils; Range 100 yards or approximately 3%. Time from identification of target to announcement of 1st range 54 seconds; Average sensings and command 9.5 seconds; total time for problem 5 minutes 40 seconds. Ammunition expended 7 rounds. Classification: Satisfactory. General Comments: The accuracy of the initial factors expedited this adjustment.

## SADDLE CLEANING RACK



THIS RACK WAS DESIGNED AND BUILT BY MASTER SERGEANT FREDERICK C. GOODWIN, D.E.M.L., ON DUTY WITH THE R. O. T. C. AT THE UNIVERSITY OF OKLAHOMA. BY MEANS OF IT A MAN CAN STAND IN ONE PLACE AND CLEAN SADDLES THOROUGHLY AND QUICKLY



# LIGHTING DEVICE FOR BATTERY COMMANDER'S TELESCOPE

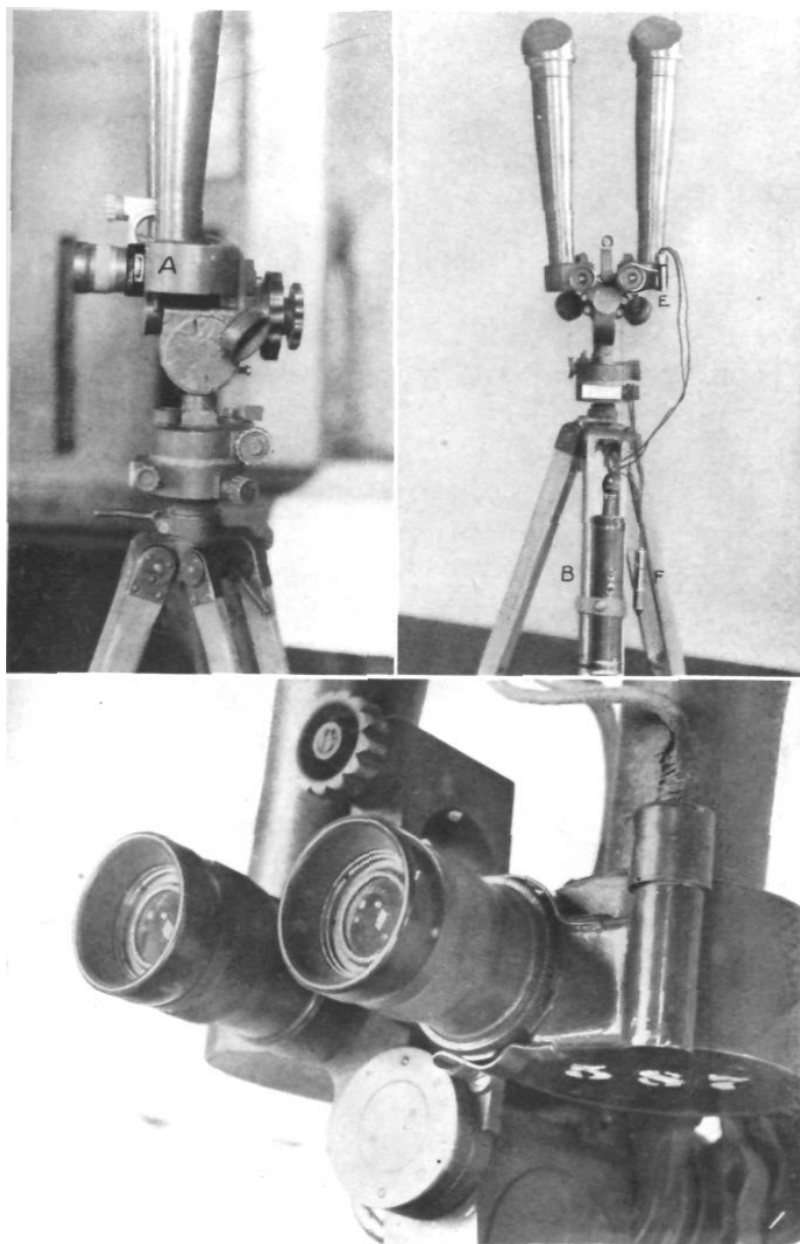
BY FIRST LIEUTENANT C. C. BLANCHARD, STATISTICAL OFFICER,  
DEPARTMENT OF GUNNERY, THE F.A. SCHOOL

A BATTALION of Field Artillery must conduct its fire at night normally without assistance from special units and by means of equipment within the battalion. Conditions favorable to effective firing will vary. A battalion may occupy a position after dark and open fire before daybreak. Generally, reconnaissance parties will do the necessary topographic work and will orient observing instruments before darkness and the guns will be brought into position after darkness and fired before daybreak. Under especially favorable conditions, the batteries may be adjusted on base points and on probable objectives during daylight hours. In any case, an effort should be made to adjust the direction of the fire or to conduct a high burst adjustment to determine the K factors just before starting a preparation which is to be fired before daylight.

An observer can make night adjustments using a battery commander's telescope without special attachments. A dim flashlight held on the objective lense will furnish sufficient light to make the cross hair visible without entirely obscuring bursts that occur in the field of view. However, this is unsatisfactory because the vision is impaired and the display of lights around an observation post is undesirable.

A very satisfactory lighting device is used at the Field Artillery School. The device and the alteration in the battery commander's telescope were made by the Ordnance Department at Fort Sill. A slot (A) is cut through the reticule adjusting ring and fitted with a piece of glass to keep out moisture and dust. A slot is also cut in the reticule cell beneath the first slot. An ordinary commercial flashlight (B) furnishes the current. Into the bulb seat is screwed an attachment (C) consisting of a double contact socket, taken from a night lighting device for the 75 mm. Gun M 1897 (French), soldered to the base of a bulb. Into this socket is inserted a double contact plug (D) with two sets of leads. One set of leads goes to a bracket (E) which fits over the slot in the reticule ring and illuminates the reticule.

## LIGHTING DEVICE FOR BATTERY COMMANDER'S TELESCOPE



TOP (Left) SHOWS SLOT CUT THROUGH RETICULE ADJUSTING RING.  
TOP (Right)—E IS THE BRACKET TO HOLD PENCIL LIGHT F. B IS ORDINARY  
FLASHLIGHT. BULB REMOVED. IT FURNISHES THE CURRENT  
LOWER—CLOSE-UP SHOWING BRACKET IN POSITION TO RECEIVE PENCIL LIGHT

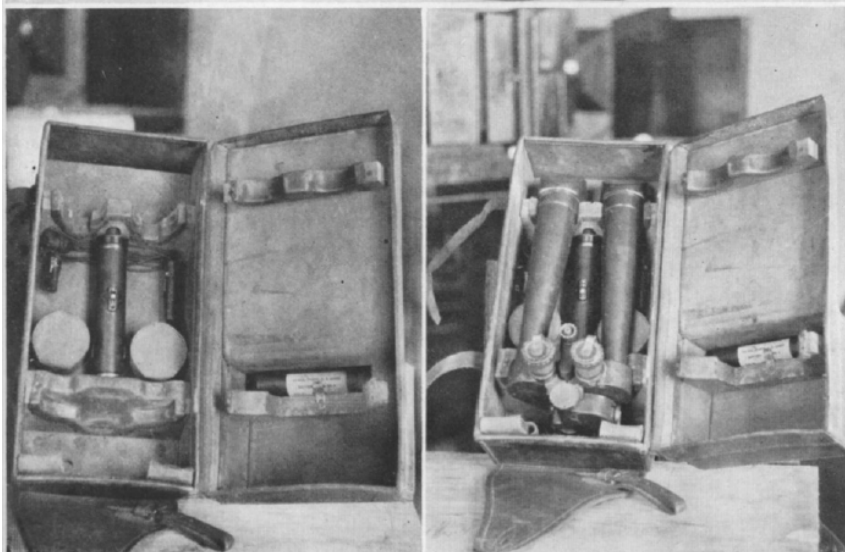
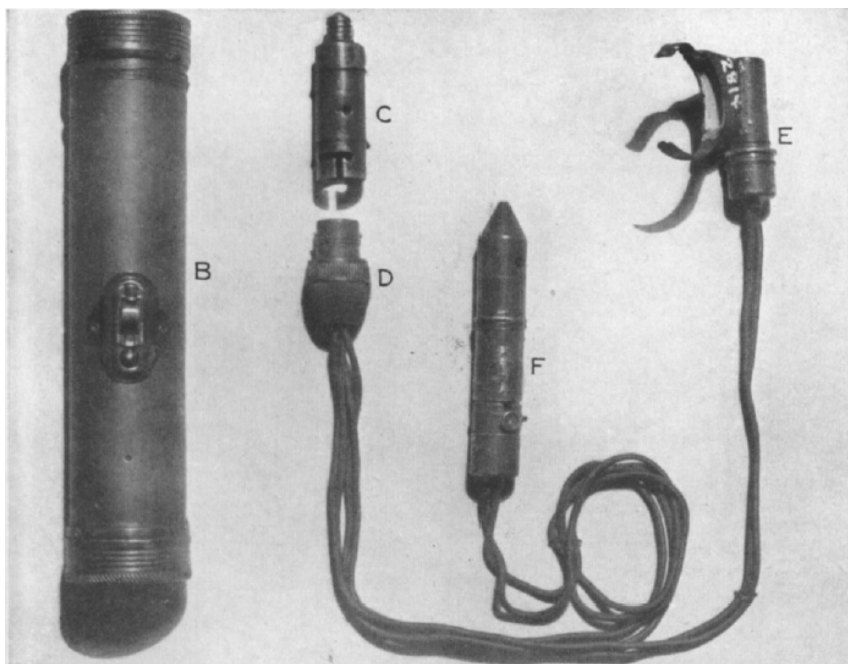
## THE FIELD ARTILLERY JOURNAL

The lines and graduations on the reticule appear to glow faintly. The vision is not lessened. The other set of leads goes to a pencil light (F) which is used to throw a small beam on the site bubble or any of the scales as desired.

A convenient and satisfactory method of carrying this equipment has been devised by Staff Sergeant E. Forgea who is in charge of the Instrument Room of the School. The figure is self-explanatory.

In view of the increased importance of unobserved fire by Field Artillery in modern warfare, the necessity for frequent occupation of positions after dark, and the opening of fire before daylight, it is believed that all batteries should be equipped with B. C. telescopes suitable for adjusting fire at night. This requires some such lighting device as that described above to illuminate the reticule scale. An instrument thus equipped would be very useful also for the purpose of performing night orientation and laying batteries on the base line after dark. A great deal of the night work now done at the Field Artillery School would be impossible without instruments equipped with night lights.

## LIGHTING DEVICE FOR BATTERY COMMANDER'S TELESCOPE



UPPER—C. DOUBLE CONTACT SOCKET WHICH CAN BE INSERTED INTO TOP OF FLASH LIGHT. B. E. BRACKET WHICH FITS OVER SLOT IN RETICULE RING OF TELESCOPE. F. PENCIL LIGHT WHICH FITS INTO E.  
LOWER—METHOD OF PACKING NIGHT LIGHTING DEVICE IN BC TELESCOPE CASE.

# WAR BUGS

*BEING A WORM'S-EYE VIEW OF THE WAR TO END WAR*



*The Algerians Made Horse Seem Very Tasty. A Few Strong Stomachs Finally Got Along On It*

**BY CHARLES MacARTHUR**

Formerly Private Second Class Battery F, 149th F.A., 42d (Rainbow) Division, A.E.F.  
Pictures by RAYMOND SISLEY. Formerly of Battery C, 149th F. A.

By courtesy of Liberty Magazine

**S**EVERAL French and German generals met, swapped cigars, spit on their shoes for luck, and agreed upon an armistice, it turned out.

Yet the bitterest fighting of the war had just begun.

In the forty-eight hours before the whistle blew we raced through more slaughter than on any other front.

There was little to be happy about, God knows. Our food was still twenty miles to the rear and we were chewing on stringy, bitter roots of so-called sugar beets. Neat squares in the flanks of dead horses lying about the fields called attention to the Algerian method of battling starvation; but we were sick as well as hungry. The Algerians made horse seem very tasty by boiling



## WAR BUGS

it with rice, pepper, and various weeds. Now and then they added a young French corporal, it was thought. A few strong stomachs finally got along on it, including the highly Southern digestive tracts of Massa Dyer and one Massa Lieutenant, who excused the necessity of mooching from our gracious and very black companions by setting forth that Algerians were really sunburned Jews, the remnant of a Lost Tribe.

In seven days we had averaged five meals and less than nine hours' sleep, except for an occasional fifteen winks on the march. Those wishing to sleep accomplished it by holding on to the carriages with their hands and dozing on their feet. Behind each carriage two men shuffled, dead to the world. The horses snoozed the same way. So did the drivers.

Most of the bridges had been blown up, which involved quite a bit of wading in ice water. Time and again the sleeping, silent column splashed into the drink, and amazing aboriginal curses arose from the dreaming cannoneers. It is no joke to wake up suddenly in four feet of ice water; although after the first shock it was pleasant to hide along the river bank and watch the remaining sleepwalkers shoot the chutes. Nobody died of pneumonia those days, and it was all considered good, clean fun.

At Chémery we caught up with the Germans on a broad, sweet road they hadn't time to blow up. They were in a stretch of frosty meadow, playing squat tag with the first wave of doughboys. We made a pretty target as we rounded the turn on a gallop, and they potted away with a couple of batteries.

In a neatly executed maneuver, we split up in sections and ran through the bursts in elegant style. The doughboys were much moved, and paused to cheer as carriage after carriage sprinted past the danger point and took cover behind a hill. In a minute we were screened from further fire and were trotting along with something like the old pepper, scaling condiment cans at Bob Barnes, an inveterate nature lover who never missed an opportunity to point out how beautiful was the scenery, how graceful the trees, how lovely the sky.

A clammy fog came from the Meuse and crept down the valley. It obscured everything but the road, which began to travel across a deep ravine. In the center was a bridge. The rest was embankment. We were within spitting distance of Sedan. The

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milestones, tiny smudges in the fog, dwindled down to 10k Nothing could stop us now, and we swapped prospects happily with the first wave of doughboys, surging abreast.

Suddenly the fog shuddered. There was a dull and imminent thunderclap fifty yards ahead. The Germans had mined the bridge. Through the murk we saw sections of it go up for grabs.

That was depressing, because it left us stranded on the narrow embankment that approached the wreckage. We sat a spell, waiting for further orders. Below us to the left our doughboys floundered in the fog, banging away with machine gun and Chauchat at every looming bulk. Orders of their officers and noncoms came sharply through the soup, so close that they seemed under our wheels. Bullets whined like trolley wires and through the crevices of sound came the oompah orders of the enemy. Evidently the Germans had stopped us just in time. Running smack into a German infantry division might have been embarrassing.

The drivers dismounted and swapped eating tobacco with the cannoneers while Captain Stone gumshoed back a piece to find out where in hell we were, how we could get out, and who won the World's Series. We relaxed. It had been a tough push, all on the double, and it seemed pleasant to sit fifty feet above a battle and hear the doughboys do their stuff. Except for stray bullets, we were safe—because invisible—in the fog.

The rattle of machine guns increased. Apparently the boys were getting a run for their money. And then, in slow wet swirls, the mist began to lift. We got a look at things. At the left where the road bank abruptly tobogganed into the field four companies of doughboys zigzagged shoulder high through suds. Here and there a machine gun nest blocked their advance. They stalked slowly in little groups, chewing the rag, crawling on all fours, running, dropping until a neatly placed bayonet or grenade expressed the Germans C. O. D. to their Maker.

Now and then some New York husky made a pretty end run and fell on the flop ears from behind. There were many thrilling individual exploits. Grenades and trench knives—and don't forget to write. A few Heinies threw up their hands and lived to tell the story.

We were itching to blow a couple of Dutch buddies out of

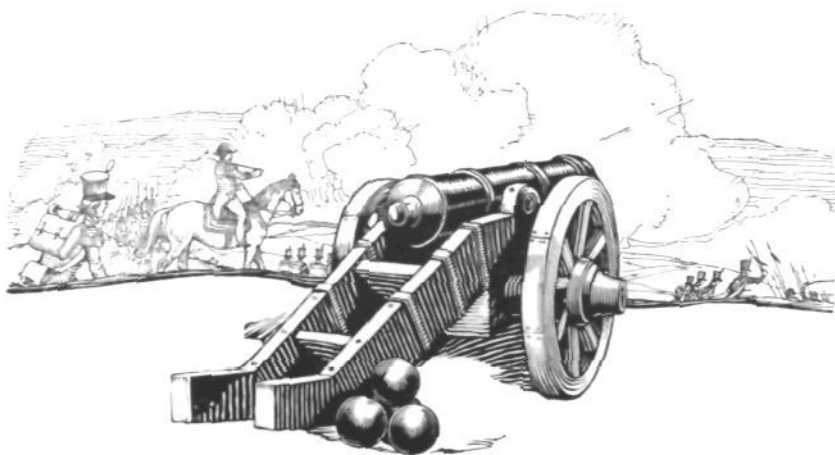
## WAR BUGS

their flops there being nothing else to do; but Pappy Le Prohon decided against it. We were many miles ahead of reserve ammunition, and he felt we would look silly in Sedan, pointing empty guns at the local police department. Every shell was worth its weight in gold.

A wind blew up. The mist lifted entirely. We got out our stolen field glasses and had a look. Not so good. On the crest of the hill across the valley were two batteries of artillery, thoroughly manned and pointing our way. We knew the Germans were never the boys to point guns in fun, and there was a scramble for the horses, the laws of the field artillery being that no driver deserts his horse in time of danger (horses get so lonesome). The gun crews yanked at breech covers and prepared to do a little pointing themselves.

But again Pappy stepped in. Orders were to fire only at the request of the doughboy general. He had made no such request. It made no difference that we were about to be annihilated. Orders, as the Boy on the Burning Deck discovered, are hooey—but orders. So we got as close to the road as possible and waited for the worst.

The first shell was a long time coming—at least five seconds. A puff and a report; an alley cat scream and a crash as it burned into the embankment on which we crouched. A long two seconds



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for corrected ranges, and a second shell screamed over our heads. Veteran artillerists, we bade farewell to this fine, pretty world with all its swell restaurants and redheaded women.

Eight scattered and rather pretty puffs from the hill, then a black and stinging whirlpool in the road. Several horses went down in heaps, screaming, kicking, the drivers fighting to cut them from the harness. More pink puffs drifted from the hill and more cyclones of jagged steel boiled out of the road. Dick Patton, fresh from a recitation of Mr. Herrick's polite verses, got a fragment in the arm that spun him clean off his nag. Cush Pryor and some others hustled him behind a steeply pitched stone barn. He was wounded again on the way. A dozen doughboys who had been scrapping over some corn willie halfway up the embankment vanished into eternity leaving the corn willie untouched. Fifteen of our badly needed horses joined them in the Great Beyond. All in the first thirty seconds of play.

We were still waiting for orders. At length—about thirty-one seconds after the fun began—Pappy Le Prohon decided that war wasn't that important, and came stamping through the shellbursts on his game leg, bawling orders to cut the horses out of the traces and take shelter on the safe side of the road bank. He stumped from section to section to see that the boys didn't shortcut by cutting traces with knives. And just to show us his feelings in regard to death and danger, Pappy removed his helmet (already ripped in a couple of places) and addressed his gallant beer belly squarely to the foe.

All of us knew that Pappy secretly longed to die in action, and out of sheer respect we paused in our getaway to see his epic end. But God evidently intended that our favorite first lieutenant should go on accumulating varicose veins and manly memories for a long time to come; for the more Pappy bellered commands over the crash of 77s, the more widely they missed his unmissable barrel legs and bulging belly.

His big blue underlip hung out a foot from pure contempt of death. The face that had scared a thousand shavetails out of a year's growth disappeared in every black burst, and immediately reappeared as fresh as a daisy—or shall we say eggplant? There were a few rips in his size 65 blouse; his two and a half pound nose seemed a bit more battered at times; but he was safe

## WAR BUGS

and sound and invulnerable. Under his cool command, we had the horses over the embankment in no time. Five or six of them were killed on the way, but the men were all safe.



*Pappy announced hoarsely that, by Gar, he would kill Wiener with a gun, as provided by Army regulations.*

The ravine was protected by three sharp slopes, but the Germans kept picking on us with reduced charges (which dropped vertically from above) and gas. Again Pappy demonstrated his wish to die by charging among the frightened horses, minus gas mask and helmet. His suicidal mania was nearly gratified this time, as he picked up quite a snootful of mustard. But when it was suggested that he go to the hospital, he entered upon the most original and extensive flow of profanity ever heard in that

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part of the world, the more marvelous because of the choking effect of the gas.

For three hours the Dutchmen filled our small ravine with mustard and shell. With all that time on our hands, we played pussy in the corner with a unit of First Division Infantry that had arrived in our wake. The game was to pick the most likely flops.

As pointed out earlier in this great work, the Armistice had been arranged hours before and the opposing generals were then calling each other by their first names.

Several of the battery distinguished themselves to the point of earning citations for heroism. One of them got to be a corporal later, demonstrating that there is some justice in the U. S. army. Incidentally, the battery was again cited for conduct under fire, although the citation wasn't anything we could eat.

Late in the afternoon New York had the German batteries on toast, and it was safe to emerge from the ravine and be on our way. Except for our wounded, everybody was present or accounted for—everybody, that is, but Mr. Papolis, the Fascinating Greek. Since there were no women to chase and no sides of beef he could swap for souvenirs, he began poking around the piles of dead, feeling very sorry and forgiving. After all, Greeks are not like other boys.

Suddenly a terrific yodeling broke out from behind the barn. We traced it to an old stone well, and finally found our little Greek, standing in five feet of slightly used water, casting a few Greek runes for luck. Since his incantations were audible for miles, they may be said to have availed. We fished him out, hitched the surviving horses to the *matériel*, and retired a kilometer or two for the night. So many horses had been killed that the move had to be made in three trips.

All of us felt quite lucky to be alive, which contributed undue vivacity to the march—a vivacity the officers felt disposed to reprove. Things started when Pappy Le Prohon, husky from gas, ordered Jack Weiner to get off the supply wagon, by Gar, and walk. Jack rashly declined to do so, which was a little like eating ground glass on a bet.

Pappy promptly stopped the column and announced hoarsely

## WAR BUGS

that, also by Gar, he would kill Weiner with a gun, as provided by military regulations. Weiner replied that Pappy would do well to button his nose and not mention Gar any more. It was all unprecedented and very beautiful.

Hysteria, engendered by a week's desperate going without food or sleep, caused us to applaud Pappy and Weiner impartially until Pappy hauled Jack down by the leg and threw him fifty feet. Rolling his bad eye over his admirers, he regretted that he had no bullets to spare on so-and-so so-and-sos. A certain emphasis implied that the entire battery should feel grateful because of this shortage.

Bill Youngman's lead horse took it in his head to quit the damn war cold, and Lieutenant Skinner properly ordered Bill to beat his rump with a steel helmet. But Bill had the character of St. Francis of Assisi and refused. When Lieutenant Skinner insisted, Bill offered to tear Lieutenant Skinner's head off and eat it with salt and pepper—an amazing proposition for Bill, whose heart was a garden of roses as a rule.

But when we saw the position picked by the mental marvels who commanded us, it was like a revolution at the zoo. The defilade ran the wrong way, for one thing; it was of solid rock



*We traced the yodeling to  
an old stone well, and  
finally found our little  
Greek.*

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for another. We were ordered to dig twenty-six degrees, anyhow.

When we pointed out the physical impossibility of the job, the officers lost their tempers. So did we (on account of being tired). Kline Gray finally ran one of the substitute lieutenants out of the proposed gun pits with a few words that left red welts all over his beautiful white body. He retaliated by putting us all under arrest, which was rather silly under the circumstances. We dug elsewhere until dawn.

The doughboys inched up during the night and were in front of Bulson, four kilometers ahead. We shoved off to join them, when it became apparent that our horses were all in, down and out. Most of them were beyond standing on their legs. The rest had learned with typical horse sense that if they refused to pull, the men would pull for them. That was known as Horse's Law. No amount of beating or entreaty could change their minds on this point. They knew their oats.

In the end we cut them from the traces and pulled the guns and carriages entirely by hand all the way up to the waiting doughboys. Most of the men were more bushed than the horses, and it was a long, tough grind. To make it we shed everything we had ever owned, down to our girl's photographs and extra razor blades.

Prolongs were attached to the hubs and we started out. Before Bulson was a hill one mile long. Direction up. By midnight we had accomplished it after eighteen hours of bellyaching and blistering hard work. The total distance thus achieved was about two miles.

Some comfort was derived from the fact that it was getting late in the year and night came quickly—ideal conditions for razzing the officers. They defended their dignity by pretending not to know who made all the remarks that bounced about the hill from sunset to Bulson; highly imaginative remarks, most of them, reflecting great credit on the battery.

Battery D preceded us in Bulson a little after midnight (they had overtaken us with their horses), and suffered heavily for their zeal. Direct hits were made on two caissons as they galloped over the crossroads in the middle of the town. They burst into flames with tragic magnificence. Plunging horses. Dead drivers. A hundred shells popping under the caisson



## WAR BUGS

doors. We took it easier, shoving over the crossroads immediately after each burst without particular damage, although the little Greek addressed his mighty mind to the problem of timing the shells, with the result that he ran his kitchen smack into a barrage. The kitchen was retrieved after it had been punctured with several big holes that should have been in the Greek.



*The contrast was so alarming that some of the veterans thought they were going to die.*

At dawn we were on the crest overlooking Sedan, and dug in. The doughboys were already in town.

The French were sweating up from the other side, burning to take the city and thus get the taste of 1870 out of their mouths. Reilly, quite a hand for a *beau geste*, had been content with a guard of honor. So it was all over. We trained our guns on the Meuse and had a chew of tobacco. It was a good war. God was in His Heaven, and Pippa yourself and see how you like it.

Sedan lay under the crest 100 yards ahead, but nobody felt like taking a look. We were too busy shooting craps to study any ancient historical spots, especially since it didn't look as if we were going to fire. There wasn't much money in the outfit, and I. O. U.s were abundant. Great Greek screams arose when Quisno lost 800,000 francs to Mr. Papolis, who had wanted to

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quit gambling when he was 500 francs ahead, and now realized that Quisno's debt was outlawed by its enormity. Nothing was collectible over 500 francs (\$100 in those days) and the wise guys quit at that point.

So dawned the 10th of November. Accustomed to army tactics, we wondered if we would be invited to cross the Meuse or spend the winter where we were. Up and down the river the doughboys were crossing with shocking losses, and there was no good reason why we shouldn't die too—except that the war was over. Suddenly the rumor spread that we would be relieved within an hour. That was carrying the joke too far, and the first man to spread the report took a sock on the nose. But it was repeated by Lieutenant Radford, and presently by Captain Stone himself.

In ten months' fighting we had never actually been relieved. In fact, it was our favorite joke that the Rainbow relieved the Forty-second and that the Forty-second relieved the Rainbow—together with several other jokes we will skip. So that when we packed and pulled out of the line we were in a daze.



*Many speculations on Bordeaux women, wine, women, omelettes, women and women ensued.*

## WAR BUGS

We borrowed some horses and pulled out of that sector like the Twentieth Century going through Poughkeepsie. Outside of Bulson we ditched our ammunition and rattled on.

M. P.s lined the road. They smiled for a change and told us we were going to Bordeaux, where the wine comes from. There were stock answers to this remark and we passed them around.

Before long we were yelling across the horses' heads as follows: Suppose General Pershing *had* gone off his nut? (It looked reasonable, what with his pulling us out of the front and all.) Suppose he really *was* sending us to Bordeaux? A great many speculations on Bordeaux women, wine, women, omelets, women, and women ensued. We even took to singing a bit. Shells still shrilled past our ears, and the mood of the runaway was best expressed by Oh, Bury Me Not at Reherrey, which went on at the gallop until we reached Mon Idée Farm and bivouacked for the night.

Some newspaper correspondents were waiting in the barnyard, notably Freddy Smith of the Chicago *Tribune*, who told us with a perfectly dead pan that an armistice had been signed. None of us thought that Mr. Smith was especially funny. That school of humor approves of explosive cigars. We were polite, however. Mr. Smith insisted. The German delegates, he said, had already crossed the line and were matching nickels with Foch. Rather coldly we told him that we got him the first time, and rolled in for a little rest.

For the first time in more than a week, nobody bothered us for nearly eight hours. In the morning we crawled out, dopey with sleep, and began thawing out our shoes. They had frozen solid during the night. A bonfire finally did the trick.

Behind us boomed the guns, giving Mr. Smith the bird (as the English have it) and denoting hard times for the winter. We limped along on our bum dogs and finally made Harricourt, our starting point in the dash for Sedan. Vic Stangel was waiting there. He had been about on his motorcycle and corroborated the armistice yarn. Mr. Stangel was a legitimate butt. We gave him the works.

The baggage detail that had kept the home fires burning in Harricourt while we were boxing with the Germans gave us

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quite a shock. They were so pink and fat, whereas we were bones. (Jack Walsh was so skinny that we spoke of using him for dice. He rattled when he walked.) The contrast was so alarming that some of the veterans thought they were going to die, though they had been feeling like wildcats at the front.

These gloomy thoughts disappeared with a little more sleep. Our old billets, broken and overrun with rats and lice, looked like the Tuileries. We boarded up new shell holes against the cold, tore up sections of the floor to burn, and otherwise prepared for a nice nap. The wagon guard had razors and in an hour we were real pretty—snoring pretty, too.

And the next morning was November 11, that big day that people talk so much about.

The top sergeant got foolish in the head and tried to kick us out at 6, which got him quite a collection of boots, bricks, and corn willie cans. At about 10 we rolled out—bankers' hours and why not? The barrage thundered on. At 11 o'clock it ceased, but nobody was much impressed about that. Barrages often stopped. Besides, we were too annoyed with the Greek to follow the war very closely. The bacon was raw and he had made no effort to remove the old grounds from the coffee can.

Besides which, the officers, alarmed at our remaining in bed, decided to check our free and easy ways with a slight dose of discipline. So it was announced that, all kidding over toward one side, the guns and carriages would be scrubbed and polished at once. There was no immediate need for this operation and the order provoked some back talk; especially when the dog robbers reported that the carriage business was only the beginning of a frank program to keep us out of mischief and deflate us a bit.

Since we had a remarkable *esprit de corps*, we felt that discipline would return as a matter of course and that the officers needn't think up dirty tricks simply to hurry things along. It was too much like making us say Uncle. So we were in none too Christian a mood when the captain brought us to attention toward noon, and remarked, with a look that dared anybody to make a wise crack:

"I am very glad to announce that an armistice has been signed."

You could have knocked us over with a feather. Nobody

## WAR BUGS

made a sound. The captain seemed slightly annoyed. He repeated his news item.

"Three lousy cheers!" remarked Mr. Gullickson from the rear rank. It was a consensus of opinion. It was also the captain's cue.

"*BUT!*" he added—"BUT— there will be *NO SLUMP* in *DISCIPLINE* on *THAT* account! From now on there will be *IRON DISCIPLINE!* And I mean *IRON DISCIPLINE!*"

And iron discipline it was, to be sure. Right off—so that there would be no more funny business—a big inspection was ordered. That was rather nutty, since we had nothing to inspect. All our belongings had been thrown away by the captain's orders when the horses died. But since an inspection is the most annoying thing that can happen in any army, we saw that it had been ordered for that very reason—and prepared for it in a suitable mood.

To help matters, it began to rain; and the inspection was in the mud flats back of the village.

While we waited for the captain to arrive, the dog robbers appeared with news of what had gone on at officers' mess. (Dog robbers start most of the insubordination of an army. They feel less like menials when snitching on officers.) They brought disturbing news:

(1) The officers had been eating steak again.

(2) One had complained bitterly concerning the Armistice. His point seemed to be that he was making more money in the army than he had been able to command in civilian life and he felt that stopping the war would set him back considerably. It occurred to us that this view might be universal among officers.

(3) The inspection was a setup, a test case. In other words, the officers were inviting insubordination in order to stamp it out. Which is all right, except that officers should keep their yaps shut in front of dog robbers.

That night bonfires blazed from Switzerland to the sea. Until then the light of a cigarette had been the signal for a bushel of bombs. We tore the burlap sacks from the billet windows and let out a yell. For the first time we realized that the war was over. The war was really over!

## **BTRY E, 8TH F. A. CROSSES KOLEKOLE PASS**

**O**N Thursday, July 3, the historic Kolekole pass through the Waianae mountains of Hawaii resounded to the roar of tractors and the rattle of guns and caissons. For the first time in history a battery of Field Artillery made a trip from Schofield Barracks over the pass to Waianae. Battery E, 8th Field Artillery, commanded by Captain A. C. Donovan, was given the honor of being the first organization to make this crossing because it had done most of the work on road construction.

With Major General Edwin B. Winans, commanding the Hawaiian division on the first tractor, followed by Brigadier General Alston Hamilton commanding the 11th Field Artillery Brigade and Colonel T. E. Merrill, division Chief of Staff, a train of more than fifteen tractors made the hazardous trip of three miles down the face of the precipitous cliffs of the Waianae mountains.

The road follows the trail which has been through the pass from time immemorial. In 1926 one tractor made the trip across, but since then the trail has been deemed too dangerous for extensive travel. Although two motor cars accompanied the battery, the grades are much too steep and the corners much too sharp as yet for automobile travel. The two cars had to be manhandled around corners and held back to prevent them from slipping off the road in certain places. At many points the road is barely wide enough for motor vehicles and of course it is at just such places where the cliffs drop away almost vertically for several hundred feet.

At the top of the Kolekole pass is the famous sacrificial rock. From this point one obtains a view almost as splendid as from Nuuanu Pali. The journey was made without mishap, a tribute to the skill of the tractor drivers who often maneuvered their vehicles with only a foot to spare between safety and destruction.

# ARMORY TRAINING OF THE NATIONAL GUARD FROM ANOTHER O. P.

By HUGH BOONE, CAPTAIN, FIELD ARTILLERY

WHEN you stop to think about it, the real success or failure of National Guard armory training depends upon attendance, and attendance is directly proportional to the ability of the board of directors to sustain interest in their proposition. The purpose of the following remarks is to indicate from another viewpoint how to keep the plant running at capacity and keep the same folks on the pay roll as long as possible.

Attendance is not a problem of the Regular Army commander. Recruits are supplied to him by other agencies. Nor is his success entirely dependent upon his ability to maintain continued interest in his instruction periods. The regular soldier enlists to lead the life of a soldier. He gets it. Technical instruction is a part of his existence. For him training is his work, in no sense play, however agreeable the work may be.

Having no troops, recruiting and sustaining interest in drill are certainly no problems for commanders of the Organized Reserves.

The situation is entirely different in the National Guard. Both recruiting and attendance are fundamental problems of the commander. He must enlist his men, he is responsible for their training, and he must do it in such a way as to keep them coming to drill. His success is largely gauged, from the Militia Bureau down through the chain of command, on the attendance he produces. Even his pay is contingent upon his ability to maintain certain standards of attendance. The attendance problem naturally interests him most.

It is a remarkable phase of our American civilization that so many men subject themselves at all to armory training. Enrollment is most certainly voluntary. It involves the sacrifice of considerable leisure at a small remuneration. It subjects its devotees to the liability of immediate call to arduous and often extremely dangerous duties. One might very properly ask what is the motivating impulse that keeps a steady flow enlisting in the Guard.

There seems to be, perhaps divinely implanted, in every able

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bodied, healthy minded male, to some degree, a love of the profession of arms. Also a sub-conscious acquiescence to what sociologists call man's first duty to his state. Note the eagerness with which young fellows don the uniform, and glory in the lore of the Boy Scouts. Observe old fellows paying out their good money to wear the plumes and carry the swords of our uniformed militant lodges.

Frequently this impulse, when it leans toward armory training is met by considerable local opposition. There is the pacifist, and the one who says that our armories engender militarism. On the whole the influence of these objectionists is minor and does not mitigate very largely against enlistments or attendance. A very great opposition is the rather general belief, at least in some communities, that there is something about armories and what they do there, that is demoralizing.

Now the keystone of successful armory training has been laid only when there has been created an atmosphere about the armory which fairly radiates disciplinary, educational and cultural benefits to the individual and to the community at large. This condition requires not only absolute intolerance of any persons or practices that might seem to have a bad influence, but also, the building up of a positive tone of strict observance of decencies and niceties.

Very few people realize how important armory training is and what reliance is placed on it in our defense system.

Our National Guard has three big missions; two national, one state. The first national mission occurs in a situation requiring a major mobilization. It then assists in the orderly raising of six field armies and the operation of the selective service act. It will supply a very important cadre of officers and noncommissioned officers for the leadership of the six field armies. It will furnish a ready line for the defense of critical areas, should that be necessary, until our full striking force can be developed.

The second national mission occurs in a situation involving a national internal crisis where a powerful trained force is immediately required on the break down of law and order or in a great national disaster.

The state mission involves reinforcing the usual law enforcing



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agencies or assisting in public disasters which are not national in scope.

During armory training preparation to fulfill these missions is largely made.

It must be apparent that, despite the important missions given to the National Guard and the reliance for national defense placed upon it, not a great deal of technical accomplishment can be expected in the time allotted to its training. Such is the case. Recruiting is the primary consideration; then the perfection of the organization and its equipment; and finally technical and tactical training.

This, then, is the dilemma from which the Guard Commander must extricate himself:—a tremendously important mission requiring considerable technical instruction, for which preparation must largely be made during the armory period, only a portion of which can be devoted to purely technical instruction. The instruction must be presented in such a way that interest and enthusiasm are maintained at all times, or else the Guard Commander loses recruiting, attendance, and organization, and he must begin all over again.

What are some of the things ingenuous commanders are doing to build up their organizations and put over a maximum of palatable instruction in a minimum of time without losing interest?

The craftiest of these hitch their wagon to a star and go after the most likely personnel in the community. It is essential to the mission of furnishing a reservoir of officer material for major mobilization that the highest type of personnel be secured. Furthermore securing recruits with substantial background facilitates control, the rapid progress of instruction, and the standing of the organization in the community.

Then there are what might be called the material rewards which induce attendance, such as:

Drill pay.

Opportunity for qualification as gunners and in small arms firing.

Opportunity to learn motor mechanism or qualify in equitation.

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Promotion in the organization.

Opportunity to win a commission in the Officers Reserve Corps.

A surprisingly large number of men take a ready interest in small arm firing. The interest may be increased by competitions arranged with other small arms groups, police teams, bank personnel teams, gun clubs, and similar organizations. In the larger cities competitions with other National Guard units may be arranged.

As to gunner qualifications, much interest may be aroused by stressing them. There is no way in which so much valuable basic Field Artillery knowledge may be put over in so attractive a manner as through this medium. Every man, immediately on completion of his recruit instruction may be interested, instructed, and qualified in the second class gunner requirements. Some deference, special consideration, or other reward should follow the first class and expert qualifications. Several successful organizations require a first class qualification as eligibility for promotion to the rank of Corporal, expert qualification before promotion to Sergeant. All officers should be required to lead the way by qualifying in all three classifications.

As a reward for qualification in small arms and gunners examinations, the authorized badges are most appreciated when publicly awarded. In the case of the gunner qualifications a certificate bearing the regimental seal and signature of the commander, made in an attractive form for framing or otherwise preserving, usually spurs effort to acquire one.

In the same way if it is desired to reach a certain standard in equitation or other particular activity, a course may be prescribed, qualification in which entitles one to acknowledgement of excellence and to some form of certificate.

In the motorized regiments a very real motor mechanical school may be provided which, if established in earnest, will interest a large number of potential recruits. The government provides a substantial monthly salary for motor mechanics whose daily duties are usually light. This money might well go to mechanics qualified to instruct in battery motor schools who are willing to undertake this task in addition to their other light duties.

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Nothing need be said about promotion in the organization as a reward for attendance, but a great deal might be said about providing an opportunity for every one in the organization to win a certificate of qualification for a commission in the O. R. C.

The principal feeders for the O. R. C. at present are the R. O. T. C. units and the C. M. T. C. camps. Why not the ranks of the National Guard? It would seem that given the same educational background, a person should be able to qualify himself for the duties of a Lieutenant just as thoroughly by four years' attentive service in a well conducted and instructed National Guard organization, including the camp periods, as he can in an R. O. T. C. unit or via the C. M. T. C. camps. Why then do not the National Guard and the O. R. C. get together on the proper exploitation of this prolific field for furnishing much needed additional officer material; the O. R. C. from the standpoint of filling their ranks and swelling the enrollment of their chapters, the National Guard of offering desirable material something very tangible as a reward for enlistment, continued attendance, and improvement of opportunities for instruction.

One plan would be to offer to those who are otherwise qualified a course of instruction beginning immediately after recruit drill is completed, ending four years after enlistment with a certificate of capacity for commission as 2nd Lieutenant in the arm in the O. R. C. Let the medium be the regular progressive instruction of the organization, including camps, supplemented by the basic army extension course of the arm as a requirement, and any additional work required by the State. Let the issuance of the certificate of capacity and right to affiliate with O. R. C. chapters follow, and the commission when the vacancy occurs. All of the army extension work must be done outside of the armory drill periods and it requires the enthusiastic cooperation of the instructor and the local commander. But what better proposition has a commander to offer a good man interested in the military service, and what single thing will keep him in the organization for so long a time as the surety of winning a commission as a result of persistent interest and attendance?

This plan for enlisting and holding desirable young men presupposes a high standard for recruits and the cooperation of the O. R. C. Any minor objections can be readily overcome. The

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way for it is already paved by the regulations though, to my knowledge, it has never been seriously advocated nor attempted. If pushed, it would be greatly beneficial to both components and would increase the bond between them. A great many of our college towns have National Guard organizations but no R. O. T. C. units. An opportunity should be given to these desirable reservoirs of potential officer material to qualify the same as where there are R. O. T. C. units.

The next group of armory period activities that hold interest in the organization are those which appeal to the sporting and social propensities. In general these are football, baseball (both indoor and outdoor teams and membership in twilight leagues), basketball, riding in mounted organizations, dances and parties given by the membership. Most of these in some form are in vogue in practically all organizations and need no further advocacy other than to stress the positive direction of their use. Parties especially are a great morale booster if the programs be given over to the natural leaders in the ranks; if everybody be asked to contribute to the programs; and if the commander will provide an inexpensive feed at their conclusion. Many organizations in addition to providing social gatherings for their own edification engage in charitable work such as Christmas parties for orphaned children which endear them to the community at large as well as to their own membership.

Then there are spiritual rewards which must not be overlooked if men are to be kept interested. Let us catalogue these as the appeal to:

Love of military service.

Man's natural vanity.

Consciousness of work well done.

The first of these more than likely brought your man in. His appetite for it must be fed with particular pains to issue him a good looking, snappy uniform, and *mirable dictu* he will like it best if you require him to keep it and wear it that way. Officers of course, must set a 100% example.

Pride in the organization is greatly stimulated by extreme punctiousness in all military formations, by the use of bugle calls, carrying of sabres by the officers, and frequent opportunities of all grades to exercise their proper commands.

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The second appeal to man's "innards" is closely allied to the first, but extends to giving him an opportunity frequently to show off at prize drills, public drills, competitions, and parades.

The appeal to the consciousness of work well done is an appeal to deep seated convictions and there can be no sham about it. A recruit may at first be awkward about performing new and strange military tasks, but he is not necessarily without sharp native ability and he is quick to sense whether he is being made to learn or not. To hold his interest requires very carefully planned and executed progressive programs and schedules.

Then next, having learned something, your soldier must be given plenty of opportunity to display his knowledge. This leads us to the efficacy of quarterly inspections in stimulating instruction, but more especially in holding interest. In order to develop their full morale value, these inspections should cover exactly just what has been gone over during the period and should be so thorough that every man will be given an opportunity to demonstrate exactly what progress he has made. Physically this will require the Battalion Commander and entire staff.

What better use of motors and gasoline allowances, if issued, can be made than transportation for this purpose? Frequently the States will provide railroad transportation for such inspections if they are properly sold on the idea, if they can be assured that correct use of funds appropriated is being made and the circumstances warrant the use of rail transportation. In many cases no expense is involved other than the time of the staff officers, and the regulations clearly provide credit for drill for such duty.

The last interest-holder which I intend to mention, is one often overlooked or slighted—publicity. In the smaller towns, all doings at the armory are news, but most organizations fail to have a well defined, persistent publicity campaign. On the other hand I know of several organizations which carry publicity to the point of taking coordinated movie reels of their summer camp programs and exhibiting them later at the armories to parents and friends and to the various luncheon clubs the following fall.

The tendency to a lack of interest in armory training may

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best be combated if we face squarely the normal cycle of events during the armory training period so that we may interpose our interest-holders where they are most needed. It may be we will find it necessary to devote almost an entire drill period here and there to this sort of thing, particularly should the most interesting phases of purely technical military instruction be scheduled for the naturally dull seasons, leaving the repetitive disciplinary drills to those periods when natural enthusiasm is highest.

Armory training may be divided into two phases: 1st—From Camp to Federal Inspection (late summer to early spring), which may be divided again into:-

- (a) Fall season.
- (b) Winter season.

The fall season is a dull period. Armory drill seems drudgery after the excitement of the Camp. Many stations have sultry, hot nights for a number of drills. Those who enlisted for the express purpose of going to Camp now drop out. Some leave town for educational institutions. It is a period of unrest and movement.

In the winter season there is a general settling down with the advent of cold weather. The approach of the annual inspection period stimulates interest all around. Recruiting gains momentum. Indoors becomes more attractive than outdoors.

2nd phase—From Federal Inspection to Camp, which may be divided into:

- (a) Spring season.
- (b) Pre-Camp period.

During the spring season interest again wanes. There is the reaction to the winter season activity, the let-down after annual inspection, and the lure of the outdoors again.

During the pre-Camp period, from two months to six weeks, prior to actual departure, military interest reaches the peak for the year.

If I have made a correct diagnosis of the cycle it is apparent that the time to drive home purely military instruction is during the winter and pre-Camp periods. It may be that the analysis of seasons does not fit every case, but I am certain that all cycles include periods of natural interest and disinterest and that all

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organizations will have certain recurring periods of the latter during which the success of their training will depend on their ability to recognize the arch enemy, "boredom," and defeat him. In conclusion we find that we have indicated that the National Guard has a much more important mission than we had previously supposed; that it has a surprisingly small amount of time to prepare itself; that it completely accomplishes its mission only by enlisting in the community a sympathy for itself and the best available young men in its ranks; that its success depends largely on the proper use of the armory training period, which in turn depends on the ability of commanders to maintain continual interest in their organizations.

To consider the National Guard simply as a one night a week addition of the Regular Army is to misjudge entirely its proper mission and procedure. The Regular Army by constant repetition and daily endeavor achieves discipline and acquires technical knowledge by long service. In the National Guard, rapid progress in technical knowledge should be possible because of the educational background possible. To stress discipline and learn by repetition is to lose interest. The latter comes on mobilization when interest is no longer the decisive factor.

I believe also that a logical conclusion to the foregoing is that the Regular Army Instructor in his capacity as friend, advisor and counsellor will be of most use to those to whom he is sent if he fits into all he does the prime idea of promoting *esprit*, interest and attendance; and if called upon to judge, he will do so from the broad standpoint of relationship of accomplishment to mission, and not be sidetracked by the minutiae of manner. In many cases after a reasonable occupancy, the Instructor himself should shoulder some of the odium of poor attendance and consequent unsatisfactory progress, should that condition obtain.

# ADJUSTMENT OF ARTILLERY FIRE AT NIGHT

BY 2D LIEUT. J. L. CHAMBERLAIN, JR., F. A.

THE nocturnal adjustment of artillery fire is a problem which will present itself with increased importance to the Field Artilleryman in any future major conflict. Rapid strides have been made during the eleven years following the World War in the development of aircraft. Long range aerial cameras are in process of development. Movement of troops during the hours of darkness to their battle positions will be of even greater importance than heretofore. Interdiction and harassing fires will, then, have to be brought down during the night, often with very little time to prepare the fire during daylight hours.

Although very little data is available on the subject of night firing, foreign military authorities have not been blind to its increasing importance. Furthermore, it has been recognized that the accepted procedure used for daytime firing will be of little or no value when adjusting fire at night, that new methods must be employed when the battery commander is handicapped by his inability to sense his bursts.

Prior to the development of high burst ranging, night adjustment was considered to be possible only against targets of considerable depth and frontage. "This fire has little chance of success except against targets of great extent," says the German Manual for 1907.\* With this type of target, the manual continues, "We form the fork with percussion fire and attack a convenient zone of the field of fire by salvo or by rafale, with time fuzed or percussion projectiles."

I believe that we are safe in saying that, under the normal procedure, the preliminary reconnaissance of position will be during the daytime. The actual occupation will, of course, be after nightfall. The attack will normally be launched at dawn. The reconnaissance officers will be enabled, therefore, to utilize the remaining hours of daylight to prepare firing charts or to locate on their maps, if such be available, the battery positions, observation posts, orienting lines, and so forth. Targets, including probable routes of approach of the enemy's forces, important

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\* Manual of Gunnery for the German F. A. (1907).



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bridges, and fords, may be obtained from the map or by terrestrial observation and transference to the firing charts. After establishment of the observation posts, instruments may be laid for both direction and site upon the base point and then referred to stakes or other point convenient for use after dark.

A second, and far less usual case will be the arrival at the positions by all elements of the artillery after nightfall, precluding the possibility of performing any very extensive topographical operations. Provided that a good and accurate map of the area is available, it will be possible under these circumstances to locate place marks, P.'s, etc., by means of a traverse from a known point or by intersection. Data may be computed for targets which have been spotted on the map, as for instance, important crossroads. Fire may then be opened at dawn with accurate data, and the adjustment made by daylight.

With the extreme care that will of necessity be attendant upon all movements of troops by night to their battle positions, rendering exceptional any showing of lights or fires, targets of opportunity will rarely show themselves. And yet what a tremendous moral effect would result from the effective placing of the fire of our artillery upon the approaching enemy columns and upon his establishments! Thus, then, is presented one of the most necessary and difficult of the artilleryman's problems. How may it be possible to bring fire to bear upon targets not located on our maps and transient by nature?

Captain Treguier discusses this matter in some detail in his small volume on the conduct of fire\*. "For this (type of) adjustment," he says, "two methods are principally employed: *a.* the method by lateral observation; *b.* the method by inversion of bursts." As to the first method, he goes on to say that either one or two observers may be employed; the procedure advocated is analogous to that employed by our own service, remembering, of course, that in his discussions, Captain Treguier assumes that a "luminous point" is visible at the target—a bivouac fire, for example.

The "inversion of bursts" method presents a system of adjustment which appears to be rather more ingenious than practical under modern war conditions. Briefly, the theory is as

\* Cours Elementaire de Tir deCampagne, Capitaine Treguier.

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follows: A "luminous point" is picked up within the enemy's lines. Instantly all guns of a battery are directed so as to be converged upon that point. Fire is opened, let us say, with a salvo right. Should the range be exactly correct, the four bursts should presumably be converged at the target. If the range has been underestimated, the bursts will appear to the observer in the vicinity of the battery in the proper order from right to left: one, two, three, four. On the other hand, if the range is over, the bursts will then appear in the reverse order, number one appearing to the left of number two, number two left of number three, and so on. Thus the crossing of the sheaf is utilized to indicate the nature of the sensing of the salvo as a whole. Going one step further, the method outlined suggests the use of shrapnel, the fuze for each gun varying by one point in corrector setting from that of the next. We are told that it will then be possible to determine the sense of a volley by the shape of the curve formed by the simultaneous detonation of the four projectiles.

It would appear, that, while some sort of adjustment might possibly be obtained by this method, say an eight fork bracket, the dispersion both in range and deflection would preclude any accurate results. So long as the sheaf were well short or well over the target, the burst pattern would furnish a fairly accurate indication of the sense of the volley. However, as we approached the target, extremely irregular patterns would result due to the dispersion, and anything in the nature of accuracy would appear to be quite impossible. In addition, illuminated points within the enemy's lines will be so rare that any method necessitating their use may be discarded.

The state of efficiency to which the development of aircraft has arrived and the increasing efficiency towards which it is pointing, afford the artilleryman with a means of great possibilities for night adjustment. However, aircraft adjustment must always remain at best a method of opportunity. Under the subject of night adjustment by planes, the Field Artillery School Notes include among the prerequisites for successful operation the factors of "clear nights," and "a thorough familiarity with the terrain on the part of both pilot and observer." The question of clear nights will become a serious problem in many

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localities during certain seasons, for example, in the tropics during the periods of rain. Familiarity with the terrain also will present a problem whose conditions will be difficult of fulfillment in any moving situation. Among the disadvantages enumerated by this same Note; we find the following: "Communication is limited to radio and pyrotechnics." Pyrotechnics can not be well considered a thoroughly satisfactory means of communication. In their use, one is limited to a very restricted list of messages and any unusual communications are therefor impossible. In its present stage of development, the radio, either using code or voice, can hardly be considered a sure means of communication. Even assuming that this system of communication were perfected to such a degree as to eliminate the natural interference of static and other phenomenon, there will still remain the personal equation of the operators, who, trained in large numbers as aerial observers during a major war, would not be experts in radio telegraphy. A considerable body of these observers will, I believe, have to be trained during the earlier stages of the next war, and one of the periods during which their employment will be most essential will be during the early months of the operations, before the situation has become stabilized, and resort can be had increasingly to map firing.

It is obvious that successful fire can be brought to bear on the enemy's works, where his exact map location is not known, by terrestrial observation if, and only if, we can illuminate the target. A careful enemy is certainly not going to do this for us. Let us consider for a moment the various means by which such illumination could be accomplished. Means at the disposal of our artillery would include: (a) searchlights, (b) parachute flares, and (c) illuminating projectiles. The searchlights can be thrown out of consideration at once. A searchlight, even were it possible to devise one to operate at long and medium ranges, would reveal itself at once to the enemy and would be but short-lived. Parachute flares, however, deserve, I believe, more consideration. The specifications for an airplane flare now in use by the United States Army are here quoted as given to me by the Ordnance Office, Fort Sill.

"The parachute opens and, when dropped from a height of 4,000 feet floats at an altitude of about 2,500 feet, burning with

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an intensity (of) not less than 350,000 candle power; and this light should burn without a diminishing candle power for at least seven minutes. This is required in specifications for manufacture."

Why, then, should the parachute flare not be utilized as an aid to the Battery Commander for *terrestrial observation*? Thus would be eliminated all difficulties of air-ground communication. Seven minutes should allow plenty of time for the officer conducting the fire to obtain a reasonably small bracket upon his target, the data being initially merely roughly determined and subsequently corrected by actual observation. Of course, the question still remains as to whether an illumination of 350,000 candle power would be sufficient to conduct such a shoot. However this question is an arbitrary one, and has no vital bearing upon the matter, for it is reasonable to assume that flares capable of considerably more illuminating power might readily be developed. Such a system of night adjustment would be of incalculable value to the infantry, inasmuch as fire could be brought down within a very short time upon enemy machine gun nests and other installations by Artillery-Air Corps team through the medium of the liaison officer with the infantry. Furthermore, it is believed that fire could be conducted by the liaison officer in the front line with the aid of even the flares now in use, the initial data being computed only sufficiently accurately to insure the first bursts being somewhere in the general vicinity of the object upon which it is desired to fire. Provided that the adjustment were not completed in the light of the first flare, appropriate signals could be arranged with the aircraft to insure the dropping of another flare, although it is believed that in the general case one flare should be sufficient for the adjustment.

As to the third possibility for night illumination, it would appear that at present there would be small chance of success with illuminating shells. The matter has been presented to me in some detail in a letter from the Office of the Chief of Ordnance which allow me to quote in part. "Some experiments have been made from time to time with illuminating or star shell for Field Artillery use, but such projectiles have never proved to be sufficiently promising in the preliminary tests to

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justify continuation of the work." The letter then goes on to explain that some use has been made of illuminating shell in firing upon naval targets, the shell being fired so as to burst at a range of some thousand yards beyond the target, "silhouetting" the target against a "bright area of reflected light." This use was said to be effective against marine targets, but doubt was expressed as to its value for terrestrial objectives. This difficulty is quite apparent. Land targets do not stand out as do ships at sea. Yet it is not inconceivable that shell of sufficient illuminating power would be developed permitting fire upon targets whose location with reference to certain terrain features is known.

Of the above three methods, then, it would appear that the second is perhaps the most feasible in the present stage of development of illuminants. The question of absolutely distinct illumination does not seriously affect the practicability or impracticability of the method. Targets as reported to the artillery by the infantry will be generally, and particularly at night, somewhat vague as to location—"machine guns in the vicinity of that hill,"; "a 37 mm. gun firing from the neighborhood of those trees." Thus a deep zone will generally have to be swept with fire, and adjustment can be made upon the terrain feature used to designate the position of the target. With the liaison officer at a considerable nearer range than the observation post of the battery, no especially high degree of illumination would be required.

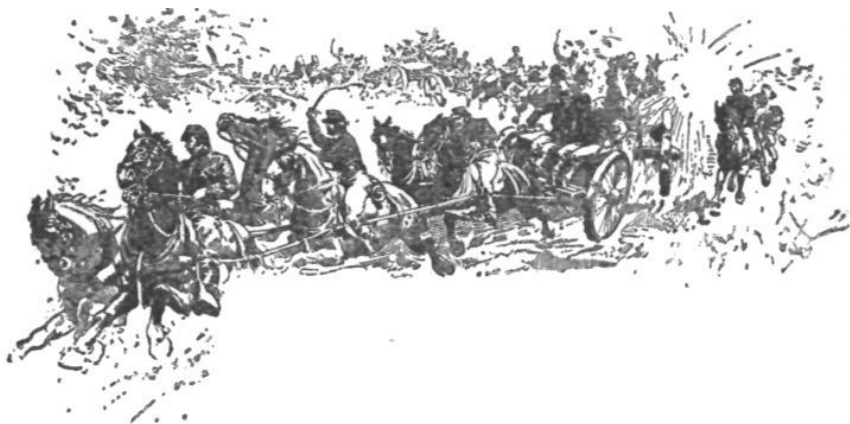
To return to the subject of firing with an accurate map or well prepared firing chart, it is believed that an extremely accurate and highly successful method has been provided in the development of high burst ranging. Although the writer has not had opportunity to witness any large number of high burst problems, those problems which have been fired during the current year in connection with the Battery Officers' Class at the Field Artillery School have demonstrated that with accurate data and correct applications of the methods, remarkably precise results may be obtained, a bracketing or mixed salvo being generally the result of a correct transfer to the target. Good maps will, it is thought, normally be available after the early stages of any war, and the Air Corps will give considerable assistance in making

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photographic maps of those areas of which there are only poor maps or none at all.

There can be no doubt that invaluable assistance can be given to the artillery in its problem of night firing by the sound and flash ranging units. This assistance will be of chief interest to the howitzers whose mission will be normally counter-battery. Demonstrations by the sound ranging organization have forcibly shown what excellent results may be expected, and close cooperation may be expected between these units and the firing batteries as soon as the situation has become sufficiently stabilized to warrant the establishment of the sound ranging equipment.

The problem of night firing remains one of the most difficult that we must encounter. It is a subject which cannot be neglected by Field Artillerymen and one which offers considerable field for research and investigation. Every improvement in airplanes, air cameras, illuminants, and other subsidiaries of war will materially affect either the necessity for or the methods of night adjustment. We must be prepared to bring down accurate fire at night as well as in the day. Thus only may the Infantry be assured of the continuous support for which they depend upon the Artillery.



## **FIELD ARTILLERY NOTES**

### **New 155 mm. Gun.—8" How. Carriage**

A new design 155 mm. gun—8-inch howitzer carriage, has been submitted by the Ordnance Department and approved for the manufacture of a pilot. This design is to move as a single load, is of the pedestal type, will be capable of being towed at high speeds, and should very materially lessen the time of going in and out of position. Ballistically, the weapon is a great improvement over the 155 mm. gun, M-1918, and will be some 5,000 pounds lighter. The weight distribution is such that it is not an overload for the standard light pontoon bridge.

### **Bogies**

Our light and medium matériel, which would be the primary armament on mobilization, can not be towed with impunity at speeds greater than those possible with tractors. For strategic movements, wheels must have anti-friction bearings and loads must be sprung. To meet this requirement, a project has been started to provide a bogie axle on which the gun or howitzer carriage can be transported. This project was started initially for the 75 mm. gun. One such bogie has been built and is being tested by the Ordnance Department prior to issue to the arm for test. The project will be extended to provide such a bogie for the 155 mm. howitzer, M-1917-18.

### **5-Ton F. W. D. Trucks for 5th F. A.**

With the appropriations for the fiscal year 1930, there have been purchased twenty-four modern 5-ton F. W. D. trucks for the partial replacement of the obsolete Militor truck equipment of the 5th Field Artillery. These trucks were purchased on specifications based upon performance tests for several different commercial products by the Field Artillery Board and the Quartermaster Corps. It is expected that delivery will be accomplished during the late summer.

### **Caterpillar 20 For 1st and 6th F. A.**

Sufficient Caterpillar 20 tractors have been procured by the

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Ordnance Department to complete the equipment with these modern tractors of the two motorized divisional Field Artillery units in continental United States, viz., the 1st Battalion, 1st Field Artillery, and the 1st Battalion, 6th Field Artillery.

### **Test of Six-Wheel Truck**

On the recommendation of the Chief of Field Artillery, the Ordnance Department has procured for test, as a prime mover for Artillery of division calibers, a modern commercial six-wheel four-wheel-drive truck of a rated capacity of four tons. A light flexible track, bridging the driving wheels gives performance off roads quite comparable to what may be expected of full track-laying equipment. On roads, the unit has all speed, power and flexibility of the modern truck. The unit already purchased will, later in the year, be sent to the Field Artillery Board for test and operation in connection with the T-3 75 mm. gun carriage. It is proposed to extend this prime mover development to types capable of handling medium and heavy artillery matériel.

### **Gasoline Burning Rolling Kitchen**

Development of a new design of rolling kitchen, more suitable for Field Artillery in size and capacity, has been suspended pending development of a more suitable type for the Infantry, and experimentation with gasoline burning types.

### **75 mm. MK-1 Shrapnel**

The standard 75 mm. MK-1 shrapnel, rebanded, has been adopted as standard for the 75 mm. pack howitzer. Development of other ammunition has been delayed awaiting the completion of the development of the super-quick short-delay fuze.

### **F. A. Training Regulations**

The rewriting of one of the most important of all the Field Artillery Training Regulations, 430-85, Gunnery for Field Artillery, was finally completed, exhaustively reviewed and sent to the printer. Other important Field Artillery Training Regulations in process of revision have been brought to a point



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where they are about ready for incorporation in the Field Artillery Field Manual. Volume I of the Manual, *Organization and Drill*, has been completed and is in process of review prior to approval for printing.

### **Artillery-Aircraft Work at Sill**

The general field exercises at the close of the school year at the Field Artillery School were utilized to stress the employment of surveillance airplanes in connection with artillery concentrations and other fires when delivered without ground observation. The excellence of the cooperation of the Air Corps in the work at the Field Artillery School was again noted; this cooperation is largely responsible for the encouraging results obtained.

Continued progress has been made at the Field Artillery School in the use of air photographs for the preparation and transfer of fire. The strip mosaic, which can be produced in about six hours, has been found an excellent substitute for a map. With a grid placed on it, this mosaic provides a firing chart of sufficient accuracy for most practical purposes.

### **Radio for Liaison Details**

Continued progress has been made at the Field Artillery School in the successful practical operation of liaison details, employing radio communication.

### **Tables of Organization**

New combined peace and war tables of organization for the 75 mm. gun regiment, horse-drawn, have been approved. In these tables, the grades and ratings for signal and radio personnel are somewhat increased, in order to better communications, and considerable attention has been paid to improving liaison with supported Infantry. These same features will be included, as far as practicable, in other tables of organization as they are revised.

Tentative tables of organization for the battalion of 75 mm. pack artillery were prepared for use by the 1st Battalion, 2d Field Artillery, of the Panama Canal Division. Early in 1931,

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based on experience with these tables, a revision of all existing pack artillery tables will be made.

Study on new tables of organization for the 75 mm. gun regiment, motorized, has progressed. It is contemplated that these tables will be submitted for approval in September, 1930.

Six additional observation battalions have been included in the General Headquarters Reserve Artillery in order to provide the necessary sound and flash ranging for the heavy Field Artillery brigade therein.

### **New Anti-Aircraft Sight for Machine Guns Developed**

The Chief of Infantry announces that, after two years of experiment and development, tentative regulations governing Infantry anti-aircraft machine-gun training methods have been issued to twelve Infantry regiments for exhaustive tests and recommendations as to their efficiency.

During the two years' study on the subject, it has been necessary to develop an anti-aircraft sight and also an adapter for the machine gun that would enable a gunner quickly to lay his gun on a low-flying aerial target, and then permit his following the target in its flight.

This anti-aircraft sight was developed at the Infantry School, Fort Benning, Georgia, by two Infantry officers—Major Leonard R. Boyd and 1st Lieut. Joseph I. Greene, and is known as the Boyd-Greene sight. It is simply constructed and is apparently rugged enough to withstand service in the field. These sights also have been issued to the twelve regiments to be tested with the tentative regulations.

The results of the test will be followed with great interest by the entire Army.

### **Trophy for C. M. T. C. Battery**

Capt. William J. Walker, Specialist Reserve, of Albany, N. Y., has presented a silver cup to the Commanding Officer of the Field Artillery C. M. T. C. at Madison Barracks, N. Y., Brig.-Gen. William P. Jackson, U. S. A., to be awarded each year to the C. M. T. C. battery showing the greatest proficiency in all military, athletic and sanitary accomplishments.

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The cup is offered in memory of Captain Walker's life-long friend and school classmate, the late Capt. Herbert Edward Rankin, Field Artillery, a graduate of the Albany Academy, Philips Andover Academy and Princeton University. Captain Rankin took his Field Artillery training at the first Officers' Training Camp in the spring of 1917 at Madison Barracks, N. Y., and while in command of a battery of the National Army en route to France in the spring of 1918, died and was buried at sea.

Captain Walker has been attached to the staffs of over twenty-five C. M. T. C. camps during the past six years and has taught over 30,000 young men the elements of citizenship.

### **Major Boles' Team Wins International Rifle Match**

World supremacy in the fine art of rifle shooting, after an absence of six years, came back to the United States on August 23, 1930, in tangible form with the return of the American shooting team aboard the S. S. America, bearing the Argentine Challenge Cup. The victory which brought the title to the United States again was achieved at the 28th annual International Free Rifle Match, held this year at Antwerp, Belgium.

Headed by Major John K. Boles, Field Artillery, U. S. A., team captain, who for several years was a member of the old 7th Regiment of New York, the returning marksmen were greeted upon arrival by officials representing Maj.-Gen. Hanson E. Ely, commanding the Second Corps Area, and the National Rifle Association, sponsors of the successful invasion.

The United States team scored a total of 5,441 points—a single point below the world's record established last year by the Swiss. Switzerland, which has held the championship since 1924, was 34 points behind the Americans, and Finland, with 5,341, was third.

A new world's record was set by the United States team in the prone phase of the match when they scored 1,910 points. Seitzinger of the American team won the individual championship in the kneeling category, while Renshaw, who led the American team in total scoring, finished second to Oksa of Finland, winner of the all-round individual championship with a total score

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of 1,111 points to the American's 1,100. The championship match was fired at the 300 metre distance, in the prone, kneeling and standing positions.

Describing conditions under which the matches were fired, Major Boles said the members of the team suffered from the intense cold. After the blistering heat of Quantico, Va., where they had completed their training, Antwerp seemed like the Antarctic. The weather was as cold as February in New York and the team members had to obtain additional warm clothing before they could go on the range.

Firing was done on two ranges. The small bore match, fired with the .22 calibre rifle, was staged on the fair grounds. The backstop was the massive wall of one of Antwerp's historic forts which fell before shots of German "Big Berthas" in the World War. The free style championships were fired at a Belgian army post, near Brasschaet, a suburb of Antwerp.

The members of the American team praised the Belgian officials for their willingness to do all possible for the comfort and aid of the competing marksmen. At the request of the Americans, mounds of earth from which the firing was to be done in the prone position were altered to suit the habitual slanting position of the United States team. In numerous other instances the officials exerted themselves to the utmost in behalf of the visiting teams.

This year's conquest by the American rifle squad is the fifth victory for the United States in twenty-eight years of International Free Rifle Match competition and the successful team is the tenth entered from this country during that time. Its achievement climaxes a determined effort to regain the title lost to Switzerland in 1924.

That remarkable little nation, where rifle practice is as much the national sport as baseball is ours, has won first honors in all but six of the 28 matches which have been held since the inception of the annual international competition. In 1898 the title went to France. The other five times it was won by the United States.

### **Found His Canteen, But Couldn't Claim His Skeleton**

Fort Sam Houston military circles were interested when it

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was recently reported that the sheriff of Coleman, Texas, had found the skeleton of a man near that place. One of the clues was an Army canteen with "Charley V. Herndon, Battery C, 15th F. A., 2nd Division" engraved on it. The canteen was lying near the skeleton as were a rotten leather purse containing a quarter and four nickles, also a Stratford watch and a headstall.

When the story was printed in the local papers Charley V. Herndon of 2046 Hayes Street, San Antonio, reported that he was alive and doing well as an automobile salesman.

Herndon states that it is undoubtedly his canteen and he has written to the sheriff at Coleman to return it to him. Herndon went overseas with the 15th Field Artillery, went up into Germany with them where he stayed until August, 1919.

When he got back to New York he got a month's furlough and turned in all his stuff. When he returned to the outfit at Fort Sam Houston all his other equipment was reissued to him but the canteen had disappeared.

It had probably been turned in as surplus and sold to some Army store. At any rate he is tickled to death to get it back.

In the meantime, the identity of the former owner of the skeleton is unknown.—*San Antonio Military Review*.

### **It Doesn't Take So Long To Make A Draft Horse**

In Czechoslovakia they have been keeping statistics and making experiments with mares. The variation in the gestation periods of mares of different breeding has been studied, from which it was found that the gestation period was shorter in draft mares than in mares of lighter breeding. It was also shown that individuals were rather constant in the length of the gestation period in successive parities. Daughters resembled their dams as regards the length of the gestation period. Other conditions were found to affect the duration of the gestation, as follows: The periods were shorter in colored mares, shorter when the sires were young stallions, and longer when the sex of the fetus was male. No correlation was observed between the age of the mare and length of the gestation period. Older mares were more likely to have horse foals than younger mares.

### **How Training Counts**

An unusually striking illustration of the value of training is afforded through a study of casualty records during the World War. The Central Powers mobilized 22,350,000 men and inflicted casualties numbering 22,090,000 upon the allied forces. The allies mobilized 42,189,444 men, yet inflicted only 13,405,000 casualties upon the armies of the central powers.

In other words, in the case of the highly trained troops of the central powers an average of nearly one casualty was inflicted upon the allies for every man mobilized, while it took nearly three men of the allies to inflict one casualty upon the enemy.

Allowance must be made for the long distances some of the allied troops had to be transported and the fact that a good many never got to the front, still their greater losses were chiefly due to the time consumed in training, which gave the enemy, with well trained and equipped troops from the beginning, a tremendous advantage until overwhelmed by sheer force of numbers.

As with an army, so with an individual. The trained man has a great advantage in every walk of life.—*Wayne (W. Va.) News*.

### **The Wichita National Forest and Game Preserve**

The Wichita National Forest and Game Preserve is a tract of 61,480 acres, embracing the major portion of the Wichita mountains in southwestern Oklahoma, the entire area lying within Comanche County. This tract adjoins the Fort Sill Military Reservation (52,000 acres) on the west.

Southwestern Oklahoma is rich in historical interest. Between 1850 and 1860, Generals Sheridan, McClellan and Scott campaigned in the Wichita Mountains and the surrounding prairies against the Kiowa, Comanche, and Wichita Indians. Geronimo, famous Apache chief, was held a prisoner at Fort Sill for twentyfive years, until his death in 1911. Quanah Parker, last chief of the Comanches, made his home immediately south of the present boundary of Wichita Preserve for forty years prior to his death on February 22, 1911.

The land now embraced within the Wichita National Forest and Game Preserve was a part of the Apache, Comanche, and

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Iowa Reservation in the old Indian Territory. In 1901, when the reservation was thrown open to settlement, Congress set aside a tract of about 60,000 acres, and it was held as a forest reserve under the jurisdiction of the Department of the Interior.

The administration of the forest reserves of the United States was transferred from the Department of the Interior to the Forest Service of the Department of Agriculture in 1905. By a proclamation of President Roosevelt, dated June 2, 1905, based upon a special Act of Congress, approved January 24, 1905, the Wichita was further designated as a national game preserve, dedicated to the preservation of wild animals and birds of national importance.

Since that time, starting with only a few animals of various kinds, herds have been built up, until at present, they have approximately 250 buffalo, 300 elk, 250 deer, 15 antelope, 6 rocky mountain sheep, and 50 long-horn cattle. In addition to these animals there are probably 500 wild turkeys on the preserve and there would have been many more, except for a violent hailstorm in 1928, which killed or crippled many hundreds.

All the above-mentioned animals have done exceedingly well except the antelope and Rocky Mountain sheep. Just why the antelope do not do well here has not been determined. This section of the country is the natural habitat for this animal, but of some forty or fifty brought in by shipment only about fifteen remain.

The Rocky Mountain sheep were received early in 1929 from Alberta, Canada, and it is too early to predict just what the result of this experiment will be. It is generally believed that they will not do well, due to climatic conditions. No lambs were raised this year, although three were dropped, their death being attributed to coyotes.

During the year of 1927 the veterinary officers at Fort Sill, Oklahoma, became interested in the animals that populated this National Preserve. Since that time they have been called on to safeguard, more or less, the health of these animals, and it has been an exceptionally interesting experience.

These officers have been called on to diagnose various conditions among the buffalo, antelope, longhorns, etc., inoculate the

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Rocky Mountain sheep and to operate on a yearling long-horn for actinomycosis of the jaw. This animal had a twenty-seven inch spread of horns and was quite capable of putting the writer up the fence. From this it is easy to draw the conclusion that the officers spent some time on the fence while working with the older animals.

In connection with the long-horns it might be of interest and general information to know that only the steer grows the real long horns. The cows and the bulls usually have relatively long horns, but it remains for the steer to grow the very long ones. It was wondered what the unsexed female would grow in the way of horns and the supervisor of the preserve has agreed to allow this to be investigated.—*Capt. G. F. Rife, V. G., in the Veterinary Bulletin.*

### **Sixteen-millimeter Training Films**

For the purpose of broadening the scope of application of War Department training films, the Chief Signal Officer has arranged for the distribution of these films in the 16-millimeter or "home movie" size as well as in the standard size.

For the present, one copy of each of the following subjects will be distributed to each corps area signal officer:

Number	Subject
46	Elements of Map Reading.
47	Elements of Map Reading.
64	Care of Animals.
65	The Rifle Squad, Cavalry, Mounted.
66	The Soldier Mounted, without Arms.
67	The Construction, Operation, and Care of the Internal Combustion Engine.
69	The Soldier, Instruction, Dismounted, with Rifle.
70	The Soldier, Instruction, Dismounted, without Arms.
71	The Medical Service, with Infantry, in Combat.

Later more of the existing subjects will be reproduced if the demand indicates the necessity therefor. Each new film produced will be distributed in the standard and substandard sizes. It is felt that the distribution of films of the latter type will



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greatly facilitate the use of training films in the smaller units. Many of these units, particularly in the National Guard and Reserve forces, now possess or have ready access to the small "home movie" projector. Their ease of transportation, set-up, and operation render these projectors particularly adaptable for exhibitions to small audiences. The sub-standard film being non-inflammable, permits of its being projected in any room without the necessity of fireproof projection booth.

Requests from time to time from the Reserve and National Guard units have indicated the need for these smaller films for instruction purposes. Oftentimes the necessary projection machines for the standard size films were not readily available to these units, and when they were available, difficulty arose in obtaining the services of competent operators. Distribution of the 16-millimeter films renders it possible for their projection by amateurs to groups varying in size from 10 to 75 or 100 persons. These films will be distributed for exhibition purposes by the corps area signal officers under the provisions of Army Regulations 105-260. Should the demand for these films create the necessity for a more comprehensive distribution, such demand would be met by increasing the number of prints of each subject allotted to corps areas.

### **Care in Message Writing**

The importance of careful message wording is emphasized in the following messages:

*a.* "No price too high." A tea-purchasing agent in the Far East cabled his home office quoting a price at which tea could then be bought, and requested instructions as to purchase. Upon receipt of the above answer he bought all tea available. The message meant: "No, do not buy, price too high."

*b.* An officer wired his wife: "Have gotten tickets Army-Navy game." He met his wife and eight friends at Grand Central, she having received: "Have got ten tickets Army-Navy game."

### **How Air Corps Planes are Designated**

Army Air Corps airplanes are divided into eight classes, according to type or model.

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	<i>Model Designation</i>
Pursuit planes .....	P
Observation planes .....	O
Attack planes .....	A
Transport, Cargo, Ambulance, Workshop planes .....	C
Bombardment planes .....	B
Primary Training planes.....	PT
Basic Training planes, used in transition from primary type to service type planes .....	BT
Photographic planes .....	F

Airplanes of experimental and service test status are prefixed by the letters "X" and "Y". Thus a type that is being developed either at a factory or at the Air Corps Engineering station at Wright Field, Dayton, Ohio, would be labelled, were it a Pursuit plane, "XP", followed by a number which would classify it according to its style, such as "XP6", which was the experimental stage of a Pursuit plane made by the Curtiss Company somewhat on the style of the Curtiss Hawk. If this experimental model proves to be of an acceptable type a small lot is then bought and put out at some active station for service test, that is, used in the service with other pursuit machines to test their serviceability and desirability. They would then be labelled "YP6".

There are still some airplanes in the service known by an earlier system of model designation, such as the DH-Dehaviland and the PW-Pursuit Watercooled, but these are either obsolete or obsolescent.

### **Battle Honors for 146th F. A.**

A review of the history of the 146th Field Artillery (Washington National Guard) shows that by virtue of its descent from the 161st Infantry (Washington National Guard) it is, in addition to the battle honors heretofore awarded, entitled to the following honors for service in the Philippine insurrection: Manila, Luzon, 1899.

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**Status of Regular Army Field Artillery Commissioned Personnel  
(August, 1930):**

Duty in command of troops .....	721
O. C. F. A., F. A. Board and Liaison Officers .....	22
F. A. S., Staff and Faculty and Instructors, other Schools .....	43
School duty (branch) .....	124
Command and General Staff School (Instructors) .....	12
Command and General Staff School (Students) .....	42
Army War College (Instructors and Historical Section) .....	5
Army War College (Students) .....	10
Oriental Language (Students and Instructor) .....	5
United States Military Academy .....	44
R. O. T. C. ....	106
Organized Reserves .....	103
National Guard .....	84
General Staff .....	43
Office, Chief of Staff .....	1
Military Attachés .....	9
Detailed to other arms .....	68
Aide-de-Camps .....	23
Disciplinary Barracks .....	4
Recruiting .....	9
Public Buildings and Grounds, Washington, D. C. ....	1
Bureau of Insular Affairs .....	1
<hr/>	
TOTALS .....	1,480

# FOREIGN MILITARY JOURNALS: A CURRENT RESUME

## BRITISH EMPIRE

### The Journal of The Royal Artillery, July, 1930

This number contains the "**Duncan**" Gold Medal Essay, 1929-1930. The subject for the competition was: "Discuss the effect of the introduction of Radio-Telephony between Battery and O. P. on the Equipment, Organization and Employment of Artillery in the Field." Major P. I. Newton, D. S. O. R. A., was the winner.

The following statements are of particular interest: "With wireless telephony observed fire becomes a practical proposition far more often than at present, thus tending to reduce the importance of survey work and predicated shooting, except where surprise is the primary object."

"Is Radio-Telephony between Battery and O. P. possible?"

With regard to the purely technical progress and development of wireless generally, only an expert is entitled to give an opinion.

It *is* possible to design transmitting and receiving sets having the necessary range and reliability for the purpose in hand, and possessing the required degree of portability.

It should usually be possible to operate a sufficient number of sets in any given area, without mutual interference, though there may be occasions when their use will have to be restricted, and there is also the question of outside interference, whether deliberately the work of the enemy or accidental, due to commercial signals or to atmospherics.

**The Development of Artillery Survey** is the subject of a lecture delivered at the Royal Artillery Institution by Lieutenant Colonel A. F. V. Jarret, M.C., R.A. Among other things the lecturer stated:

"It is one of the principles of survey that we should work from the whole to the part; and if we follow this principle literally we will arrange for the R. E. [Royal Engineers-Editor] control to be fixed first, and information concerning it circulated to all concerned;

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the lesser R.A. [Royal Artillery-Editor] controls as far as gun and O.P. will each be fixed in the same manner, each waiting for the necessary information from the control in which it is to fit; finally the registrations fall accurately into place. These last, of course, are done in any case without waiting for anyone, whether there is to be survey or not. Meanwhile, perhaps, the enemy may wait for the avalanche to fall, but it seems unwise to gamble on it. It is not, however, necessary to follow a principle, whether survey or any other, to the death. The poet tells us that *a merciful providence fashioned us hollow in order that we might our principles swallow*; and if we keep in mind that time is probably short, that the smaller the area the quicker the survey of it, and that in any area the fewer points to be fixed the shorter the time required to fix them, it will be clear that there is at least something to be said for the system advocated in the annual memorandum of training for last year and this. That system is briefly for each control to be started on such information as is to hand, without waiting for anyone else; the whole being fitted together as it is wanted."

"The importance of bearings in artillery survey can hardly be overemphasized. If bearings are correct, small errors in coordinates will be swallowed up by the zones of the guns, the burst of the shell, and if necessary by a little searching and sweeping."

"The present (artillery) instruments are not ideal for survey—they were not designed for that purpose, and they aim at reasonable accuracy at ranges at which they cannot be accurate as a surveyor understands that word. The artillery [range finder—Editor] instrument is unwieldy and will not read ranges under 500 yards; the infantry pattern cannot be read with real accuracy at 1,000 yards; nevertheless within limits both are invaluable to any surveyor who can lay hands on one. What he would like is a portable instrument reading from about 100 yards to 1,000 or so; with this he can traverse, or measure a base for triangulation and fix points accurately at ranges where the range finder itself can only give an approximation. If someone will invent such a weapon, and also a compass which is not affected by casual lumps of metal, he will have made the survey of a brigade [The

British call of F. A. battalion a "Brigade"—Editor] area a very simple business."

"Owing to improved methods of dealing with aeroplane photographs, the prospects of getting large scale maps under certain conditions of mobile warfare are much more rosy than they have been. One hears it said that the introduction of these maps sounds the death knell of the artillery surveyor; there is, on the other hand, no artilleryman who will give them a more cordial welcome, and he is no more anxious than the next man to join the unemployed. It is a sound general rule that co-ordinates can be obtained from a map with an accuracy in yards suggested by the thousands in the denominator of the R.F. of that map; e.g. 20 yards with a 1/20,000 map. This is accurate enough for the co-ordinates of a point at which one wants to shoot; for target fixing we need no more, and the artillery surveyor is relieved of his hardest task. As regards the guns, there will be many occasions, especially in enclosed country, where it will be possible to fix their position from such a map to this accuracy of twenty yards or even better; and this will probably suffice for mobile conditions."

In a brief article entitled **Section Command**, Major-General Sir John Headlam, K.B.E. R.A. [corresponding roughly to Chief of Artillery—Editor] discusses the advisability of a department system of apportioning duties of a battery as opposed to having Lieutenants command pontoons.

Captain G. L. Appleton, R.A. has an article entitled **Artillery Umpiring**. In discussing his experiences as one of the umpires in the Westland-Eastland manoeuvres in the War Office exercises last autumn he states:

"It could usually be assumed that the Infantry on either side knew what Artillery support was behind them, but Artillery umpires had to seek out the "enemy" Infantry umpires and tell them the time, locality, and intensity of fire which was being brought to bear on them. Here various practical difficulties at once arose. The Infantry umpires were widely scattered over a length of front. Was one to seek them out piecemeal and attempt to "paint a picture" to each of them, IF they could be found? Or was one to wait in the locality where perhaps a concentration

## FOREIGN MILITARY JOURNALS: A CURRENT RESUME

was to be fired, in order to penalize any enemy who might be there at the right place and time?

Umpires of an opposing side are always hard to find, and when one has found them they are inclined, humanly enough, to have rather a local view and to be a little apathetic about the somewhat nebulous opposing artillery. By the time all umpires are found the attack has probably moved a mile or more and the situation has completely altered. If one adopts the other plan, and waits in a shelled area the odds are strongly in favour of no one coming through it at all. On the other hand if one does not wait there it is very likely that a continuous column of Infantry in fours with transport will move over the precise spot which a battery is steadily shelling at four rounds a minute.

Let it be assumed that the Artillery umpires had tried by one means or another and with varying success, to put the opposing Infantry umpires in touch with the situation. The battle had now rolled on. What was to be done? There seemed to be two alternatives. One could send back a report to the brigade senior umpire and then wait for news of further action by the brigade, either through the report centre or from the O.P.'s. Alternatively one could wander about among the Infantry and try to go on "painting a picture" to elusive Infantry umpires, and hope that instructions from the brigade umpire would reach one from the report centre. In either case the action of the Artillery umpire tended to be rather futile. He either did nothing or painted a picture which probably was not in accordance with the actual situation. One could not do much picture painting without making oneself rather a nuisance to Infantry umpires who had their hands full. If the battle moved fast, and it usually did, the Artillery umpires were quite unable to keep in touch with the situation. The net result was that by about 9 a. m. or 10 a. m. Artillery umpires ceased to take any useful part in the battle. In the afternoon there were usually one or more small staged attacks or counter-attacks. If an Artillery umpire happened to be at the conference preceding such an operation he was usually able to do some useful work, since the frontage and objective were usually limited, and he had only to deal with one or two Infantry units.

The writer suggests one important conclusion from this, and that is that an Artillery umpire is not really an umpire at all and should not be asked to attempt to umpire. The umpires who actually issue decisions affecting the battle are the Infantry umpires. The Artillery umpire is really a collector and transmitter of Artillery intelligence, which by some means must reach two destinations, one being the Infantry umpires and the other being the Chief Umpire and the Directing Staff."

Colonel J. F. C. Fuller's article, **The Influence of the Constant Tactical Factor in the Development of War**, deals with mechanization in a theoretical manner. Among other things he says:

"Obviously there are many differences in sea and land fighting: nevertheless, I am of the opinion that one day it will be recognized that September 15, 1916, the day when tanks first took the field, was as important a date in land warfare as was March 8, 1862, in naval warfare—the day the Monitor met the Merrimac."

Captain D. McK. Kennelly, 5th Royal Mahrattas, in his article **Artillery Support of Piquets in Mountain Warfare** brings out some very interesting points:

"A piquet may be only five hundred yards from its supporting troops and yet have to fight the enemy to a finish without receiving any outside help. All who have served with a piquet in action will readily admit this. It is not the fault of the supporting troops—they would help if they could see the enemy, but hillmen are born with an eye for country and will seldom show themselves. The piquet alone will know where the enemy fire is coming from. Supporting troops, especially the gunners, also find it difficult, at a distance, to distinguish between the enemy and our own men and often withhold their fire for this reason.

A slow method of communication is useless, for three or four minutes usually decides the issue of a fight between a piquet and the enemy. This again is due to the nature of the country. Good cover enables the enemy to strike at close range and unless the piquet can gain superiority of fire in a few minutes the chances are that it will be overwhelmed.

A battalion (of Infantry) for piqueting duty on an average supplies twenty piquets. To lay and roll up the miles of cable



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required to supply each piquet with a telephone or buzzer would be an impossible task to the small complement of signallers with a battalion. Wireless telegraphy may solve the difficulty in the future, but at present it is not a practicable solution. The only remaining means of communication is by visual. A battalion would have the greatest difficulty in supplying even ten piquets with pairs of trained signallers.

Now each piquet carries an Artillery screen, \*khaki on one side and white on the other. The only uses of this screen are to show the Artillery:

- (a) That the piquet is in position
- (b) That the piquet is withdrawing from its position.

The former warns the Artillery not to fire, the latter tells them that they may fire if they think fit. But for lack of information the gunners are not always certain that their fire is necessary; if they think it is, they fire on top of the hill, not knowing where the enemy really are. It is suggested that it is possible for a piquet to send a quick and accurate call for support by the clock code method.

An example of the occupation of a piquet position is given below to make the method more clear:

A piquet having approached a point four hundred yards distant from its objective is suddenly fired on by a party of thirty or forty tribesmen who are in a small ravine to their right. The advanced guard of the column is moving along a valley on the left of the piquet. The piquet commander realizes that the fire power of his piquet, (two sections) is not sufficient to beat down the enemy's fire, and that half of his men will be knocked out before he reaches his post. He knows that the Lewis guns or guns detailed to support him have no idea of the enemy's position, for he himself can only just discern an enemy head here and there. He decides that Artillery support is necessary, orders his men to keep under cover while engaging the enemy and then sends back his call for support: he faces the battery and waves the screen from side to side above the shoulders about six times and closes it. (Note: screen should be handled closed and only opened

\*The screen consists of two rods about three feet long which go on either side of a cloth panel. It is like a big semaphore flag, but the signaller waves it by means of a rod in each hand.

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when in the correct position for the signal.) This is his call for Artillery support. He need not wait for an acknowledgement from the battery as he knows that the gunners have detailed someone to watch his progress through field glasses, and he is already in touch with the screen worked by the Artillery O. P. He carries straight on with his message. The enemy are directly on his right flank; three o'clock. He holds the screen stationary for a few seconds in line with his left shoulder, denoting three o'clock. He judges the enemy are three hundred yards away. He raises the screen three times above his head and the call for support is through in less than twenty seconds. Moreover the gun or guns, which should already be aligned on the piquet's objective, have only to switch a degree or two right, drop, say one hundred yards range to be ready to fire on the enemy.

The piquet commander now places himself in position to watch the effect of the shells, handing over the working of the screen to an assistant, who remains under cover. He hears the first shell come over but does not see it burst—the gunners are treating this as a "danger shoot." The next shell falls two hundred yards behind and to the right of the enemy. The assistant signals "plus" (screen held straight above the head) then "right" by holding the screen in line with his left shoulder.

Some battalion commanders may not like piquet commanders to work direct with the guns, but it is the only way to ensure quick support. Usually the senior Artillery officer is with the executive Infantry commander—the commander of the advanced guard or rear guard; his guns may be anything up to fifteen hundred yards away from him. He is not, therefore, in a position to control the fire of his guns for quick support—this must be done by the gun or section commander.

Other battalion commanders may think the method too complicated to be understood by some of their piquet commanders, but nothing less complicated will bring accurate fire to bear on the enemy. Training for mountain warfare cannot remain stationary. With each year the danger on the Northwest Frontier of India increases; the tribesmen are becoming better armed and better acquainted with our manner of dealing with them.

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Every endeavour should be made to counter this increase of efficiency on their part by new methods of training."

### IRELAND

#### **An t-Oglach**

The July number of the *Irish National Defense* magazine contains an interesting article on the Canadian Army by Brigadier J. Sutherland Brown, C.M.G., D.S.O. of the Canadian Permanent Force. After discussing the Canadian National Defense from its earliest days of colonization he gives us the following brief history of the Canadian effort in the Great War:

The 1st Canadian Division mobilized in August 1914 at Valcartier, P. Q.; sailed on 30th September, and was concentrated on Salisbury Plain by mid-October, 1914. Its earlier embarkation was only hindered by most regrettable interference in its mobilization. It finally reached France early in February, 1915, although it could have arrived in November, 1914, when the B. E. F. was in need of support; it might also then have been in better shape. It was in the line on the left of the attacking troops at Neuve Chapelle, under orders to attack, when the operations were postponed. It was "blooded" at the Second Battle of Ypres where, notwithstanding individual mistakes, it stood its ground to the eternal honour of Canada and the Empire.

The 2nd Canadian Division arrived in France in September, 1915. The 3rd Canadian Division was made up in France in the autumn and early winter of 1915-16. With the arrival of the 4th Division in France in July, 1916, the Canadian Army Corps was made up of four strong divisions. From that date the Corps took part in nearly every battle of importance, and always gained and held its objectives. Its gala days were the 8th and 9th of August, 1918, when it advanced about fifteen miles into the enemy's lines, captured 9,131 prisoners, 190 guns, and more than 1,000 machine guns and trench mortars. Together with the Australian and IIIrd Corps it had created a situation which was a turning point in the war. Ludendorff states that "August 8th was the black day of the German Army in the history of the war."

In addition to the Canadian Corps there were also in France a Canadian Cavalry Brigade, the Canadian Forestry Corps, the

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Canadian Railway Troops and many medical units, etc.

The total number of men who enlisted in the Canadian Expeditionary Force during the War was 619,636 of whom 556,314 were British born and 63,322 were foreign born. Of the latter 35,599 were born in the U. S. A., many no doubt, of British or Canadian parentage. Of the British born 318,728 were born in Canada, 156,697 in England, 47,427 in Scotland, 19,427 in Ireland, and the remainder in other parts of the Empire.

The Canadian Army Corps suffered over 200,000 casualties during the War, of whom over 50,000 were killed in battle, while they lost only 130 officers and 2,688 other ranks as prisoners. Many times, in a single day they captured two or three times the above number of Germans. These figures indicate the Canadians' fighting qualities.

Mention should be made of the work done by the late Sir Willoughby Gwatkin, Chief of the General Staff, who by his tact, energy and ability kept everything going from Ottawa in the first two years of the war. Likewise, mention should be made of all the Permanent Force officers, and men, who served with great credit, not only in the P. F. units, but also distinguished themselves under every circumstance of unforeseen difficulty."

As regards **Post-War Organization** he makes the following statements:

"The Government authorized a committee to investigate and report upon re-organization. . . . This committee was known as the 'Otter Committee.'

In due course a report was issued, and in the main accepted. The present militia organization, with a few minor changes, is the outcome of that report. The perpetuation of the overseas units was provided for, and the old Militia was saved. Militia Headquarters and the Military Districts remained the same as at the end of the war. The divisional system was maintained. The Permanent Force was reconstituted. Its duties are mainly instructional, but it is entrusted with special duties of mobilization, while by law it is to be the first to be called out in aid of the Civil Power.

The Militia is divided into:

- (1) The active Militia, which is again sub-divided into:

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Active units; Reserve units; Depots; Reserve of Officers.

(2) The Reserve Militia consisting of all the male population of Canada between the ages of eighteen and sixty, physically fit, and not legally exempt. It is unorganized at the present moment.

The basic law governing the constitution of the Militia is the Militia Act. It is a good Act giving the Government and the military authorities great powers.

The National Defense Act of 1922 has consolidated the three fighting services (Army, Navy, Air Force) into one department under one minister, henceforward known as the Minister for National Defense.

Order in Council of June, 1922, and January, 1923, have provided for the Constitution of a Defence Council to advise the Minister on all matters of defence, including or relating to the Militia, the military, naval and air services of Canada, and on all matters referred to it by the Minister. . .

The training of the Canadian Permanent Forces may be briefly summarized as follows: The Royal Canadian Navy and the Royal Canadian Air Force, being largely professional, are trained on identical lines as the Royal Navy and the Royal Air Force. In fact, Canadian naval officers and many seamen do most of their service with the Royal Navy. All Canadian Air officers undergo flying courses in England; in addition they are admitted to the Air Staff College, and can serve in England by exchange. All Permanent Force officers take the War Office qualifying examinations. Exchanges are arranged with Great Britain, the selected officers take courses in England. Lastly, there is a keen competition for three annual vacancies at the Camberley (2), and Quette (1) Staff Colleges.

The position of the Militia is different. Funds voted by the Canadian Parliament do not permit of the training of the large regimental establishments provided before the war. Central camps have had to be eliminated or curtailed. Post-war training has thus been made to concentrate on officers, specialists and N. C. O.'s. With somewhat increased funds in 1928 and 1929, as well as by economics and re-arrangement effected by District Officers Commanding, more central camps have been held lately.

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The training generally is similar to the training of the British Territorial Army; but there are marked differences, the Canadian Militia having no "permanent staff" attached to units."

"The permanent Force of Canada consists of:

- 2 Regiments of cavalry (R.C. Dragoons and R.C. L.S.H.).
  - 3 Batteries of horse artillery (R.C.H.A.).
  - 5 Medium and heavy batteries (R.C.A.).
  - 13 Detachments of engineers (R.C.E.). Corps of Signals (R.C.C.S.).
  - 3 Regiments of infantry—each of 1 Battalion (R.C.R. P.P.C.L.I. and R.22d Regt.).
- Depots, detachments, etc.

The Canadian Militia consists of:

- Cavalry
  - 33 Regiments of cavalry and mounted rifles and 33 reserve regiments.
- Artillery
  - 94 Field, 20 medium and 12 heavy batteries with 22 reserve brigades.
- Engineers
  - 11 H.Q.'s divisional engineers.
  - 14 Field companies and 10 reserve field companies.
  - 7 Field troops and 4 reserve field troops.
  - 2 Fortress companies.
  - 1 Reserve topographical section.
- Canadian Corps of Signals
  - 11 Divisional Signals.
  - 2 Fortress signal companies.
- Canadian Officers' Training Corps
  - At the Canadian Universities.
- Infantry and Rifles
  - 122 Regiments each with 1 active battalion, except the Q.O.R. and the R.H. of C. which have 2 active battalions; total 124 battalions.
  - 166 Reserve battalions.
  - 25 Reserve regimental depots authorized to date.
- Canadian Machine Gun Corps
  - 2 Motor machine gun brigades and 2 reserve brigades.
  - 1 Cavalry machine gun squadron and reserve squadron.
  - 12 Machine gun battalions and 10 reserve machine gun battalions.
- Canadian Army Service Corps
  - 12 Divisional trains.
  - Reserve divisional trains
  - 2 Reserve depots.

## FRANCE

### Revue Militaire Francaise May, 1930

In the article, "Operations in Morocco," by Lieutenant-Colonel Boisboissel, we find a description of the employment of the various arms during the recent Moroccan campaigns. In discussing artillery, Colonel Boisboissel describes each type of matériel used in Morocco, mentions the relative merits of the several types and explains the many adaptations of artillery to this special kind of warfare.

Colonel Boisboissel speaks very highly of the 65 mm. mountain

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gun. Very light, strong, capable of rapid fire, it is an ideal accompanying gun. This gun is apparently being replaced by a 75 mm. mountain howitzer, a change which does not find unanimous approval. A mountain battery of 65's can move out of action in five minutes and march faster than the ordinary Infantry. These characteristics make the 65 mm. batteries invaluable in stopping enemy counter-attacks in warfare where speed is of the utmost importance.

Unfortunately the 65 mm. gun has a short range and a relatively flat trajectory. Moreover, it is subject to premature bursts, requiring cover for the gun crews.

The 75 mm. mountain howitzer, which is to replace the 65, is very mobile and is capable of high angle fire. It's rate of fire is a little less than that of the 65; it requires at times, twenty-five minutes to accomplish "March Order" and "Pack"; and it breaks up into a greater number of loads. Since more mules are required to pack the piece, there is more chance of a single mule being hit. This question of the relative merits of a four and six load mountain howitzer, is of course, frequently discussed in our own service.

The 75 mm. gun cannot be employed in the mountainous regions of Morocco. There are frequent occasions however, as in the valley of Ouerga in 1925, where the 75 gun was used very effectively. In rough terrain it is very necessary to use iron poles on the limbers. The wreckage of wooden poles during one engagement almost caused the capture of a large group of artillery.

It is interesting to note the method one Battery Commander used to solve the double problem of ammunition supply and draft for his guns. He left his caissons behind, using all his horses to pull the guns. He used pack mules to carry ammunition, each mule packing sixteen rounds. This is quite a load when we remember that we pack not more than ten rounds on a mule in our 2.95 batteries.

Colonel Boisboissel speaks of the 155 mm. Howitzer as a "Boulder to kill a fly." In 1926, to place a battery of 155's in position, it was necessary to build a road, wear out several teams of horses and exhaust a battalion of Infantrymen who replaced the horses. Eventually a section of tanks pulled two guns into

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position after breaking several couplings.

In discussing the employment of artillery in Morocco, Colonel Boisboissel clearly identifies himself as an advocate of habitual use of accompanying artillery. He does not believe that artillery in groups can successfully break up Moroccan counterattacks, because, in such rough terrain, the communication system between the artillery and infantry is so difficult to maintain. In the role of accompaniment, the 65 mm. gun was of the utmost value. It is understood, of course, that the principle of accompaniment applied only during an attack or on the march. During an "Artillery Preparation" all artillery was under the control of the Artillery Commander.

In such a war it is very important to conserve ammunition and not to waste it in useless preparations.

The author offered other maxims, as follows:

"Never move all artillery at once, a rule which is not common to war in Morocco."

"Avoid too frequent changes of battery position! this procedure is very fatiguing to personnel."

"If it is necessary to eliminate weight, reduce the number of guns and not the number of caissons or ammunition mules."

"The questioning of communication between infantry and artillery is especially difficult to regulate during movement as the telephone cannot be used, visual signalling is very uncertain, and rocket signals are very confusing."

"A good system of liaison to indicate the cessation of fire on an objective is to fire a salvo of shrapnel with a very high corrector setting."

"To designate a target to supporting artillery, the infantryman can make use of a rough panoramic sketch. It is still the surest method."

"For batteries called to reinforce a battery already in action, the designation of targets to the former can be made by means of salvos of very high shrapnel bursts followed by a salvo of percussion bursts on the target."

"In conclusion, it is only just to repay the artillery for its services rendered to the infantry; the latter arm must be careful to constantly protect the artillery during an engagement."



## BOOK REVIEWS

The Great Crusade, a **Chronicle of the Late War** by Jennings C. Wise, D.S.C., Lieutenant-Colonel, Infantry, A.E.F., (*The Dial Press*, New York, 1930).

This may be rated as one of America's great books of the War. Its absorbing interest grips the reader's imagination in a personal participation with the actors in the events which made history. Gifted with a fine literary style, a memory for day-by-day details of men preparing for the supreme sacrifice, a keen sense of the dramatic amidst tragic surroundings, and not lacking in the comedy of the trenches which was nature's safety-valve, Colonel Wise, has with fine discrimination, painted a vivid word picture of modern war. His trenchant comments on America's many mistakes of omission and commission are pertinent and straight from the shoulder of one who suffered from such errors, altho', if the book has a fault, it is in seeing so few wonderful accomplishments in America's going to war. But the author's wish to point a moral as well as to adorn a thrilling tale, is most commendable; and the mistakes of G. H. Q. in not profiting by French and British experience, the disappointments of our replacement system for battle-scarred units, as well as the iniquities of promotion to higher grades, are handled without gloves. Several caustic references to the so-called "regulars" in France, however, lose sight of the fact that there were no regulars; the old regular organizations were swallowed up by the waves of emergency officers and drafted men, and in original personnel for battle-training, one American division had little advantage over another.

Colonel Wise's book is most readable, and should occupy a high place in the bibliography of the Great War, which, though a source of patriotic exultation to the average man in the street, was to the American doughboy not without its grievous errors, tragic mistakes, and bitter injustices, which left in the hearts of many, a sense of misgiving for the future. America's memory for repeated war-blunders, is unhappily short.

CHARLES D. RHODES,  
*Major-General, Retired*

# POLO

## FORT BRAGG REACHES FINALS IN INTER-CIRCUIT

This year Fort Bragg turned out an exceptionally strong team. After winning the Southern Circuit at Fort McPherson, Georgia, in which Fort Benning, the 6th Cavalry (Oglethorpe), Fort McPherson and Fort Bragg participated, the Bragg team went on to Narragansett Pier, R. I., to contend with the winners of the other Eastern, Central and Southern Circuits in the Eastern Intercircuit championships. At Narragansett they found assembled an aggregation of very strong teams: Fort Sam Houston, winners of the Southwestern Circuit; Chagrin Valley (on which the three Firestones played) winners of the Central Circuit; the 3d Cavalry, winners of the Southeastern Circuit; Rockaway, winners of the Eastern Circuit; and Rye, winners of the New England Circuit. After defeating the 3d Cavalry in the semi-finals, the Fort Bragg team lost to Chagrin Valley in the finals. The team was composed of Lieutenant L. E. Jacoby at 1, Captain P. C. Fleming at 2, Captain P. P. Rodes at 3, and Lieutenant-Colonel G. H. Paine at 4, all Field Artillerymen.

### POLO AT FORT SILL

BY MAJOR J. M. SWING, F. A.

The Field Artillery School enjoys a splendid reputation for its scholastic work with all who are familiar with its activities in that line. Until recently not much could be said for its activities in mounted work, especially in polo circles. True, the development of a second year course in equitation has benefited certain individual officers, who will do much to raise the quality of riding and standards of driving and draft through the branch, and the formation of a show team is developing jump riders who should presently hold their own in the strongest competition. However, in polo, a mounted activity now universally recognized as one of the leading sports both in civilian and military circles, its reputation was very mediocre. The School had never entered a team in a national tournament, had never defeated its sister mounted service school at Fort Riley in the various tournaments played throughout the middle and southwest. This

POLO



LEFT TO RIGHT: LT.-COL. G. H. PAINE, LT. E. S. MOLITOR, LT. L. E. JACOBY, CAPT. P. P. RODES, CAPT. P. C. FLEMING, CAPT. D. L. CRANE

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latter object was accomplished in the Fall Tournament of 1929 at Ponce City, Oklahoma. A team was entered in the Rocky Mountain Circuit in 1929, coming out runner-up to Fort Leavenworth. A team was again entered in the Rocky Mountain Circuit in June of this year and won the championship by defeating both Fort Leavenworth and the Cavalry School. This team enters the Western Division of the Circuit Championship at San Mateo in August.

Having, as it may be said, arrived in polo at least to a point where we can take a small amount of pride in our achievement, it is believed that other Field Artillerymen might be interested in how polo is conducted at their school. There are always three very vital and burning questions which interest all followers of polo: 1st. Organization of the polo body; 2d. the pony situation; 3d. playing fields. A brief discussion of these three points should give a fair picture of polo at the Field Artillery School.

*Organization.* Polo, as conducted under the direction of the present Commandant, Brig.-Gen. William M. Cruikshank, gives the maximum polo to all interested, from the so-called dub to the highest handicapped player on the post. None but active players have a voice in polo matters, i.e., who shall play, selection of teams for tournaments, time and kind of club polo, use of fields, etc. Of course, all matters are submitted to the General for his approval. This is done in the following manner: Each organization on the post elects from among its polo players a representative to the post polo committee. This committee then recommends to the Commandant several officers, one of whom is usually suitable and is designated by the Commandant as his representative and chairman of the polo committee. The polo committee then endeavors to work out the details for the polo season as desired by the players and in accordance with the policies of the Commandant. This organization has to date led to the greatest harmony among the players, a difficult object to achieve, but one very necessary, else the natural rivalry of the organization teams might soon disrupt the polo body. Now, although the competition in the intra-mural tournaments is still keen as in previous years, on club polo days all organizations report with players and ponies to the same field and play is arranged

## POLO

so that players, no matter to what organization they belong, are issued periods of play commensurate with the number of ponies at their disposal. This is especially satisfying during the school year when the scholastic work often interferes with just enough members of an organization as to cause the remaining members to lose their play if it were not that they are taken right in for play with the other organizations.

A word about student players. Of course students are not authorized by regulations to ship private mounts when ordered to school. However, quite a few are detailed to school from school troops and in some cases have mounts already at this station so that they are incurring no additional expense to the Government. These students are usually permitted to play with the organization to which assigned before coming to school. However, no student is prohibited from playing because of the fact that he is a student. The Commandant has authorized the polo committee to take up individual cases on their own merits. To date no student who has requested the committee to play has been denied that privilege.

*Ponies.* It should be stated in the beginning that there are no public animals at the Field Artillery School which are devoted exclusively to polo. The shortage of men in all divisions and



RUCKER FIELD IN THE FOREGROUND AND THE OTHER TWO FIELDS IN  
CONTINUATION

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organizations requires the minimum number of horses to be kept in the stables at all times and such horses must be just as capable of quietly carrying a more or less elderly gentleman laden with maps, dispatch cases, etc., on a terrain exercise as of rushing furiously down the field in pursuit of a polo ball. Suitable polo horses are procured in two ways. As part of the training of the officer in the second year equitation class he is required to produce from a horse which has had one year in the battery officers' remount class a horse capable of playing polo. In addition every officer playing may have from among the horses not assigned to the second year class a horse or horses to train. Right here it should be understood that a horse trained for polo by any officer is played by that officer in all polo on the post, whether club or tournament polo. The only time at which public animals are taken away from the officers to whom assigned or by whom trained is in making up the string for a team going off the post. Then the policy of the Commandant is to take the best of all available resources in men and animals in an effort to put out a winning team. This method of training new horses is gradually bringing results. At this time the school has sixteen horses in California and twenty-four in Colorado, mounting two teams away in competition. This policy of insuring that an officer may enjoy the results of his own labor has borne fruit as shown by the fact that every player is working at least one green pony, despite the fact that all work has to be done after school hours.

*Fields.* Fields play a prominent part in the quality of the polo put out by any club. The School polo body has been concentrating for the last two years on making a few good fields where fast polo can be played, rather than having numerous pastures convenient to the various stables on which dub polo flourishes. With the opening of the third field south of the polo club house near the railroads. Fort Sill now has three fields smooth and even, well watered and kept, which are the equal of any installation in the southwest. These fields easily carry the load of some forty-odd players playing three times a week and Spring and Fall tournaments in which there are games every day for a week or ten days at a time.

FORT SILL WINS ROCKY MOUNTAIN CIRCUIT POLO  
TOURNAMENT AND WESTERN DIVISION OF THE NATIONAL  
INTER-CIRCUIT



FORT SILL TEAM

LEFT TO RIGHT: NO. 1—LT. A. R. S. BARDEN; NO. 2—LT. J. W. CLYBURN; NO. 3—MAJ. H. L. McBRIDE; NO. 4—MAJ. J. M. SWING; SUBSTITUTE—LT. I. L. KITTS

**T**HE teams participating in the Rocky Mountain Circuit were the Black and White of Fort Leavenworth, the Purple of Fort Leavenworth, the Kansas City Country Club, the Cavalry School of Fort Riley and the Field Artillery School of Fort Sill.

In the opening game the Black and White team of Fort Leavenworth defeated its own Purple team and in the semi-finals won from the Kansas City Country Club team. On June 17, Fort Sill defeated Fort Riley in an extra-chukker game, 9-8, and on June 21 annexed the Rocky Mountain Circuit title from Fort Leavenworth, 8-3.

The Sill-Riley game proved to be one of the best ever contested in Army circles and was a fight from start to finish. Both teams played brilliantly, showing sportsmanship of the highest caliber and holding the interest of the crowd by fast and thrilling

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polo throughout the entire game. At no time during the game was one team more than two goals ahead. Fort Sill, by virtue of its handicap of two goals retained the lead for the first five chukkers and entered the sixth period with a score standing 6-5 in favor of the Artillerymen. At the very opening of the sixth chukker the Cavalrymen started a whirlwind finish which netted them three goals, making the score 8-6 in their favor, with only three minutes to play. At this critical point the Artillery held fast and started a rally of their own, making two most spectacular goals, the tying shot occurring in the last ten seconds of the period. This enforced an extra period. Fort Sill took the ball at the throw-in and scored the winning goal in less than one minute of play. This victory made the Artillery team eligible for the finals of the tournament.

The Artillery team played the final game of the tournament against the Black and White of Fort Leavenworth, who were last year's victors of the Intracircuit play. The red-shirted riders of Fort Sill completely outplayed Fort Leavenworth in the first five periods and it was not until the final chukker that the defending champions were able to score, when a rally on their part netted them two goals.

The Fort Sill team, by virtue of its victory in the Rocky Mountain Circuit, went to San Mateo, Calif., in August to compete for the championship of the Western Division of the National Inter-Circuit. Fort Sill won this championship and became eligible to play Chagrin Valley, the winners of the Eastern Inter-Circuit Division, by defeating San Mateo 5-3 in the finals. Several strong polo clubs of the Pacific Coast had fallen by the way before reaching their Circuit or Inter-Circuit Championships, among them Midwick, Santa Barbara, the Uplifters of Santa Monica. Vancouver Barracks, Camp Lewis, Portland Hunt Club, etc.

This is the first time the Artillery School has featured in a national match. For the new champions the play of Lieutenant Barden on the offensive, and Major Swing on the defensive is especially noteworthy. They were ably supported by Lieutenant Clyburn and Major McBride.



## FORT SILL TEAM

### INTERNATIONAL POLO TOURNAMENT IN TEXAS

The second series of tournaments between the polo team of the Mexican Army and the 1st United States Cavalry Division, was played to successful conclusion at Fort D. A. Russell, Texas, from July 15th to July 19th, 1930.

The polo team of the Mexican Army was composed of the pick of all the officers now playing polo in Mexico: Gen. Jesus Jaime Quinones, Col. Alfinio Flores, Col. J. F. Kennedy, Capt. 1-0 Juan Garcia, Capt. 1-0 Carlos Quinones, Capt. 1-0 Anonio Nava, Capt. 2-0 Santiago Dominguez, Lieut. Rodolfo Torres, and in addition two of the best civilian players in the country.



GENERAL JESUS JAIME QUINONES, STAR BACK ON  
THE MEXICAN POLO TEAM

The officers selected to represent the 1st Cavalry Division were Capt. Theodore E. Voigt, 7th Cavalry; 1st Lieut. Lawrence G. Smith, 1st Cavalry; 1st Lieut. Jack S. Winn, Field Artillery (D.O.L.); 1st Lieut. J. K. Baker, 8th Cavalry; 2d Lieut. Paul J. Harkins, 7th Cavalry, and 2d Lieut. Paul A. Ridge, 1st Cavalry.

The Mexican Army polo team was accompanied by Gen. Abundio Gomez, Senora Gomez and seven other ladies, Maj.-Gen. Eulogio Ortiz, Coronel Rosendo De Ande, Teniente Coronel Pliego, Teniente Coronel Juan F. Trujillo, Capt. 1-0 Vicente

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CHIHUAHA MILITARY BAND WHICH ACCOMPANIED THE MEXICAN POLO TEAM

Cortez, the official photographer of the expedition, many other officers of the Mexican Army and distinguished civilians from Mexico City, who arrived in Marfa on the private car of the Secretary of War of Mexico, on Tuesday afternoon, July 15.

Wednesday afternoon the first game of the polo tournament was won by the Mexican polo team. The Mexican team took the lead early in the game and despite a desperate rally by the American team in the eighth period, won the game by a score of six to five.

	Goals		Goals
	Scored	Mex. team	Scored
1st Cav. Div.			
1. Harkins .....	0	1. Capt. Garcia .....	3
2. Smith .....	4	2. Capt. Nava .....	2
3. Winn .....	0	3. Capt. Perez .....	1
4. Baker, Ridge .....	1	4. General Quinones .....	0

Thursday afternoon the second game of polo tournament started with the Mexican Army substituting Mr. Muller for Captain Perez, and Lieutenant-Colonel Kennedy for General Quinones. On the American team Captain Voigt took the place of Lieutenant Baker, whose injuries of the previous day prevented him from playing.