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THE FIELD ARTILLERY JOURNAL

EDITED BY
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THE UNITED STATES FIELD ARTILLERY ASSOCIATION
1624 H STREET, N. W.
WASHINGTON, D. C.

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Major, Field Artillery, U. S. Army

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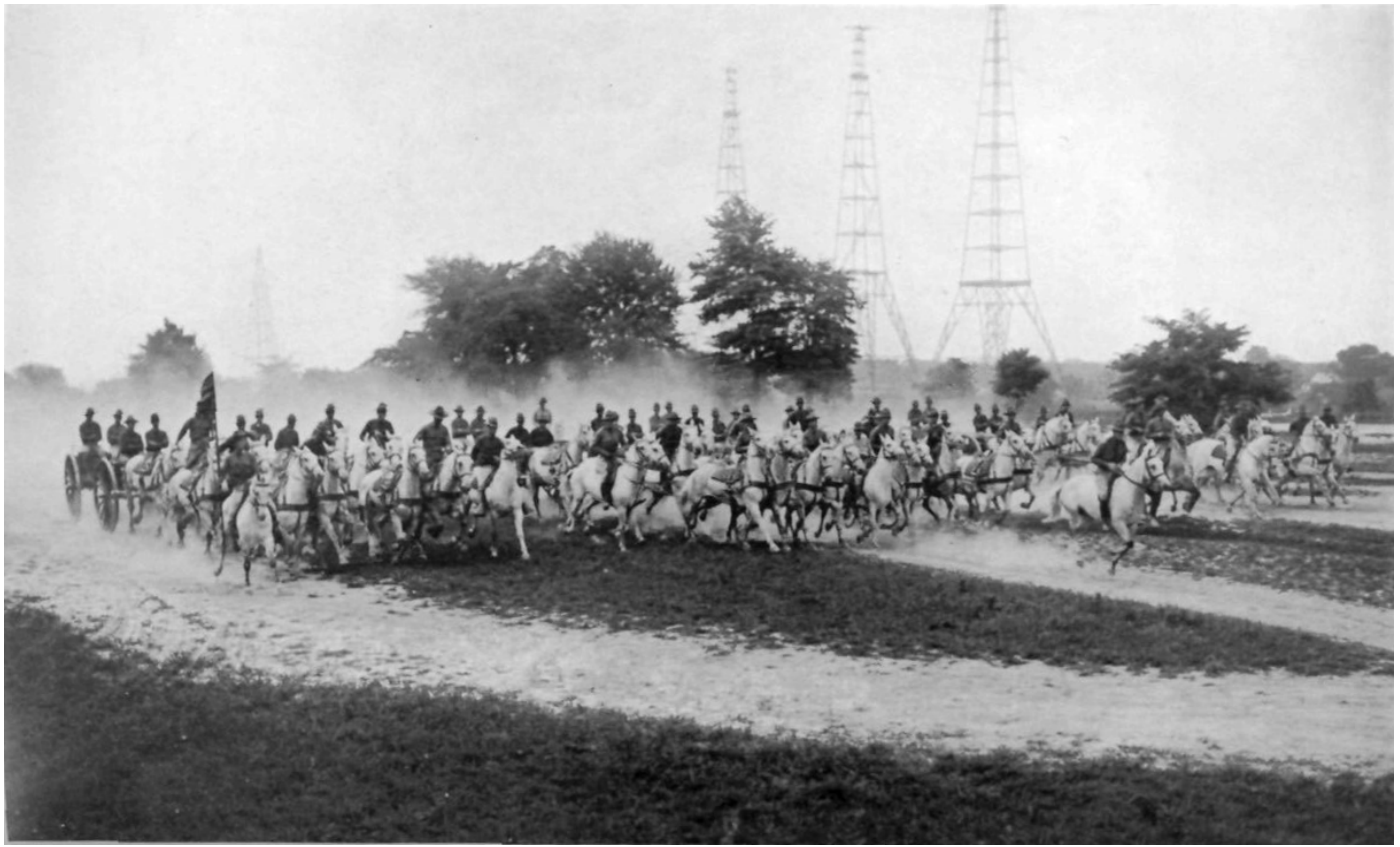

"KEEP 'EM ROLLING"

BATTERY "C," 16TH FIELD ARTILLERY, FORT MYER, VIRGINIA, WORKING OUT ON THE PARADE GROUND PREPARING FOR THE NATIONAL HORSE SHOW

THE FIELD ARTILLERY JOURNAL

VOL. XVII NOVEMBER–DECEMBER, 1927 NO. 6

THE ANNUAL REPORT OF THE CHIEF OF FIELD ARTILLERY FOR 1926–1927

IN TWO PARTS—PART I

SECTION I

PERSONNEL

1. REGULAR ARMY

a. Commissioned Personnel.—(1) On June 30, 1927, the number of officers in the Field Artillery, including those commissioned in the arm and those detailed for duty with it from other arms, was as follows:

	Colonels	Lieutenant Colonels	Majors	Captains	First Lieutenants	Second Lieutenants	Totals
Commissioned in Field Artillery	27	54	236	433	394	262	1406
Detailed from Other Arms	6	1	. . .	. . .	1	. . .	8
Totals	33	55	236	433	395	262	1414

NOTE.—Forty-one second lieutenants commissioned from the 1927 class at the United States Military Academy are not included in the above table.

(2) Of the 1414 officers noted above, twenty-five were detailed for duty in other branches, leaving a total of 1389 officers for duty with the Field Artillery.

(3) During the year, the gains and losses in this arm were as follows:

One colonel ..... gained
Two lieutenant-colonels ..... lost
Nineteen majors ..... gained
Three captains ..... gained
Twenty-four first lieutenants ..... gained
Forty-seven second lieutenants ..... lost

(4) The present distribution of the commissioned personnel of this arm is as follows:

	Colonels	Lieutenant Colonels	Majors	Captains	First Lieutenants	Second Lieutenants	Total
Duty with Branch (R.A.)	14	19	53	224	254	211	775
Special Service Schools		1	38	48	31	37	155
Duty with General Staff (W.D.)		5	7				12
General Staff (Troops)	3	2	8				13
Duty with G.S. with Troops			1	1			2
General Staff (Attaches)			4				4
War College (Staff)	1	1	2				4
War College (Students)			12				12
Command and G.S. School (Staff)		1	10				11
Command and G.S. School (Students)		2	23	2			27
Ecole de Guerre (Student)			1				1
Inspector General's Dept	1	1	3				5
U. S. Military Academy			6	4	35		45
Organized Reserves	12	16	16	42	2		88
National Guard		2	22	54	5		83
R.O.T.C.		3	23	47	41		114
Miscellaneous Duties:							
Aides					7	2	9
Recruiting	1		2	4	7		14
Disciplinary Barracks			1	2	2		5
Foreign Language				1	1		2
Battle Monument Commission					1		1
Bureau of the Budget			1				1
Naval War College			1				1
Signal Corps School				1			1
Corps Area Headquarters	1	2		1			4
Detailed with Air Corps			1		3	8	12
Detailed with C.W.S.					1		1
Detailed with Ordnance				2	3	4	9
Detailed with Q.M.C.					1		1
Detailed with Signal Corps			1		1		2
Totals	33	55	236	433	395	262	1414

NOTE.—1. Student officers will not, as a rule, report at schools prior to September 1, 1927. Officers under orders to report to the various schools are carried in the above table as students and not as performing any of the other duties enumerated.

2. Forty-one second lieutenants, commissioned from the 1927 class at the United States Military Academy, are not included in the above table.

(5) The Field Artillery has furnished the quota of regular officers authorized for duty with Organized Reserves and National Guard. This quota appears to be inadequate.

(6) In my last Annual Report, I called attention to the comparatively small amount of service with regular troops available under present conditions to officers of field grade. The average duty with regular troops of field officers of Field Artillery is:

Colonels	four out of ten years
Lieutenant-Colonels	four out of nineteen years
Majors	four out of twenty years

These figures show that unless the field artillery officer has obtained a fair grasp of his arm in practical everyday matters, before he reaches field grade, he will never get it, and thus clearly indicate the importance of giving battery officers a maximum amount of service with gun batteries which is the basis of all Field Artillery Training.

(7) During the past year, there has been some improvement in the number of Field Artillery officers assigned by the War Department to organizations of the Regular Army who have been detached by subordinate commanders for other duties. While this improvement is encouraging, the evil still exists and some remedy for it should be sought.

(8) The settling down of personnel, which was commented on in last year's report, has continued and officers, upon an average, have been at their station for a longer period than at any time since 1916.

(9) In my last Annual Report, I invited attention to the objectionable policy which permits a Corps Area Commander to interpose objection to the proposed assignment of officers for duty with the National Guard, Organized Reserves, and with units of the Reserve Officers' Training Corps. Existing conditions require the placing of such a considerable number of officers on these details that there is no place in the army today for any officer who is incompetent to perform duty with the various civilian components. Several years application of the "Class 'B' elimination" of the National Defense Act, as amended, has practically removed all officers incompetent for these duties from the active list of the regular army. Certainly, the Chief of Field Artillery never recommends an officer for these duties unless his record clearly indicates his suitability for the assignment. Under these circumstances, the General Staff's approval of an unexplained objection by a Corps Area Commander to the proposed assignment of an officer, makes the orderly and balanced distribution of commissioned personnel unreasonably difficult. If the objection to the assignment is based on facts, then the officer objected to should not be assigned to similar duties in some other Corps Area

UNIT	July 1926	Aug. 1926	Sept. 1926	Oct. 1926	Nov. 1926	Dec. 1926	Jan. 1927	Feb. 1927	Mar. 1927	Apr. 1927	May 1927	June 1927	Yearly Per cent. of Authorized Recruiting allotment
1st Division (1st Field Artillery Brigade) Fort Hoyle, Maryland													
Hq. and Hqrs. Battery	38	37	36	33	35	37	35	30	43	41	41	44	94.1%
1st Am. Tr.	54	56	57	56	55	50	51	51	62	58	58	65	90.9%
6th F.A.	828	804	783	764	770	766	701	670	777	785	760	907	87.0%
7th F.A.	805	796	788	772	785	807	831	850	897	904	906	877	89.6%
2nd Division (2nd Field Artillery Brigade) Fort Sam Houston, Texas													
Hq. and Hqrs. Battery	36	32	31	31	31	34	33	33	34	35	34	37	88.7%
2nd Am. Tr.	44	46	45	45	45	51	53	53	52	58	56	54	85.0%
12th F.A.	736	759	751	732	714	759	762	742	727	778	770	773	83.0%
15th F.A.	754	775	757	743	712	759	750	737	723	780	774	772	83.4%
3rd Division (3rd Field Artillery Brigade) Camp Lewis, Washington													
Hq. and Hqrs. Battery	35	35	35	34	33	32	31	31	29	32	31	31	85.3%
10th F.A.	793	806	786	794	776	748	735	717	700	705	676	619	83.0%
76th F.A.	754	728	703	690	689	713	720	721	671	669	668	653	77.9%
13th Field Artillery Brigade, Fort Bragg, N. C.													
Hq. and Hqrs. Battery	38	38	37	32	36	38	38	38	38	37	38	38	97.8%
1st Obs. Battery	59	52	57	57	59	59	65	66	66	65	66	65	91.5%
13th Am. Tr.	49	49	49	44	44	48	47	49	49	49	49	45	97.1%
5th F.A.	679	692	682	661	662	669	687	702	724	730	714	693	89.6%
17th F.A.	588	606	598	575	567	602	611	584	622	609	614	591	92.2%

NOTE.—Authorized Strength, G.O. No. 7, 4/3/26, 15,880; Recruiting Allotment to 11/1/26, 15,880; Recruiting Allotment 11/1/26 to 3/1/27, 14,683; Recruiting Allotment 3/1/27 to 7/1/27, 15,379.

UNIT	July 1926	Aug. 1926	Sept. 1926	Oct. 1926	Nov. 1926	Dec. 1926	Jan. 1927	Feb. 1927	Mar. 1927	Apr. 1927	May 1927	June 1927	Yearly Per cent. of Authorized Recruiting Allotment
Separate Organizations:													
1st F.A.	897	877	848	854	869	877	925	941	919	900	884	862	88.5%
2nd F.A.	409	408	401	369	391	392	400	401	411	399	400	384	96.5%
3rd F.A.	364	368	376	365	354	357	350	355	365	362	364	363	89.0%
4th F.A., McIntosh	406	386	376	371	366	455	444	436	433	492	487	470	81.6%
9th F.A., Snelling, Riley, and Des Moines	487	338	334	350	350	362	373	369	363	353	357	352	90.9%
14th F.A., Sheridan and Jefferson Barracks	328	324	307	301	322	374	401	416	411	404	394	376	90.1%
16th F.A.	420	419	413	415	399	402	381	385	388	406	412	409	90.4%
18th F.A.	392	381	372	378	377	395	401	381	376	358	357	367	84.5%
82nd F.A.	337	335	351	350	364	428	428	429	429	409	386	385	84.7%
83rd F.A.	399	399	375	389	371	369	363	383	390	372	372	337	94.4%
Office Chief of Field Artillery	23	23	23	22	22	22	23	24	24	24	24	24	96.5%
The Field Artillery School:													
3rd Am. Tr.	54	50	57	57	56	52	60	53	53	51	50	52	84.0%
F.A. School Det. White	154	150	143	138	132	135	135	136	131	131	134	142	91.6%
F.A. School Det. Colored	149	162	160	155	150	147	139	145	142	147	151	162	96.6%
Overseas:													
Panama, 4th F.A.	421	411	415	417	397	402	405	398	407	430	433	437	92.7%
Hawaii, 11th F.A.B.	2770	2642	2614	2532	2591	2534	2447	2424	2473	2393	2412	2471	91.9%
Philippine Islands, 24th F.A.	984	991	979	978	973	975	949	949	943	891	891	890	94.6%
Monthly Per Cent. Recruiting Allotment	89.9	88.1	86.6	84.6	92.0	94.5	94.1	93.6	90.5	90.8	90.2	90.9	90.3%

where the facts may be unknown, and the facts should be made a matter of record for the protection of those Corps Area Commanders who do not have personal knowledge of them. And more important still, the objectionable facts should be made of record in order that they may be available for the purpose of eliminating incompetent personnel. Only in rare cases, where considerable personal contact with the objecting Corps Area Commander will be involved in the proposed assignment, is personal dislike or unfavorable opinion a justification for objecting to the assignment.

(10) It is recommended that some action be taken if possible, to reduce the number of officers detailed to the Air Corps, and relieved after a short time, involving unnecessary expense for mileage and transportation and a disruption of the training of young officers. On March 1, 1927, sixteen officers were detailed from the Field Artillery to the Air Corps. On June 30, 1927, twelve of these officers had been relieved from further duty with the Air Corps. The Chief of Field Artillery, with rare exceptions, approves applications of officers to leave his arm. He has accordingly approved a total of forty-four such applications to join the Air Corps. Of this total, twenty-seven are now back with the Field Artillery.

b. Enlisted Personnel.—(1) The Field Artillery has had an unsatisfactory year with regards to its enlisted personnel. The average actual enlisted strength, during the twelve months of the fiscal year 1927, was only 90.5 per cent of the average authorized recruiting allotment. This has been due, however, to causes not under the control of the Recruiting Service. Major Phillipson, in charge of recruiting in The Adjutant General's Office, has coöperated most faithfully in trying to keep the ranks filled. The tables on the two preceding pages show the strength of each unit for the year.

(3) The tables show a remarkably uniform maintenance of strength and equitable distribution of enlisted men, when all the vicissitudes of service are considered.

(4) It is desired to reiterate that the Field Artillery has insufficient personnel to carry out the task assigned to it by the National Defense Act.

(5) Some progress has been noted at certain posts toward carrying out the suggestion contained in my last Annual Report—that Field Artillery units, on account of the nature of their duties, be given special consideration when making fatigue details in mixed garrisons. However, adequate relief has not yet been secured. I desire to reiterate my estimate that relations approximately as follows should be applied in all calls for soldiers for duty away from their organizations:

1 field artilleryman (horse) = 2 cavalrymen;
1 field artilleryman (horse-drawn or pack) = 1 cavalryman plus 1½ infantrymen, or 1½ cavalrymen;
1 field artilleryman (tractor-drawn or portée) = 2 infantrymen.

In my opinion, the present injustice to the Field Artillery, while serving in mixed garrisons, will never be corrected without some suggestion from the War Department.

2. NATIONAL GUARD

a. The following is a résumé of the situation with regards to the Field Artillery of the National Guard; the complete allotment of Field Artillery to the National Guard is as follows:

18 Light Field Artillery Brigades, Infantry Division
4 Separate Battalions, 75-mm. Gun (Horse), Cav. Div.
2 Corps Artillery Headquarters
6 Corps Artillery Brigade Headquarters and Headquarters Batteries
8 Corps Artillery Brigade Ammunition Trains
3 Observation Battalions
17 Regiments, 155-mm. Howitzers (Corps)
3 Regiments, 155-mm. Guns (Corps)
2 Ammunition Trains (Army)
5 Regiments, 75-mm. Gun Portée (G.H.Q. Reserve)
6 Regiments, 75-mm. Gun, Tractor-drawn (G.H.Q. Reserve)
1 6-inch Gun Regiment (G.H.Q. Reserve)
1 Regiment, 155-mm. Gun (G.H.Q. Reserve)

Of the units listed above, the following are those that are included in the Modified Program of National Guard Development, the "250,000 Man Power Project," towards which the National Guard is working:

18 Light Field Artillery Brigades, Infantry Division
4 Separate Battalions, 75-mm. Gun (Horse) Cavalry Div.
1 Corps Artillery Brigade Ammunition Train
16 Regiments, 155-mm. Howitzers (Corps)
2 Regiments, 155-mm. Gun (Corps)
2 Regiments, 75-mm. Gun, Portée (G.H.Q. Res.)
1 Battalion 75-mm. Gun, Tractor-drawn (G.H.Q. Res.)
1 Regiment, 75-mm. Gun, Tractor-drawn (G.H.Q. Reserve)

The tabulation at the top of the following page indicates the status of organization this date, showing the total number of units* allotted and organized.

* Basic Units—Brigade. Regiment and Battalion Headquarters Batteries; Firing Batteries; Service Batteries; Ammunition Trains; Medical Detachments.

b. Great care has been exercised in the selection of regular officers for detail as Instructors with the National Guard and it is believed that these officers are rendering excellent service in the training of the National Guard.

c. As presumably, all details as to strength of the National Guard will be found in the Report of the Chief of the Militia Bureau, such statements are omitted here.

	Total allotted	Modified program	Authorized organization	Organized and recognized	Percentage of total recognized	Percentage of mod. program recog.	Percentage of auth. recognized
Infantry Division	432	432	389	387	90	90	99
Cavalry Division	20	20	9	9	45	45	100
Corps	315	227	135	135	43	60	100
Army	22	0	0	0	0	0	0
G.H.Q. Reserve	145	38	31	31	21	82	100
Totals	934	717	564	562	60	78	100

NOTE.—The above figures include Medical Department.

3. OFFICERS' RESERVE CORPS

a. The status of the Field Artillery Section of the Officers' Reserve Corps is as follows:

LOSSES

Died	23
Transferred	41
Discharged	285
Declined re-appointment	98
Resigned	137
Total losses	584

GAINS

Regular acceptances	706
R.O.T.C. acceptances	591
Transferred	53
Total gains	1350
Surplus of gains over losses	766

The total number of Field Artillery Reserve Officers as of June 30, 1926, was 9926, of whom 1201 also held commissions in the National Guard. The total number of Field Artillery Reserve Officers, as of June 30, 1927, is 10,692, of whom 1328 also hold commissions in the National Guard.

b. The following table shows the distribution of Field Artillery Reserve Officers:

Assignment Jurisdiction	Colonels	Lieutenant Colonels	Majors	Captains	First Lieutenants	Second Lieutenants	Total
Corps Area Commander	73	125	451	1214	1807	5383	9053
Chief of Field Artillery	8	10	42	124	90	28	302
The Adjutant General	3	1	2	2	0	1	9
Totals	84	136	495	1340	1897	5412	9364

NOTE.—Reserve officers holding commissions in the National Guard are not included in this table.

This table shows that about one per cent are in the grade of colonel; one and one-half per cent in the grade of lieutenant-colonel; five and three-quarters per cent in the grade of major, or a total of eight per cent in field grades. This is regarded as very satisfactory.

SECTION II

TRAINING

4. REGULAR ARMY

a. Field Artillery commanders show an increasing interest in the organization of training. Favorable comment which last year was applicable to some is now applicable to nearly all. *Hobbies* are being ridden less and less with a result in better rounded field artillery instruction plans. Occasionally, a higher commander has imposed a training hobby of his own, but given the initiative to which he is entitled, the field artilleryman is getting down to the application of the training appropriate to his unit.

b. Firing instruction is better organized than formerly and seldom is there now found a commander who does not so plan as to obtain the most from his limited ammunition allowance. Due to this planning, better training is resulting from the reduced allowances than was believed possible.

c. In some commands, communications are being developed rapidly; junior officers are being required to demonstrate all-around proficiency and communications are functioning efficiently. In many, however, this progress is not apparent and the efficiency of communications may depend upon a few skilled officers and enlisted men. This should be corrected. An all-around knowledge of, and proficiency in, all types of communications is as essential to a battery officer as is a knowledge of drill movements.

d. A very apparent attempt is seen to develop the other elements of field artillery instruction but, in far too many instances, the drains of administration and fatigue are so great that personnel is not made available for the training of the combat units. It is a source of satisfaction to me that the field artillery accomplishes as much as it does, under the handicaps placed on it.

e. Coöperative training of Air Corps and Field Artillery units suffered severely through the lack of a policy which would make airplane gasoline available for such instruction. In some instances, observation planes were not suitably equipped for two-way radio telegraphy. The airplane field artillery training was not satisfactory in the Canal Zone, where it is especially important that this work be stressed.

f. *Marching*.—Improvement has been noted in training in marching. A greater number of organizations had an opportunity to practice this important item of training during the past year than has been the case for several preceding years. Marching and camping, both by battery and by battalion, are essential if the training of larger units is to be satisfactory. This important element of training needs more attention and all training schedules should allot the necessary time to it.

g. In general, the training of regular field artillery units was intelligently and actively directed, but suffered appallingly from personnel shortages. At certain stations some relief from the detached service and fatigue evils was apparent, at others fatigue appeared to be so increased that it might be said to have been given precedence over training.

h. *Equitation and Horsemanship*.—In my last Annual Report, I commented on the unsatisfactory training in equitation and horsemanship. While this situation has not been entirely remedied, the past year has seen material progress made. Authority has been granted for a small second year course at the Field Artillery School in Equitation and Draft which will probably have a far-reaching effect in improving conditions throughout the service. The first class in this course will enter the Field Artillery School in September, 1927. During the past year, Regulations governing the owning of mounts by Field Artillery Officers have been materially liberalized and already an improvement in the quality of privately owned mounts and in the interest taken in horsemanship is apparent.

i. Officers in their first year of service were given uniformly excellent instruction. Officers were not detached so as to prevent such instruction except at one station where two officers were so detached, resulting in the transfer of one officer to another Arm and in the taking to summer training camp of the other officer not fully prepared to assist in the training of civilian components. The return to the field artillery of first year officers, who have been tried out for the Air Corps, results in these officers being behind in their basic field artillery training and, as this fact frequently is overlooked, these officers are handicapped for many years. The importance of completing the basic training of officers in the first year of their service is most apparent.

j. (1) I have commented (paragraphs 1, *a,* (6) and (7) on the relatively small amount of duty-with-troops possible for field officers and on the slightly improved situation with reference to the detachment of officers supposed to be on duty with troops. In spite of this improvement, a number of instances were observed of officers, assigned to troops by War Department orders, who were detached by Post or other Commanders for considerable periods, often more than six months, performing staff or administrative duties. I desire to emphasize the importance, in these days of much detached service, of leaving with their organizations those officers who have been assigned to units of the Regular Army. Maximum possible duty-with-troops is essential to the proper training of officers.

(2) Nothing can take the place of service with gun batteries in the training of captains and lieutenants. All battalion and higher commanders should be charged with the responsibility of providing the greatest practicable amount of such service for all officers of battery grade assigned to their commands.

(3) In too many commands there is a practice of detaching an excessive number of officers. A strong desire to get more officers actually handling troops is badly needed in the service.

k. The Knox Trophy and Medal.—(1), (*a*) In the Knox Trophy test for 1926, several commands, due to personnel conditions had difficulty in providing a competing battery. Some commands were not represented in the test. The Knox Trophy was competed for under conditions similar to those stated in my report for 1926. The Trophy was again won by a foreign station battery, this year by Battery "C," Fourth Field Artillery, Fort Davis, Canal Zone, commanded by Captain John D. Key, Field Artillery. It is interesting to note that Battery "C," Fourth Field Artillery was a pack battery at the time of the test, though since converted into portée, and that the winners for the previous two years were horse-drawn and tractor-drawn batteries, respectively. Although, due to changes in the rating sheet, the score of the winning battery was lower than for last year, the general average of scores was higher and the competing batteries were more closely grouped. Communications continued to be the lowest scoring element of the test.

(*b*) The Knox Trophy test continues to be an important factor in maintaining the interest of troops and commanders in well balanced training and in assisting the Chief of Field Artillery to compare the degrees of training accomplished in the different organizations. In addition, and most important of all, the specifications of the competition are so drawn as to set forth what may be called a "standard battery," and therefore every battery commander in the service may, merely by comparison, determine the shortcomings of his organization.

(2) The Knox Medal for 1926 was awarded to Corporal L. J. Arnold, Battalion Headquarters, First Battalion, Eighteenth Field Artillery, who stood first in his class at the Field Artillery School.

l. Morale.—Conditions affecting morale have undergone little change—quarters and living conditions are still bad, cost of uniforms and equipment is still disproportionate to pay of junior officers; high prices are often charged, apparently unreasonably, by local tailors; there is an occasional situation where a commander requires clothing standards in excess of War Department regulations and which junior officers are not financially able to meet. The recognition of the mounted status of field artillery officers serving with tractor-drawn units has had a most beneficial effect on morale, as has the trend towards placing responsibility and initiative in the hands of unit commanders. While data is lacking, it is the belief of many officers that large numbers of junior officers are in debt to-day. This is a serious situation, calling for a thorough investigation, if found necessary, and suitable relief. Commanders who are imbued with a feeling of interest and responsibility for the welfare of junior officers and enlisted men are doing much to better their conditions.

m. Safety Requirements in Firing Shell.—(1) Since July 1, 1918, on the recommendation of the Chief of Field Artillery, all personnel of firing batteries have been required to take shelter while firing high explosive shell. Frequent criticism has been made of this requirement on the ground that it tends to make the personnel afraid of their weapons. On account of this criticism, I have caused an examination to be made of the records of premature explosions and the casualties caused by them.

(2) The following table shows the premature explosions and casualties recorded as occurring in the Field Artillery from the entry of the United States into the World War until June 30, 1918.

Date	Caliber	Kind	Model	Place	Killed	Wounded	Remarks
Aug. 27, 1917	3 in.	Gun	1905	Fort Sill	1		
Feb. 6, 1918	155-mm.	How.	Fr. 1918	Fort Sill	3	1	
Apr. 5, 1918	3 in.	Gun	1905	Fort Sill	1	2	
May 8, 1918	6 in.	How.		Fort Sill		2	
June 11, 1918	6 in.	How.		Camp Fremont	1	5	

(3) The table on the opposite page shows the premature explosions and casualties recorded as occurring in the Field Artillery from July 1, 1918, when the present safety precautions went into effect, to present time (June 30, 1927).

(4) It will be noted that during the first period, when no protection of personnel was required, five premature explosions caused six men to be killed and ten to be wounded. During the second period, when protection of personnel was required, nineteen premature explosions caused no casualties. Assuming that the average of casualties per premature explosion during the first period would have been continued in the second period, the safety requirements first published July 1,

Date	Caliber	Kind	Model	Place	Killed	Wounded	Remarks
Aug. 26, 1918	75-mm.	Gun	1916	Fort Sill			
Oct. 9, 1918	75-mm.	Gun	1916	Fort Sill			
Nov. 20, 1918	75-mm.	Gun	1916	Fort Sill			
Dec. 10, 1918	75-mm.	Gun	1916	Fort Sill			
Sept. 17, 1919	8 in.	How.	Vickers				
Aug. 30, 1920	155-mm.	Gun		Camp Lewis			
Sept. 3, 1920	8 in.	How.	Vickers	Fort Sill			
Sept. 4, 1920	8 in.	How.	Vickers	Fort Sill			
Sept. 14, 1920	8 in.	How.	Vickers	Fort Sill			
June 19, 1922	75-mm.	Gun	1917				
Nov. 21, 1923	75-mm.	Gun	1897	Fort Bragg			
May 6, 1924	75-mm.	Gun	Fr. 1897	Fort Hoyle			
Nov. 6, 1924	155-mm.	How.	1918	Fort Bragg			
Nov. 14, 1924	155-mm.	How.	1918	Fort Bragg			
Dec. 24, 1924	75-mm.	Gun	British	Schofield Bks.			
Aug. 24, 1925	75-mm.	Gun	British	Schofield Bks.			
Nov. 9, 1925	75-mm.	Gun	Fr. 1897	Fort Benning			
June 22, 1926	75-mm.	Gun	Fr. 1897	Camp Sparta			
Sept. 6, 1926	75-mm.	Gun	Fr. 1897	Pine Camp			

1918, have saved the lives of twenty-three men and prevented thirty-eight others from being wounded. Objectionable as these safety requirements may be, they are clearly essential in peace time training until an entirely bore-safe fuze for the high explosive shell is developed and issued.

5. OFFICERS' RESERVE CORPS

a. New regulations have recently been published governing examination and promotion of reserve officers. These regulations have occasioned considerable comment, both favorable and unfavorable.

They have been in effect too short a time to permit me to comment on them intelligently and so all comment on the subject is withheld.

b. There is, however, a related subject on which I commented in my last Annual Report and which, so far as I know, has not been further considered. This is the equalization of promotion between regular and reserve officers. In my opinion, this equalization is desirable for maintaining the morale of both classes of officers, and is essential in order to provide a well balanced army in time of mobilization.

c. On account of the expense involved no camp of instruction for Field Artillery Reserve Officers of the *Branch Assignment Group* was held during the past fiscal year. All such officers, for whose active duty funds were available, were given training by Corps Area Commanders at my request or were given training at the Field Artillery School. This method of training proved so satisfactory and economical that it will probably be continued in the future.

6. NATIONAL GUARD

No inspections of Field Artillery National Guard organizations were made during the past fiscal year. I assume that a statement of their condition will be made in the report of the Chief of the Militia Bureau.

7. THE FIELD ARTILLERY SCHOOL

a. During the past fiscal year, Regulations for the Field Artillery School were published as Army Regulations 350-600. No material changes in policies or methods already in effect were involved.

b. (1) *Officers Courses*.—Seven separate courses for officers were held during the School Year 1926–1927, as follows:

Battery Officers' Course	(Regular Officers)
Advanced Course	(Regular Officers)
National Guard and Reserve Battery Officers' Course	(Two—Fall and Spring)
National Guard and Reserve Field Officers' Course	(A Refresher Course)
Refresher Course	(Regular Officers)
Refresher Course	(Special General Officers)

(2) *The Battery Officers Course*.—This course was taken from September 15 to June 10 by a class of eighty-three officers, including:

78 Field Artillery	(10 failed to graduate; 1 relieved)
2 U. S. Marine Corps	
2 Officers of Cuban F.A.	(1 failed to graduate)
1 Officer, Irish Free State.	

This course is well standardized, any tendency of change being towards the substitution of practical for theoretical instruction.

(3) *The Advanced Course*.—This course was taken from September 15 to June 10 by a class of twenty-seven officers, including:

23 Field Artillery 1 Infantry 1 Air Corps 1 U. S. Marine Corps 1 Cuban F.A.	(All students were graduated.)

The principal change in this course, contemplated for 1927–28, is the addition of practical work in marching and march discipline.

(4) *The National Guard and Reserve Battery Officers' Course*.—This course (September 15th–December 10th and February 7th–April 30th) was taken by two classes totaling fifty-nine officers, including:

38 National Guard	(14 failed to graduate)
21 Reserve Corps	(8 failed to graduate)

This course will remain essentially unchanged. Students who have a good familiarity with field artillery and a satisfactory basic education are uniformly successful. Others, less well prepared, are unable to master certain parts of the course and are given certificates in place of diplomas. The course is not designed for beginners, and student officers should be selected with special care. It is desirable that one-half of the total students attend each course, since uniform classes make for better instruction.

(5) *The National Guard and Reserve Field Officers' Course*.—This course (January 3rd–February 12th) was taken by a total of nine officers, including:

8 National Guard 1 Reserve Corps	(All officers satisfactorily completed the course.)

This is essentially a refresher course in which much of the profit depends upon the previous field artillery training of the student and upon his personal interest. The standard of the student classes has been uniformly high.

(6) *The Refresher Course for General Officers and for Field Officers of Field Artillery*.—This course (February 7th–May 7th) was taken by a class of ten officers, including:

1 general officer 3 colonels of Field Artillery 6 licutenant colonels of Field Artillery	(All officers satisfactorily completed the course.)

The results of this course strengthened the impression, which I expressed in my report last year, of its value in enabling experienced senior officers to brush-up on details of field artillery technique with which their diverse duties did not permit them opportunity for personal contact. This course is serving a most useful purpose, but, due to the limitations of School facilities, the classes must be held down to their present size.

(7) A Special Refresher Course for General Officers of the Regular Army was attended as follows:

Brigadier-General H. O. Williams (Dec. 21st–Jan. 21st);
Brigadier-General Alston Hamilton (March 10th–April 11th).

c. Enlisted Specialists Courses.—(1) Five Courses for Enlisted Specialists were held in the School Year 1926–1927.

(2), (*a*) *The Horseshoers' Course (September 15th–January 29th)* was attended by twenty-one students from seven different regular army commands and the National Guard, including:

19 Regular;
2 National Guard (Reg. D.E.M.L.) } (All students satisfactorily completed the course.)

(*b*) *Horseshoers' Course (Spring Course) (January 31st–June 10th)*.—This was a special course attended by seven enlisted men of the local garrison.

(3) *The Motor Mechanics' Course (September 15th–January 29th)* was attended by eleven enlisted men of the Regular Field Artillery from three different commands. All satisfactorily completed the course.

(4) *The Saddlers' Course (February 7th–June 10th)* was attended by seven enlisted men of the Regular Field Artillery from three different commands. All satisfactorily completed the course.

(5) *The Communications Course (February 7th–June 10th)* was attended by fifty-three students from eleven different Regular commands and the National Guard, including:

25 Regular Field Artillery (2 did not complete course.)
2 Regular Infantry
26 National Guard (2 did not complete course.)

(6) *The Battery Mechanics' Course (February 7th–June 10)* was attended by three enlisted men from six different Regular Field Artillery commands. One student failed satisfactorily to complete the course.

(7) *Special modified courses* of instruction were given to ten enlisted men of the Eighty-third Field Artillery Battalion under special instructions of the War Department. Enlisted men received instruction as follows:

Saddlers 4
Horseshoers 3
Stable Sergeants 3

(8) Enlisted Specialists Courses will continue without material change except that in 1927–1928 two courses (fall and spring) have been recommended for Saddlers. It is most essential that, in selecting students, commanders consider their character and suitability. Such men should be dependable, without constant supervision, and suited by education and bent for the particular specialty. Not only is it a loss of money to send an unsuitable man but he hinders instruction

in any class to which he may be assigned. Better to send no student than one not worth while.

d. Correspondence Courses.—This subject was dealt with in some detail in my report of last year. Conditions remain practically unchanged. This work is an added burden on Instructors already heavily laden, and upon an insufficient clerical staff. The purpose of the course is worthy and is entitled to special consideration of the means for its efficient maintenance. Adequate means are not now provided.

e. Instruction.—(1) *Tactics and Communications*.—Constantly, the endeavor is made to give the student opportunity to solve problems involving command of troops present on the ground. The additional time required for practical exercises as compared with the more theoretical has necessitated the most careful coordination of the work of the various departments and of the use of the school troops. This practical instruction has covered the normal reconnaissance, selection and occupation of positions, by day and night; marches and movements, by day and night; the use of all means of communications; liaison with and close support of an Infantry battalion; practical demonstration of the supply of field artillery ammunition from refilling point to the guns of a division; and culminated in a practical five-day General Field Exercise in the Wichita Forest Reserve. Advantage is taken where practicable of the increased uniformity of basic instruction given students prior to reporting, and for the coming year the time formerly devoted to instruction in sketching will largely be given to other subjects. Instruction in communications will be made more than ever practical. Reduced allowances of Infantry ammunition interfered somewhat with the effectiveness of the Infantry demonstrations during the past year.

(2) *Gunnery*.—Coördination between the Gunnery and Tactics department has insured the test of occupation of position, fire direction, and conduct of fire under the assumed tactical situation, this both by day and night, and both in deliberate and quick moving situations. Special effort was made to perfect and to improve the employment of air observation but this work was badly handicapped by the shortage of airplane gasoline. Within the limit of allowances, every effort was made to have each student solve all types of firing missions.

(3) *Animal Transport and Equipment*.—The increase in horses materially benefited instruction in this department. However, the shortage of enlisted personnel was acutely felt, since the added care of animals, stables and horse equipment was a tremendous burden upon the few enlisted men available. Additional personnel must be forthcoming if this situation is to reach maximum effectiveness. The

increased demands for horses to mount students in practical tactical exercises emphasizes the urgency of this situation.

(4) *Aërial Observation*.—It was impossible to carry out the War Department instructions for practical training in Aërial Observation to the degree desired, because of the unforeseen cut in airplane gasoline. There would appear to be some lack of coördination between the policies announced and the allocation of training gasoline. Fifty-two student officers volunteered for this instruction, of whom thirty-seven were classed as qualified upon the completion of the course. It is obvious that such officers should be given the increased compensation for extra hazardous duty, during the period, estimated as one month each, of such air observation instruction. The Instructors, who voluntarily expose themselves to these extra hazards, should receive extra compensation for the full twelve months each year, subject to the usual requirement as to hours in the air. It is estimated that this would involve extra compensation for two officers for twelve months each. With the removal of the Observation Squadron from the Field Artillery School, it will be impossible to maintain past standards in instruction involving the use of airplanes.

f. School Troops.—Shortage in School Troops and reduced strength of those authorized sadly handicap the practical instruction which the School endeavors to give. Units are worked to the limit and, if also required to carry on summer training camps, some reduction will be necessary in the work required of them in School instruction. There is an urgent need for a systematic and regular supply of recruits; for additional units; and for an increase in the strength of certain units now authorized. With a yearly reduction being applied to the total Field Artillery allotment, it is not seen how these reliefs may be accomplished, and some curtailment of instruction may be forced through necessity.

8. COURSES FOR REGULAR FIELD ARTILLERY OFFICERS AT CIVILIAN EDUCATIONAL INSTITUTIONS AND AT OTHER SPECIAL SERVICE SCHOOLS

a. During the past year, field artillery officers have attended courses at such schools as follows:

Automotive Engineering, Mass. Inst. of Tech.	2 officers
Communications Engineering, Yale University	2 officers
Ballistics, University of Chicago	1 officer
Cavalry School	2 officers
Signal Corps School	2 officers
Air Corps Tactical School	1 officer
Chemical Warfare School	3 officers

One officer completed the course (two months) at Sweeney Automotive School, Kansas City, Missouri, in August, 1926, and four officers entered in June, 1927.

b. I fully appreciate the advantages derived from having selected officers attend special courses of instruction and desire to take full advantage of the opportunity offered by Section 127a, National Defense Act. However, as pointed out in my report last year, details to such schools must be weighed and balanced with details to the regular courses at the Field Artillery School and, in some instances of relatively short courses, with the item of relative cost of transportation. Officers are selected for such details in the interest of the Field Artillery Arm and ordinarily are graduates of one of the regular courses at the Field Artillery School. Officers so selected possess the requisite educational groundwork and exhibit an especial interest in and aptitude for the specialty. It is planned to send officers to at least two additional courses in 1927–1928.

9. RESERVE OFFICERS' TRAINING CORPS

a. This activity is one of the most valuable and far-reaching provisions of the National Defense Act. A visit to our great educational institutions and a careful inspection of the R.O.T.C. work, arouses one's enthusiasm over the exceptionally high type of college man now graduating from the Advanced Course into the Organized Reserves.

b. Immediately after the war, there was a natural reaction against military training. The colleges were filled with young men who had had war experience, and who were therefore eager to drop and forget everything "military." During the first few years of the post-war period, the R.O.T.C., as a consequence, labored under the handicap of this very natural attitude on the part of the student. This attitude has now almost wholly disappeared, and in general the work is progressing in an atmosphere which varies from sympathetic to enthusiastic. Aggregate enrolment has reached the point where it is approximately sufficient to meet our needs for reserve officers. Greater attention can, therefore, be paid to perfecting our courses, and to securing the best possible type of young men for the Advanced Course. It is not to be expected or presumed that every young man in college should be in the Advanced Course of the R.O.T.C. any more than that every one of them should go into Medicine or Law. It is desired, however, that every college man in the Advanced Course be one who has a special aptitude and fondness for the work, one of engaging personality who possesses to a considerable degree native leadership ability, one of reasonably high scholastic attainments, and one of fine character—in other words a *good man*. That the Advanced Classes in our units are now so generally composed of young men of this type is a matter of profound satisfaction, and of great potential import to our country.

c. *The Needs of the R.O.T.C.*—(1) At the present time, the

needs of the R.O.T.C. are not great, but they are exceedingly important. I list them in what I judge to be the approximate order of their importance.

(2) *Greater Stability*.—University officers and governing boards must plan and publish in their catalogues, the courses of their several departments, including that of the R.O.T.C.—their Department of Military Science. An abrupt change in the assignment of officers or enlisted men, or in the number of students to be enrolled imposes embarrassing hardships on the institution. Frequent changes in the location of summer camps militate against their attractiveness and seriously disarrange the plans of many individuals.

(3) *Better Uniforms*.—The R.O.T.C. student is ashamed of his uniform, issued, as it is, from war surplus stock. Especially is this the case at those institutions where Navy units are associated with Army units. The Navy has a smart, well tailored, perfectly fitting uniform in which the student is proud to appear.

(4) *Additional Enlisted Men*.—Field Artillery units are an average of seven enlisted men per unit short of the number that I deem the minimum for the efficient and proper conduct of the units. Seven is a small number when dealing merely in figures, but it is a whole lot when it comes to grooming and caring for equipment. There is a limit to what a man can do day after day, and in the absence of these seven men, the work simply does not get done.

(5) *Additional Officers*.—Field Artillery units last fall aggregated an enrolment that is only 1300 students under that which is necessary to produce the number of Field Artillery officers deemed necessary. Steps, therefore, can be taken to stabilize them at a little over their present strength. No additional growth of importance is necessary, and, on account of economy, none is desirable. Attention can now be devoted entirely to improving quality of output. The most important factor in accomplishing this is to conduct courses that are on a high educational and technical standard. This can be done only with a proper number of qualified instructors. Field Artillery units are now ten officers short of the number that I deem necessary. These, if supplied, would bring the number up to what would seem to be sufficient for the Field Artillery R.O.T.C. project. A survey of the Field Artillery units discloses the fact that officers are devoting to actual classroom teaching a considerably greater number of hours per week than the average permitted by those institutions that place a limit on the hours of their Civilian Instructors. The danger involved is that courses may be permitted to suffer in excellence and interest. At many Field Artillery units the sickness or absence of an officer means that his classes cannot meet—there is no substitute available to take them. Among those senior officers of the Army, who have not studied this question

as I have, there is a general belief that there are too many regular officers on R.O.T.C. duty. In so far as the Field Artillery is concerned, such an opinion is utterly wrong, and I again renew my previous recommendation—that the extra ten officers needed be authorized.

(6) *Basic Camp*.—Although the same would probably hold with all branches, I regard it as particularly necessary for the Field Artillery to have a few selected men from the 1st or 2nd Year Basic Course, sent to a Basic Camp. The number should be limited to about five per cent of the 2nd Year Basic (Sophomore) class, but should be allowed to include either Freshmen or Sophomores at the option of the P.M.S. and T. This camp would thus be a reward for outstanding merit and the men who had taken it would, upon going to the Advanced Camp, be of inestimable value as first sergeants, stable sergeants, chiefs of section, squad leaders, etc., and as Instructors in helping the students, new at camp, smoothly and quickly to learn the numerous details of camp life.

SECTION III

HORSES AND FORAGE

10. HORSES

a. *Supply*.—(1) While gradual replacement of the war-time horses held in service has been going on, examination of organizations shows that there are many aged animals still in service. In one regiment, there are approximately one thousand horses more than fifteen years old—of which more than three hundred are older than twenty years. In one Brigade Headquarters Battery, out of a total of thirty-three horses, there are twenty-five more than fifteen years old—of which seventeen are older than twenty years. From this, it is apparent that for the next few years replacement of horses will necessarily be much greater than the normal ten per cent.

(2) It is desired to call attention to the fact that while the horse shortage has received considerable attention, practically nothing has been done toward correcting the aggravated condition of the mule shortage. To begin with, the reduced allowance of mules for artillery organizations was placed at a minimum. In practically every unit, there is now a shortage and the extreme age of those on hand make most of them unfit for field service. Funds for yearly replacement to meet the requirements of the situation should be included in the budget.

(3) It is important that the replacement of horses and mules be placed on a systematic basis. Once the exceptionally large number of old animals that now fill organizations have been replaced, these yearly replacements should be very nearly a fixed figure. At

the present time, there is a fight each year to determine whether or not any animals will be purchased and, if any are, the number that will be bought. This should be fixed by policy and the policy until changed should be fought for by the War Department Budget. I use the word "fought" advisedly, for apparently adequate military appropriations can be obtained in no other way.

(4) The coöperation of the Remount Section of the Quartermaster General's Office (Major C. L. Scott) during the past year has left nothing to be desired. The result has been many expressions of satisfaction, relative to the horses received by artillery organizations over the country.

b. Equitation.—(1) Elsewhere in this report (paragraph 4, *h*) I have commented on the improvement in conditions affecting training in equitation.

(2) During the past year, through the courtesy and assistance of the Chief of Cavalry, the Cavalry arm and the Remount Service, two officers of Field Artillery were members of the United States Army Horse Show Team, which represented the Army at certain important horse shows, riding mounts developed at the Cavalry School. This has had a very beneficial result in raising the interest of the entire Field Artillery in equitation and horsemanship. Plans are now being formulated to develop high-class horse-show mounts in the Field Artillery, and it is hoped that in the future this arm will be able to coöperate more fairly with the Cavalry. I desire to record the obligation of the entire Field Artillery for the generous assistance of the Cavalry and the Remount Service in this matter.

c. Mounted Status of Field Artillery Officers.—In paragraphs 4, *h*, and 4, *l*, I have commented on the liberalization of the regulations, of which I complained in my last Annual Report, which discouraged the ownership of private mounts by many Field Artillery officers—particularly those assigned to motorized organizations. The liberalization of these regulations, during the past year, has already shown a beneficial effect in the increased number and improved quality of private mounts and in the improvement of morale.

II. FORAGE RATION

The reduced ration of hay and grain, of which I complained in my last Annual Report, has been put on an elastic basis which permits commanding officers to vary the amount of food in accordance with the amount of work required. This seems to be giving satisfactory results, but more experience with the present system is necessary before it can be given definite approval.

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PART I

G.H.Q. ARTILLERY

A LECTURE

BY LIEUTENANT COLONEL EDWARD H. DEARMOND, F.A.

1. THE idea of a General Artillery Reserve Developed in the French Army during the World War: The 75-mm. gun, in which greatest dependence had been placed, was found to be outranged by German field artillery; and the ammunition for the organic field types of artillery was practically exhausted. The result was a heterogeneous mass of cannon of all types for which ammunition existed, called forth from everywhere to serve with the field forces. Also, manufacture and development began of types better suited to field employment. An administrative headquarters for this unorganic artillery was established, and continued thereafter throughout the war. At first a division was made between Army horse-drawn types and the tractor-drawn, the latter, only, being assigned to the Reserve. Later the horse-drawn types, also, were placed in the Reserve; and, still later, largely due to shortage of horses, some of the light field guns were made portée and gradually passed to the Reserve.

The mobility of this general reserve artillery was, except for a few units of portée 75's, the mobility of tractor-drawn units. The importance of strategic mobility in the reserve artillery was demonstrated by circumstances, especially in 1918. Today we are thinking of greater mobility, faster rates, and the G.H.Q. Artillery of our organization is limited to field types, those designed for maneuver. It is well to understand that many types to be found in the French war organization were entirely unsuited and out of place but included under the urge of necessity.

2. In April, 1919, General Pershing convened a Board, which became known as the Superior Board, "to consider the lessons to be learned from the present war in so far as they affect tactics and organization."

The Superior Board recommended that there be no organic army artillery but, instead, a General Reserve of Artillery. In illustrating the requirements of this General Reserve the Board took the situation offered by the Meuse-Argonne offensive of September 26, 1918, and, considering only the three corps west of the Meuse, the 1st, 3rd and 5th, the General Reserve thus figured was approximately 103 per cent. of the combined organic Corps and Division Artillery.

However, in forwarding the report of the Superior Board to the Secretary of War, General Pershing took occasion to observe:

"The recognized ability of the officers who composed the Superior Board entitles their opinions to great weight. But I think that the work of this Board was undertaken so soon after the close of hostilities that the members were unduly influenced by the special situation which existed during our participation in the World War. Thus, in my opinion, the recommendations of the Superior Board are based upon the necessities of stabilized warfare in Western Europe rather than upon the requirements of warfare of the character and in the theatre upon which we are most likely to be engaged."

I present this quotation because, later, I expect to comment, somewhat, upon our present organization.

3. Prior to this, in December, 1918, the Chief of Field Artillery recommended the appointment of a Board, now generally referred to as the Caliber Board, "to make a study of the armament, calibers and types of matériel, kinds and proportion of ammunition, and methods of transport of the artillery to be assigned to a Field Army."

The Caliber Board recommended two types, a gun and a howitzer, each for the Division, Corps and Army. Progress in the development of these cannon will be discussed later. The Board, also, in a minority report, introduced the question of organization. This minority report opposed the idea of organic Army Artillery and favored, instead, an Artillery Reserve.

4. In June, 1920, the Director, War Plans Division, W.D.G.S., organized a "Special Committee" "to define the general plan of organization to be adopted for the Army provided by the Act of June 4, 1920." The report of the Special Committee, slightly modified by a memorandum submitted by the Chief of Staff, was approved by the Secretary of War on September 1, 1920.

In this approved report of the Special Committee provisions for Army Artillery and for G.H.Q. Artillery of the G.H.Q. Reserve were made as follows:

(*a*) Army Artillery
- Army Artillery Headquarters
- I ammunition train
- (Also 1 Antiaircraft Brigade of 3 regiments, not classed as Army Artillery).

(*b*) G.H.Q. Reserve (pro rata of artillery for *one* army).
- G.H.Q. Artillery (pro rata for one army).
  - One Brigade* of light artillery, including:
    - 3 regiments of 75-mm. (motorized)
    - 3 regiments of 75-mm. (portée).
  - One Brigade of medium and heavy artillery, including:

* See paragraph 5 for changes.

2 regiments 155-mm. G.P.F. (motorized)
2 regiments 240-mm. howitzers (motorized)
1 regiment 6″ guns (motorized)
(Also 1 Regiment Antiaircraft Artillery and Machine Guns, not classed as G.H.Q. Artillery).

(*c*) G.H.Q. Reserve (total of artillery for 6 armies).
G.H.Q. Artillery (for 6 armies).
6 Brigades† of light artillery, each of
3 regiments 75-mm. (motorized)
3 regiments 75-mm. (portée).
6 brigades of medium and heavy artillery, each of
2 regiments 155-mm. G.P.F. (motorized)
2 regiments 240-mm. howitzers (motorized)
1 regiment 6″ guns (motorized).
1 regiment trench mortars
1 sound ranging service (10 S.R. companies).
1 regiment† 12″ guns (railroad)
1 regiment† 16″ guns (railroad)
(In addition, † but not a part of the G.H.Q. Artillery, there was G.H.Q. Antiaircraft Artillery and Machine Guns, consisting of 1 brigade of 6 regiments).

5. The major items shown above are still in force, except in two or three particulars:

(*a*) The light artillery brigade of six regiments has been replaced by two light brigades of three regiments each (one brigade of motorized and one brigade of portée). This change, carried through to the G.H.Q. Artillery for six field armies, provides 12 light artillery brigades instead of the 6 listed above, but the same number of regiments.

(*b*) The two regiments of railroad artillery provided in the G.H.Q. Artillery for 6 field armies have been withdrawn and are now allotted to Harbor Defenses.

(*c*) G.H.Q. Antiaircraft Artillery is listed under the general heading of G.H.Q. Artillery.

These changes are carried in the approved War Department General Mobilization Plan.

(*d*) A fourth change worthy of mention here is connected with the organization of a Cavalry Corps, authorized by letter of the Adjutant General dated September 20, 1927. The only organic field artillery in the Cavalry Corps is the headquarters of a field artillery brigade. The following regiments of field artillery "may be attached to the Cavalry Corps from troops especially assigned or attached to the Army for this purpose":

1 regiment 105-mm. howitzers (horse-drawn).

† See paragraph 5 for changes.

1 regiment 75-mm. pack howitzers (or two regiments in case the horse-drawn 75's of the Cavalry Division are increased from a battalion to a regiment per division).

These units were not previously provided for, either in the Army Artillery or in the G.H.Q. Reserve.

6. As has been seen, the various Boards recommended in favor of a G.H.Q. Artillery, rather than organic Army Artillery. The Chief of Artillery, A.E.F., in forwarding the report of the Hero Board (the Artillery Board convened in the A.E.F. following the War), made the same recommendation.

The Chief of Field Artillery was less wedded to the plan as it was worked out, believing then, as now, that there was a need to think in smaller figures, and that a Field Army, considered alone, might very probably require a different quantity and different types than would be allotted, by percentage, to it as a part of a much greater force. However, the question was not of primary importance and he was not in a position to feel himself qualified to comment either from personal experience or from observation. Something of this thought will be presented for your consideration.

7. The Superior Board, for a field army of 12 divisions, organized into 3 corps, recommended an average of approximately 7½ regiments of field artillery, all types, per division. The recommendation was based upon a situation of the World War.

The Special Committee, for a field army of 9 divisions (smaller in size), organized into 3 corps, recommended an average of approximately 4½ regiments of field artillery, all types, per division. The approved recommendation of the Chief of Staff increased this by one regiment per division.

In each case the quota of G.H.Q. Artillery for one army was, obviously, a percentage of the great reserve mass, the mass needed as a reserve for a force of many armies. The larger project governed not only the proportionate distribution but also the types.

8. The types recommended by the Special Committee and given effect in our approved mobilization plans are, per army:

75-mm. tractor-drawn	(3 regiments)
75-mm. portée	(3 regiments)
155-mm. G.P.F.	(2 regiments)
6-inch gun	(1 regiment)
240-mm. howitzer	(2 regiments)

(*a*) Organically, and aside from means of traction, the 75's of the G.H.Q. differ from the 75's of the Division in that the tractor-drawn regiments have no battalion combat trains; and that the portée regiments have no battalion combat trains, have reduced ammunition and no tactical mobility.

The tendency of thought with respect to the light field artillery regiments of the G.H.Q. is that they should have an organization essentially identical with that of the division field artillery regiment. For tractor-drawn units this would mean the addition of battalion combat trains. For the regiments now classed as "portée" the change would be greater; they would become essentially identical with the tractor-drawn.

The "portée" unit as originally discussed is not the portée of present thought. Then, the idea of strategic mobility overshadowed all others; a battery had but one tractor for the maneuver of its four guns, and hence had no tactical mobility; had but 60 rounds of ammunition per gun, and no reserve in the battalion or regiment. Plans were under way to increase tactical mobility but were uncompleted at the time of the Armistice. The portée was a type of special and limited employment, too much so, in the thought of today, for its maintenance to be justified.

While the Chief of Field Artillery has never been able to secure at his disposition a unit with which to carry on tractor-drawn and portée experiments, there are units organized as tractor-drawn and these units have done some experimenting in portée. In Hawaii, two regiments of 75-mm. are tractor-drawn, and in one battalion of one of these regiments portée has been extensively tried. The value of this work has been limited by a necessity of utilizing such equipment as was available locally. In Panama, the field artillery battalion has been made portée, but the organization was modified so as to provide sufficient tractors to insure tactical mobility. At the Field Artillery School one battalion of light field artillery is tractor-drawn, and recently one battery was hastily given the added transport required to secure portée mobility; marched to Marfa, Texas; maneuvered with the 1st Cavalry Division, and marched back. With old trucks taken from the post motor-pool and equipment unnecessarily heavy, this column was able to average about 70 miles per day, with high runs nearly 50 per cent. greater. The total load carried and trailed by a gun truck was about fourteen tons. The drivers, although qualified truck drivers, had had no previous experience in handling trucks so loaded.

The thought that I desire to present is that the light regiments of the G.H.Q. Artillery should be capable of the rapid movement which we term "strategic mobility" but should also possess the organization and mobility that would admit of their being attached to and maneuvered with division field artillery.

Later, I will refer to the progress made in developing the light field howitzer. This is a division type, with a mobility comparable

to that of the 75-mm. gun. When available, it will deserve a place in the light field artillery of the G.H.Q. Artillery. This type, also, should be capable of both tactical and strategic mobility.

(*b*) The 155-mm. G.P.F. regiments of the G.H.Q. Artillery have an organization identical in all respects with those of the corps. This gun is transported in a single load weighing upwards of 14½ tons. While lacking the mobility desired in the corps types, the units of the 66th Brigade, the only organic Corps Artillery Brigade which saw extensive and varied service in the World War, were maneuvered in a manner beyond all expectation. Progress in the development of a more suitable corps gun will be discussed later.

(*c*) The 6″ gun regiments have the same organization tables as the 155 G.P.F.'s. No units equipped with this type are maintained in our peace organization, and little or no knowledge of its employment is available. Due to the complication of types involved, the 6″ gun is not looked on with much favor in the Field Artillery. As an Army type, its one great advantage over the G.P.F. is in range: 19,600 yards as against 17,700. One great defect is limited traverse: 8 degrees as against 60 degrees. The gun is transported in one load weighing about 12½ tons. There are but 150 of these guns; 99 carriages, and no ammunition. Many Field Artillery officers would be glad to have the G.P.F. substituted for this type.

(*d*) The 240-mm. howitzer, like the 6″ gun, is not found in the division or corps. It is the most powerful of the field types. Compared with the 155-mm. howitzer, its projectile weighs 345 pounds as against 95; its range is 16,400 yards as against 12,400; its traverse, when mounted on the firing platform, is 20 degrees as against 6 degrees for the 155-mm. howitzer; but the latter may be shifted by hand whereas a shift of the former requires as much (or more) labor and time as an original emplacement. The 240-mm. howitzer is transported in four loads and requires five or more hours to emplace.

9. The employment of all field artillery is in conformity to the great plan of the higher commander. Each field artillery commander should be sufficiently informed of any action of other artillery which might affect his own mission. The allotment and employment of G.H.Q. Artillery are governed by the general plan: G.H.Q. allots to armies much or little of the available artillery in accordance with the importance and difficulty of each army mission. The units of the G.H.Q. Artillery, once allotted to an army, are employed in two ways: sub-allotted to corps in accordance with their requests, or the

importance of their missions; or retained under army control. Corps in turn may sub-allot to divisions, or retain under corps control.

(*a*) In general, if the unit is to continue under division or corps command throughout the engagement; *i.e.,* if it is to maneuver with the command to which attached, it should be of a type (light or medium) similar to that with which the command is normally equipped. This is not always practicable, especially with existing matériel.

If an attached unit is to serve a limited purpose not involving maneuver with the command, the question of type and maneuverability becomes relatively less important.

It is desirable that artillery fire employed on or in connection with division missions should be under division control; but shortage in artillery may make such action impracticable. Artillery retained under corps control should have the range to execute corps missions beyond the division artillery zone, and no types should be retained under army control which have ranges insufficient to fire at targets beyond the corps artillery zone.

(*b*) As I have said, the types employed directly under army control require great range so that they may be specially efficient at ranges beyond the outer limit of the corps artillery zone. While desirable, theoretically, that they should have sufficient range and traverse to permit covering the entire army artillery zone at its inner limit, such a requirement is obviously impractical. But these heavier types, which cannot be traversed by means of shifting the trails, should possess the greatest possible traverse on the carriages.

The most suitable of the heavier field types in this respect is the 155-mm. G.P.F. which, with its 60 degrees traverse, covers a front whose width is approximately equal to the range. The 240-mm. howitzer, under most favorable conditions of mounting, is only about one-third as efficient in traverse; and the 6-inch gun, less than one-seventh as efficient. The location and employment of all of these army types, under direct army control, are governed by the limited and specific missions which are to be assigned them. A single piece of neither of the latter two types can be traversed so as to cover a normal division front. A battalion (2 batteries) of 240-mm. howitzers, firing at 13,000 yards and emplaced so that the battery fields of fire do not overlap, could concentrate the fire of one battery over a front of approximately 8000 yards.

Of these two items, range and traverse, the latter is most frequently overlooked in problems. The units of the heavier types are so few in our peace establishment and their employment in problems so greatly limited to those affecting large commands

that the technical question of the power of a weapon to accomplish all that is frequently required of it is seldom raised.

The fire of a single battery is the least that should be concentrated on an objective of any importance; preferably, it should be possible to concentrate the fire of a battalion. Using the regiment of 155-mm. G.P.F., of three battalions, it is possible to cover the front of an army of three corps (assumed as about 20 miles) and concentrate the fire of a battalion on any point of the army artillery zone. Three regiments of 240-mm. howitzers would be required to effect such concentrations. However, concentrations of less power and upon restricted areas may serve the need of any special situation. The location of battalions should, preferably, be in rear of the center of the sectors they are to cover, and with special reference to specific missions.

10. I have said that there is some question as to the soundness of the present provision of G.H.Q. Artillery. It is commonly accepted that as forces increase in size their powers of maneuver decrease. The division, if adequately supplied with field artillery for combat as a separate unit, should require some accession to its artillery power when its maneuverability is restricted through its being joined with other divisions into a corps. Our organization recognizes this condition and provides corps artillery. Similarly, the corps is restricted as to maneuver when formed with other corps into a field army. The lack of maneuverability develops increased frontal resistance and more extensive ground organization. A question apparently unanswered is that as to the amount of field artillery required by a field army operating alone. The amount given under the present organization based upon six field armies is not the answer, in my opinion, and I favor a study of allotments to a field army when acting alone, and also of the somewhat different problems of the requirements of an army which is one of a group but which is facing normal conditions on its own front. It is relatively immaterial whether this artillery be organic or not; but probably organic army artillery, thus computed, would be better, with, in addition, quotas of G.H.Q. Artillery provided for various sized groups of armies.

In practice, the great G.H.Q. Artillery will be determined at the outset by the availability of matériel and ammunition. As an example, it is idle to depend upon the 6-inch gun, even to the extent of a single regiment, since there is no ammunition. Assuming that ammunition were available, we have carriages enough to mount the guns of only four regiments. The following table shows the requirements in field cannon for *one field army* and the status of matériel and ammunition for the various types:

Type	Requirement I field army	Number of guns and carriages on hand in U. S.		Ammunition on hand in U. S.
75-mm. Fr.	432	*3534 G.	3555 C.	4,000,000 shell 2,500,000 shrapnel
155-mm. H.	216	2978 H.	*2096 C.	823,000
155-mm. G.	120	*794 G.	940 C.	93,000
240-mm. H.	48	309 H.	*303 C.	1,700
6-inch G.	24	150 G.	*99 C.	0
Pack H.	24	New matérial		
105-mm. H.	†24	New matérial		

* Limiting figure.

† Nine division regiments not included.

The requirement of six field armies in matériel may be met for all types except the 6-inch gun, and the two new types. The latter are provided for, in part, in the ten-year program. 155-mm. guns and 240-mm. howitzers in the hands of the Coast Artillery Corps are not included in the figures. The General Mobilization Plan requirements for seven 155-mm. gun regiments in the Coast Artillery Corps have not been considered for the reason that the field forces have precedent claim on the field types of cannon.

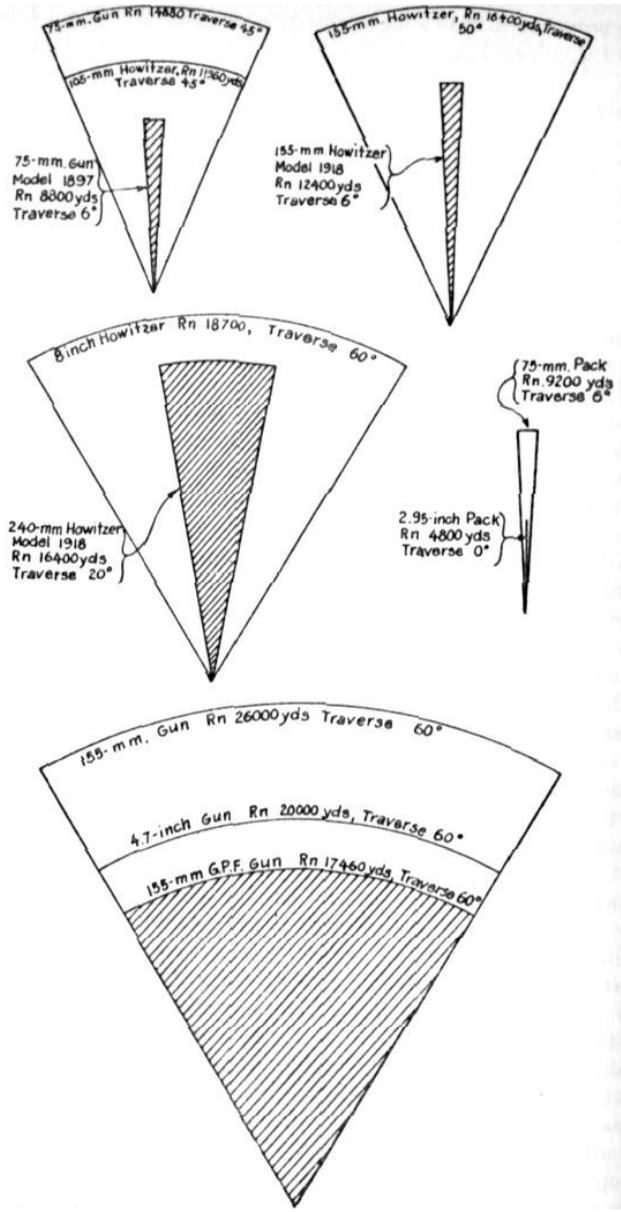
The ammunition on hand is fairly adequate for the 75-mm. gun; for the 155-mm. howitzer is equivalent to about twenty-five days of fire for the howitzers of one field army; for the 155-mm. guns, to about eight days of fire; for the 240-mm. howitzer, to less than one day of fire; and for the other types there is no ammunition.

The War Department has recently undertaken new mobilization studies based upon the limitations imposed by reduced strength and upon other practical conditions, and a single field army may be given increased importance in this study. It is apparent that the present organization is not in keeping with the requirement of a force for immediate employment.

11. Two items of the G.H.Q. Artillery have not been touched on: trench mortars and sound-ranging units.

(*a*) It is somewhat difficult to say whether the trench mortar should be classed as an Infantry weapon or as Field Artillery. It is now assigned to the Coast Artillery. Many field artillery officers question the propriety of including the trench mortar in the G.H.Q. Artillery. It is a weapon of a very limited range of usefulness. As artillery, it would be better to continue development, so as to have designs available in event any emergency called for this type; but not to enter into production or even to provide units in the organized general reserve. Limited funds can better be employed in manufacturing more valuable field types.

(*b*) Sound ranging is a valuable means of obtaining information of the location of enemy batteries and of improving the accuracy of field artillery fire. The Superior Board recommended



A comparison of the areas covered by armament at present issued to troops with that of the cannon developed since the World War. Shaded areas represent present equipment. Traverse by shifting the trail is not considered in these figures. The 75-mm. gun Model 1897 and both of the Pack cannon have a rapid traverse by this means. The 155-mm. howitzer Model 1918, as compared to the heavier types, can readily be traversed by shifting the trail.

that sound and flash ranging be combined in the Corps Observation Battalion. I am convinced that such is the proper organization. It is difficult to understand the motives which led the Special Committee to place flash ranging in the corps and sound ranging only in the G.H.Q. Artillery of six field armies. Recently a change has been proposed by the Chief of Field Artillery in the organization of an Observation Battery (a corps unit) which will combine in that unit both flash and sound-ranging functions. This should lead to an organization which will extend the scope of the Corps Observation Battalion to include sound-ranging functions and probably eliminate the Sound-ranging Service from the G.H.Q. Artillery.

However, under present organization, there is no sound-ranging unit in the corps, or in the quota for one field army.

12. Before taking up the subject of progress in development of new and improved types of field cannon, it is well to refer briefly to the results which may be expected from field artillery fire.

In applying probabilities to the determination of the number of rounds required to give a desired effect, it is usual to assume an adjustment which places the center of impact in the target. Such an adjustment is surely practicable only when observation is possible. While some means of observation are better than others, it may be said that any means is preferable to none. Terrestrial observation will frequently fail even at the shorter ranges, and will rarely be possible at the longer. In good weather the airplane is invaluable for observation of field artillery fire, but a recollection of the Meuse-Argonne will bring to mind many days when the use of airplanes was impossible. High burst and sound ranging are means which may produce good results. Otherwise, firing must be by the map, unadjusted.

It is not possible to say how much of the long-range fire of the World War was without material effect, but certainly such fire does not deserve the rather blind confidence with which its effect was credited. Of special interest in this connection is the study made of the army artillery in the San Mihiel. Units which are sent in just prior to (or even during the night before) an offensive frequently are unregistered, of doubtful location, and ill-supplied with ammunition. An extended study of the probabilities of all elements affecting the accurate delivery of fire under such practical conditions of service is now being made by the Field Artillery Board. At the moment, little more may be said than that haste and lack of observation must be paid for with the ammunition required to search large areas.

13. Development in field artillery matériel since the war has been based upon the approved recommendations of the Caliber Board.

The report of this Board is remarkable both for soundness and for vision, It has served as the guide of field artillery development in matériel for the past eight years. Requirements stated by the Board have from time to time been modified to meet the practical limitations developing from experience in manufacture and test.

Developments in field artillery matériel are always complicated by the two warring requirements, mobility and power. Field types must have mobility and they should have as much power as the mobility requirement makes possible.

(*a*) The 75-mm. pack howitzer has been adopted for procurement, and units to equip two regiments have been included in the ten-year Ordnance Program. This howitzer breaks up into six loads for packing; may be carried in any light truck; may be drawn by hand or by one animal; and has a range of 9200 yards with the normal 15-pound projectile. It is hoped soon to have sufficient units to complete practical service test. The present issue 2.95-inch mountain gun is obsolescent.

(*b*) The 105-mm. howitzer (the division howitzer) has been developed in two types, split trail and box trail, and units to equip two regiments have been included in the ten-year program. This howitzer has a maximum range of about 12,000 yards with a 33-pound projectile. The split-trail type has about 45 degrees traverse and the box trail about 8 or 9 degrees. Tests of this matériel are still in progress, no standard for manufacture having been adopted.

(*c*) A new 75-mm. gun (the division gun) is being developed but the existing types will be employed in any probable war of the future since both matériel and ammunition exist in quantity. Development includes both the split-trail and box-trail types of carriage with maximum traverses of 45 degrees and 9 degrees, respectively. Types now under test have a maximum range of about 14,800 yards with the 15-pound projectile. Some field artillerymen feel that too much increased weight has been paid for this increased range.

(*d*) The new model 4.7″ gun is designed to replace the 155-mm. G.P.F. as the corps gun. So far as tests have gone this type has been most favorably considered. It has a split-trail carriage; a traverse of 60 degrees, and a maximum range of about 20,000 yards with a 50-pound projectile. It is transported in a single load weighing about 12,700 pounds. Due, however, to probable difficulty of procurement of the high grade steel of which the pilot was made, a new model is under design.

(*e*) The present 155-mm. howitzer is an excellent weapon which exists in quantity and it will be the corps howitzer of the next war. It weighs about 8200 pounds in firing position, and

experiment is now under way looking to giving it strategic mobility. The 155-mm. howitzer deserves consideration in any study of the army types for a field army. It has a maximum range of 12,400 yards with a 95-pound projectile.

The most recent development in this type is a howitzer having 50 degrees traverse; weighing, in one load, about 15,500 pounds; and having a maximum range of about 16,400 yards. Service tests have not been completed.

(*f*) Development of an improved 155-mm. G.P.F. (as the army gun) is still in progress. The pilot gun is designed to have 60 degrees traverse; a maximum range of about 26,000 yards with a 95-pound projectile; and to be transported in two loads.

(*g*) An 8-inch howitzer (the army howitzer) is being developed to replace the 240-mm. howitzer. The latest model has 60 degrees traverse; a maximum range of 18,700 yards with a 200-pound projectile; and is transported in two loads.

14. Progress in development is limited by available funds and such as are available are devoted to the development of selected types. Thus the progress on other types is continually delayed. It is hoped to perfect and to equip gradually with the new pack howitzer, the 105-mm. howitzer and the 4.7-inch gun. For other types it is hoped to perfect a standard, for manufacture during some future war. We must expect to enter the next war with the matériel now on hand.

THE RELATIVE IMPORTANCE OF ORIENTATION AND GUNNERY

BY CAPTAIN V. R. WOODRUFF, F.A. (DOL)

FOR the training of junior officers of field artillery it is difficult to conceive how orientation is to be regarded as a subject of minor importance in comparison with gunnery. While it is true that practical orientation for field artillery may be said to consist of nothing more than the application of certain basic principles of plane table control to the solution of firing problems, yet many of the principles involved are found to be so fundamental in their nature as to include much of the foundation essential to any well arranged course in gunnery. It is perhaps owing to these fundamental characteristics of the subject that it should heretofore be assigned to a minor place in the average schedule of instruction. This does not prove to be a logical arrangement for the subject. Where a careful study is made of the material to be included in a progressive course in orientation, it will serve to emphasize the fact that the benefits to be derived by the field artillerymen are only limited by the degree of accuracy required and obtained in the work. With proper equipment in the hands of trained personnel, the standard methods of plane table control can easily become indispensable aids in the rapid determination of the two prime factors of firing; range and direction. In the discussion to follow an effort will be made to show how excellent results may be obtained in all cases where accurate work has been insisted upon during the preliminary training period. At the outset it should be recognized that all the methods employed must be characterized by extreme practicability and the mathematical computations limited to what might well be required of the average battery or battalion detail.

PRESENT-DAY FIELD METHODS OF LOCATION AND RANGE FINDING SHOULD BE REVISED TO COFORM TO CHANGING TYPES OF MATÉRIEL

The 1923 edition of firing tables for the 75-mm. gun, Model 1897 (French), lists the Mark IV shell with a maximum range of 12,500 yards. In the design of the new 75-mm. gun of American manufacture the present tendency towards increased power is further strengthened by the efforts being made to gain effective ranges in excess of 15,000 yards. Clearly the divisional artillery of the future must be prepared to handle ranges up to and including 20,000 yards if the many problems accompanying improvements in matériel are to be met and solved. The question as to how best we may attain this result with methods which are applicable equally

well to present-day equipment, remains one for our careful consideration.

In the case of the range finding equipment which is issued at the present time, we find the Model 1916 Range Finder to be limited in its practical application to distances not far removed from 5000 yards. There appears to be little possibility of a new range finder being constructed in the near future which can be used at much greater ranges and at the same time meet the demands of a light and portable instrument for field service. To supplement the use of this instrument at the greater ranges, gridded maps have been prepared in a few special localities, which by means of coördinates enables the officer preparing the data to determine the approximate position of the gun and target. As the use of gridded maps becomes more general we find, however, that our difficulties will increase. The ordinary map is not printed on paper of a sufficient strength and texture to withstand the errors of distortion due to changing climatic conditions in the field. This fact alone will rapidly reduce the accuracy of the work below that essential for the desired results. A second and even greater objection arises when it is realized that little has been accomplished up to the present time towards mapping the country at large on a scale suitable for field artillery firing. The vast amount of work involved in such an undertaking precludes the possibility of its being accomplished any time in the near future even in the restricted areas necessary for instruction purposes. A solution of the problem remains to be found in the use of the plane table, properly equipped, and in conjunction with a set of grid tables for the conversion of whatever data is found to be available on the ordinary maps to be obtained in any special locality under consideration.

GRID TABLES AND THEIR USES

Army Regulations 100-15, issued under date of July 2, 1927, contains the latest specifications for map making. In the above regulations the polyconic projection is adopted for military maps of the United States and the zone system of grid coödinates authorized. For the conversion of the determined latitude and longitude of any established control point to grid coördinates of the standard system, the U. S. Coast and Geodetic Survey has prepared a set of tables of grid coördinates for every five-minute intersection of latitude and longitude.* While the grid coördinates of any point may readily be determined by means of these tables yet the process is somewhat involved and can scarcely be considered as suitable for field operations. To further simplify the work and render it entirely

* Coast and Geodetic Survey, Special Publication No. 59. Obtainable from the Superintendent of Documents, Government Printing Office, Washington, D. C. Price, 25 cents.—EDITOR.

practicable the U. S. Geological Survey undertook to prepare special tables showing interpolated grid values to the nearest minute intersections.* An extract of these tables is shown below.

X COÖRDINATES

	40º 47′	40º 46′	40º 45′	40º 44′
111º 51′	1106158.4	1106184.9	1106211.4	1106237.9
111º 50′	1107696.8	1107723.7	1107750.6	1107777.5
111º 49′	1109235.2	1109262.5	1109289.8	1109317.1
111º 48′	1110773.7	1110801.4	1110829.0	1110856.7

Y COÖRDINATESC

111º 51′	2035104.1	2033080.0	2031055.8	2029031.7
111º 50′	2035124.4	2033100.3	2031076.1	2029051.9
111º 49′	2035145.0	2033120.9	2031096.7	2029072.6
111º 48′	2035165.9	2033141.8	2031117.6	2029093.5

The ease with which the conversion is made from geographic to grid coördinates may be seen from the following illustrative example:

COMPUTATION OF GRID FROM GEOGRAPHIC COÖRDINATES

Triangulation Station, Fort Douglas Flag, Fort Douglas, Utah.

Latitude 40º 45′ 55.546″ Longitude 111º 49′ 57.841″

$\frac{55.546}{60} = .9257$ $\frac{57.841}{60} = .9640$

	X on Lat. 40º 45′	*Y on Lat. 40º 45′*	
1.	111º 50′ = 1107750.6	2031076.1	1.
2.	111º 49′ = 1109289.8	2031096.7	2.
	(2) – (1) 1539.2	(2) – (1) 20.6	
3.	0.9640 × 1539.2 = 1483.7	0.9640 × 20.6 = 19.8	3.
4.	(2) – (3) = 1107806.1	(2) – (3) = 2031076.9	4.

(4) – coördinates on parallel 40º 45′

	X on Lat. 40º 46′	*Y on Lat. 40º 46′*	
5.	111º 50′ = 1107723.7	2033100.3	5.
6.	111º 49′ = 1109262.5	2033120.9	6.
	(6) – (5) 1538.8	(6) – (5) 20.6	
7.	0.9640 × 1538.8 = 1483.4	0.9640 × 20.6 = 19.8	7.
8.	(6) – (7) = 1107779.1	(6) – (7) = 2033101.1	8.

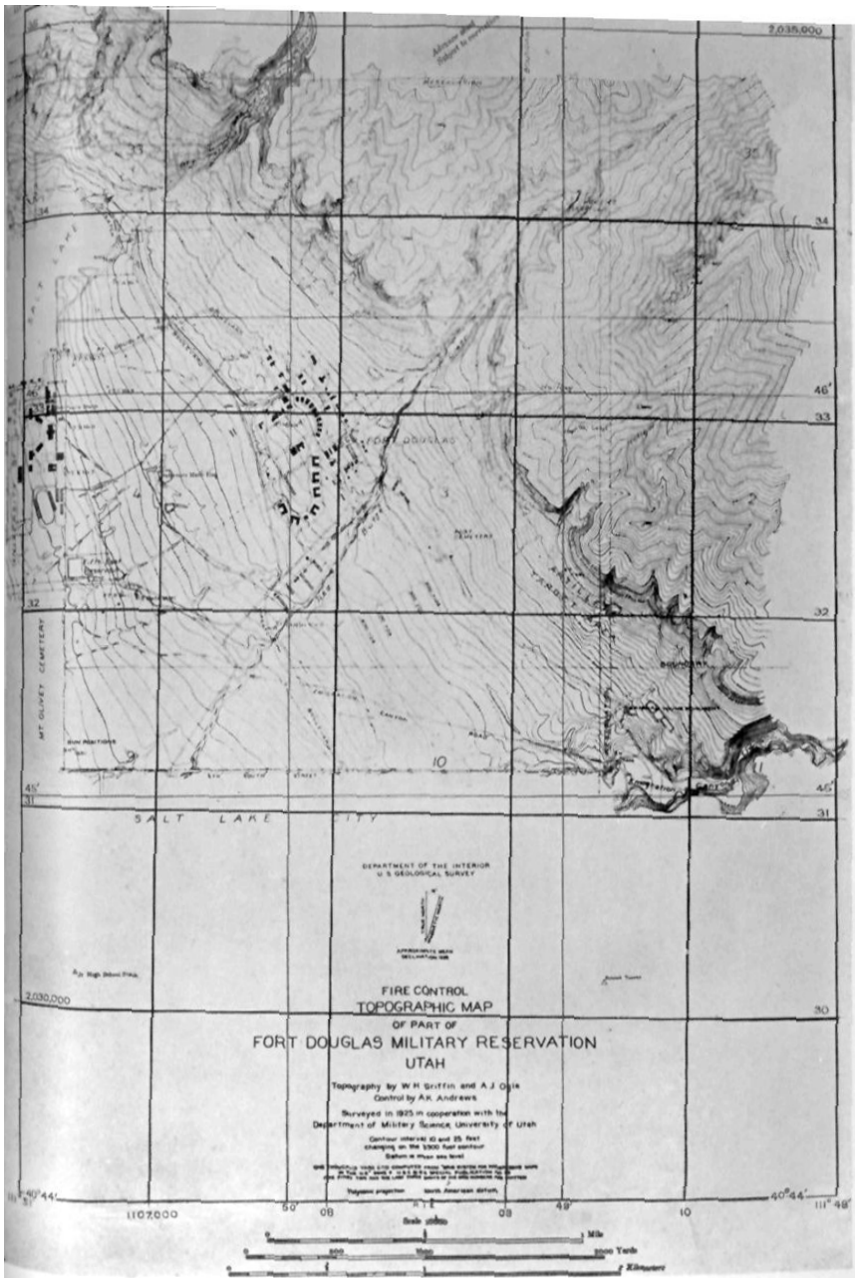
(8) – coördinates on parallel 40º 46′

9.	(4) – (8) = 27.0	(8) – (4) = 2024.2	9.
10.	0.9257 × 27.0 = 24.9	0.9257 × 2024.2 = 1873.8	10.
11.	(4) – (10) = 1107781.2	(4) – (10) = 2032950.7	11.
12.	X = 1107781.2 Y = 2032950.7	Grid coördinates of Sta. Fort Douglas Flag	

THE PRACTICAL APPLICATION OF GRIDS TO FIRING

In any situation where plane table control has been selected as the means for range determination, the first duty of the reconnaissance

* The areas for which one minute intersections were computed, are limited chiefly to Government reservations. There is no immediate prospect of the computations for the entire country being completed. Such computations as were made, have been turned over to the Corps of Engineers.—EDITOR.



FIRE CONTROL SHEET USED BY THE MILITARY DEPARTMENT, UNIVERSITY OF UTAH

PREPARED BY THE U. S. GEOLOGICAL SURVEY IN 1925. THIS MAP OF A PORTION OF THE FORT DOUGLAS MILITARY RESERVATION CONFORMS STRICTLY TO THE REQUIREMENTS OF A.R. 100-15, EXCEPT THAT OWING TO THE LIMITED AREA UNDER CONSIDERATION THE SCALE WAS ENLARGED TO 1/10,000. THE GUN POSITIONS AND THE ARTILLERY TARGET AREA ARE VISIBLE NEAR THE SOUTHERN LIMIT OF THE MAP.

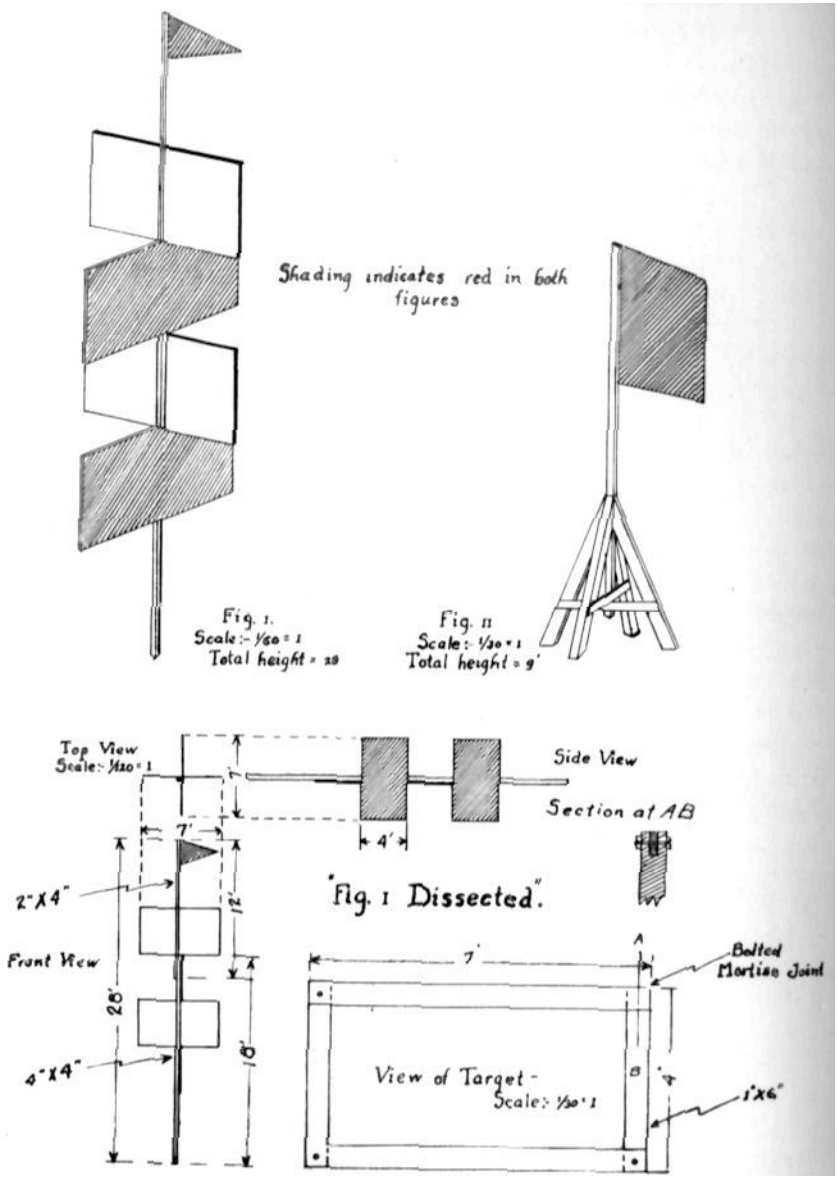


FIG. 1.—DIAGRAMMATIC SKETCH SHOWING THE TYPE OF SIGNAL USED FOR DISTANT CONTROL POINTS

FIG. 2.—TYPE OF SIGNAL ADAPTED TO CLOSE IN WORK SUCH AS TRAVERSES ORIENTING LINES OR IN LOCATIONS USED FOR INTERSECTIONS

officer upon entering a new position is to identify several prominent landmarks which are visible from a point in the area adjacent to the battery positions. To find the latitude and longitude, or what is commonly known as the geographic coördinates, of these points any available maps may be used regardless of the scale on which they have been constructed. Herein lies the chief value of plane table control as opposed to a more general use of maps. Not only is it possible to deduce usable data from a variety of widely different sheets, but of even greater importance remains the fact that with a positive check for all the work at hand, the accuracy of the final data supplied to the guns is thus insured. Once the geographic coördinates for the various points have been determined, all that remains is a few minutes work with grid tables to reduce them to coördinates for plotting on the gridded sheet. The officer is then able to proceed with the necessary locations by any one of the several standard methods of resection or intersection.

Italian resection (Bessel's Theorem), two and three-point location, the use of tracing paper, and the graphic solution of triangles of error are all matters of common knowledge among field artillery officers and need no discussion in an article of this nature. However, it might be well to point out that where control points are definitely located and accurately plotted, any one of the standard methods of resection will locate an orienting line or a base piece within an error of less than five yards. With the equipment issued at present, it is possible in using an open-sight alidade to locate distant targets and base points well within practical limits of accuracy at ranges exceeding 7000 yards, while the telescopic alidade will give positive results at more than twice this distance. The value of this work is at once demonstrated beyond any question of doubt when we consider ranges exceeding 10,000 yards. To any one familiar with the difficulties in adjusting artillery fire at extreme ranges, the advantages to be gained by having the opening rounds at or near the target will be readily appreciated. Localities of considerable artillery activity, high-burst ranging, aërial observation, all require the utmost accuracy in regard to the preliminary data used, not only as an aid in the final adjustment, but in order to make it possible to identify the first rounds fired with reference to the target.

Definite standards of accuracy, reducing the allowable errors to a minimum must be insisted upon during the training period. To accomplish this result it is necessary to establish a number of precise locations on the target range and to identify all control points, traverses, base points, etc., by means of permanent place marks and signals.

Where the soil permits an excellent place mark is formed by means of a concrete post 6″ × 6″, well anchored, and projecting

slightly above the ground. A bronze reference cap should be centered in the top of the post as an aid in locating the instrument. Constructed in this manner the place mark will remain a lasting and easily located station, and one not dangerous to the passage of animals or wheeled vehicles.

For the identification of place marks at a distance, it is necessary to erect signals of a permanent nature. Here again the nature of the terrain determines to a considerable extent the methods to be used in the construction of targets. Any permanent structure such as a flag pole or church steeple, which is sharply outlined, will serve both as a signal and place mark and thus do away with the necessity of any additional construction. In a rough or hilly country rock cairns may be constructed on prominent points, and with a pole and pennant upright in the center, are easily sighted and form excellent stations. Where sights of several miles are to be taken over a level or slightly rolling terrain, the best signal to use is one similar to that shown in Fig. 1. Here two selected sticks 2″ × 4″ × 18′ are joined together. A single 2″ × 4″ × 12′ is then spliced to the end of the pole making a durable upright 28′ in height. A 4′ triangular pennant is attached to the top and below that two sets of targets, alternating red and white, are bolted in position. The entire signal is then guyed into an upright position by heavy guy wires, one set of four wires being placed above each pair of targets and extending out and down at right angles to the center pole. With care a signal of this nature can easily be made to withstand an ordinary gale and by renewing the target cloth annually it will be plainly visible in clear weather for a distance of ten miles and remain a permanent fixture on the terrain.

Figure 2 illustrates a type of signal which may be used to advantage in establishing a traverse or locating place marks near to where the exercises are conducted. It is light, portable, easily visible, and presents a good appearance. This signal is especially well suited for outlining an orienting line of considerable length.

There is perhaps no other phase of field artillery training wherein attention to minor details is of greater importance. Questions as to the scale of the sheet, quality of the grid paper and drawing pencils, and the size of the plane table to be used, must all be carefully considered in order to attain the desired results. Once the preliminary preparations have been completed rapid progress may be expected with the average individual, while training in the precise operations involved cannot fail to react favorably on other branches of field artillery instruction.

THE TESTIMONY OF AN EXPERT

BY MARTIN GALE

OUTSIDE was the heat of a summer day, inside the court-martial sat in a stuffy court room sleepily listening to the drone of testimony from the witness stand. The room was crowded with spectators as both the Post and the near-by town were well represented in the audience. While the preliminary witnesses were being heard the court listened perfunctorily, the building up of a case is never interesting.

"What's happened so far?" whispered a late-comer to his neighbor. "How do things look for Hay?"

"Bad," answered the other. "The T.J.A. has shown that Captain Good was O.D. that night, that he went on an inspection trip after midnight, that Hay and Cromer were on post down by the warehouses, and that it was on Hay's post that Captain Good's body was found. And Hay was bawled out by Captain Good only a few days ago. It looks black for him. I think that Cromer will be the next witness."

The prosecutor announced, "Private Cromer will take the stand."

The court sat up, the spectators leaned forward to better hear. Cromer entered, was sworn, and answered the familiar preliminary questions. He said that he was Private John Cromer of the —th Infantry and that he knew the accused.

"Tell what you know about the case," said the Trial Judge Advocate and Cromer began in a sing-song voice: "Well, on the night of June fifth I was on guard on Post number five down by the warehouses, on first relief. Hay was next to me on number four. When I went on at midnight everything seemed alright. About one o'clock Bun, the Captain's dog come out of the bushes and I stopped and petted him. I expected Captain Good to come up and I kept looking for him. About that time I heard a shot down on number four so I ran down there and saw Captain Good lying on the ground. I went up to him. He'd been shot in the back. I saw a revolver lying on the ground near him. Then I called the Corporal of the Guard. That's all I know."

"Did you see Private Hay?" asked the Trial Judge Advocate.

"Not until the Corporal come up. He said he was around the other side of the warehouses and didn't hear the shot."

"Did he seem excited?"

"Yes, he did. He come running up and yelled when he saw the body."

"Do you know of any trouble between Captain Good and Hay?"

"Hay got bawled out for being dirty at inspection last week."

"Did you ever hear that Hay owned a revolver?"

"I did hear that he had a gun of his own one time but I didn't pay much attention to it."

The defense took the witness but could not shake his story although the Defense Counsel questioned for half an hour. "Tell me," he finally asked, "did you ever have trouble with Captain Good?"

"No, Sir, I never did," denied the witness.

"Did Captain Good ever reduce you?"

"Yes, Sir, he reduced me from Corporal, but I didn't hold that against him."

Private Hay took the stand in his own behalf. "I came on post at midnight and everything was alright. About one o'clock I went around to the far side of the warehouses. I didn't hear any shot but I heard Cromer shouting for the Corporal of the Guard. I ran around to the front of the warehouses and there I saw Captain Good lying on the ground. The Corporal was there with Cromer and he was holding a revolver in his hand. That's all I know about it."

"Did you ever own a revolver?"

"No, Sir, I never did."

"Did you ever have any trouble with Captain Good?"

"No, Sir, never. Oh, he bawled me out once or twice but that's nothing." The prosecution took the witness but did not succeed in breaking down his story. The Trial Judge Advocate did emphasize the fact that the body had been found on Hay's post, however.

The court was proceeding to the closing incidents of trial when the junior member interrupted. "Mr. President," he said. "I'd like to ask Cromer a few more questions."

Cromer was recalled and took the stand. He seemed confident and completely at ease.

"Cromer," said the junior member, "you say that you petted Bun when he came on your post?"

"Yes, Sir, I stopped and petted him."

"He's friendly, eh?"

"Oh, yes, Sir. I'm fond of dogs. Bun and I have always been friendly. I used to feed him, and he sure likes me."

"Mr. President," said the junior member. "I'd like to have Bun called into court."

The court was surprised, the spectators murmured at this turn

but the president sent out a messenger to find the dog. In a few moments he returned with Bun on a leash.

"Take him over to the witness stand," directed the president.

The little dog trotted willingly across the room. As he neared Cromer his ears flattened. With a snarl he sprang at him.

"The little devil's bit me," cried Cromer.

The Defense Counsel rose. "May it please the court," he said, "in view of the expert testimony just presented, I move that the charges against Private Hay be dropped and that Private Cromer be tried for murder."

PORTÉE MARCH BY BATTERY "A," FIRST FIELD ARTILLERY

BY CAPTAIN EDWARD F. HART, F.A.

[ON September 3, 1927, the Commanding General, Fort Sill, Oklahoma, received a radiogram from The Adjutant General directing that a light battery from Fort Sill make a portée march to Camp Maria, Texas, and report to the Commanding General, 1st Cavalry Division, for participation in the maneuvers of that division, September 20 to October 3. The organization was to be similar to that of the portée 75-mm. batteries in Hawaii, details of organization and modifications of equipment being forwarded on the same date by the Chief of Field Artillery. The radiogram further stated that 3-inch gun trailers were being shipped to Fort Sill from Rock Island Arsenal.

The instructions of September 3, mailed from the Office of the Chief of Field Artillery, which did not arrive until after the battery left Fort Sill and consequently were not followed, called for the use of the Holt T-35 tractors instead of the 5-ton tractors. The former tractor is listed as a standard for portée units and materially reduces the severe overload imposed on the power plant of the trucks when the 5-ton tractors are used.

As it was not previously known that such a march was contemplated and as none of the batteries at Fort Sill had been portée equipped, it was necessary to accomplish the organization, obtain additional trucks and other matériel at Fort Sill, await the receipt of the trailers from Rock Island Arsenal and make a march of seven hundred miles, all within seventeen days of the receipt of this radiogram. That the necessary modifications were made, equipment obtained and the march made with war-time vehicles within the specified time, reflects great credit on all concerned. The complete report as submitted to the Commanding General, Fort Sill, by Captain Hart, Commanding, is shown. Following this report is a copy of a letter of commendation.—EDITOR.]

PURSUANT to and in conformity with the instructions received from The Adjutant General, the Commandant, the Field Artillery School, began on September 3, 1927, the selection of the commissioned personnel for the battery. At a conference held in the office of the Executive, the Field Artillery School at 3:00 P.M. on September 4, 1927, the following named officers were designated to accompany the battery:

Captain Edward F. Hart, 1st Field Artillery,
First Lieutenant John G. Brackinridge, 1st Field Artillery,
First Lieutenant Thomas M. Tiernan, 1st Field Artillery,
First Lieutenant William R. Schaeffer, 18th Field Artillery,
First Lieutenant Lawrence E. Heyduck, 3rd Ammunition Train.

At the close of this conference, the designated officers met in conference with the Commanding Officer, School Troops, and began the preparation of an estimate of costs and the organization of the battery.

Due to the fact that trailers were not available, it was contemplated carrying the tractors on Class "B" trucks and have the trailers, which were shipped from Rock Island on September 3, diverted to Marfa. This would require some additional trucks, but appeared to be the only way in which the battery could hope

to move early enough to reach its destination in time to participate in the beginning of the maneuvers. The Quartermaster was accordingly advised that twelve Class "B" trucks would be required. Battery "A", 1st Field Artillery, was selected to make the march; and since this battery was not equipped with French 75-mm. guns, the Ordnance Officer was requested to prepare and issue the required guns and caissons.

On Monday, September 5, the commissioned personnel was changed by substituting First Lieutenant Leonard S. Arnold, 18th Field Artillery, for Lieutenant Heyduck, but making the latter available for use in connection with the preparation for the march.

The Ordnance Officer began the fabrication of loading ramps for both guns and tractors and channel irons for gun and caisson guides when loaded.

The Quartermaster assembled the required number of trucks and began their overhaul and repair. Five of these trucks were taken from storage and needed a complete overhaul.

At a conference held at 2:00 P.M., on this date, the organization of the battery was practically completed. A list of positions (or duties) was prepared, and, where possible, the name of the man to fill such position was entered. Since there were but fifty-six men available for duty with Battery "A", it became necessary to call upon other School Troops units for sixteen men, which, with thirteen men from the Motor Transport Company, No. 91, five men from the 59th Ordnance Company, and one man from the Detachment Medical Department, made up a total of ninety-one enlisted men.

At this time it was also decided as to what vehicles would be taken, and what units would furnish same.

On Tuesday, September 6, the work consisted of the preparation and assembling of vehicles, listing and assembling of equipment, supplies and spare parts, and the completion of organization, insofar as possible.

By Wednesday morning, September 7, the Ordnance Department, having worked day and night, had completed several of the loading ramps and channel-iron guides for guns and caissons, and some of the loading ramps for tractors. The Quartermaster was therefore requested to send to the Ordnance shops, such trucks as were in running condition for the installation of guides and the loading of guns and caissons. By noon, two trucks were completed and loaded.

Shortly after noon, it was learned that the six trailers shipped from Rock Island had arrived. This was gratifying news to the Battery officers, since an experiment in loading a tractor in a Class

"B" truck had been made earlier in the day and the great difficulty experienced, together with obvious danger to be expected from such a top-heavy load, had caused considerable uneasiness in the minds of all concerned. The arrival of the trailers, however, presented to the Ordnance Officer, the additional problem of modifying the short drawbar, designed for towing behind a tractor, so as to permit towing behind a truck. To allow time for this work, the date of departure was changed from September 8 to September 9. Work on this modification was begun at once and continued during the night. The trailers were carefully serviced and the springs tested by loading a tractor on each in turn.

At the close of the day, a considerable portion of the necessary supplies and equipment had been assembled and partially loaded; but it was apparent that the time originally assigned for organization and preparation for the march, had been too short, and that the battery would not have been ready to march at 5:30 A.M. on the 8th had the arrival of the trailers not changed the previously designated date.

On Thursday, the 8th, by 4:00 P.M., all vehicles were assembled in park, loaded and serviced; the battery was formed and the men given a short talk by the Battery Commander, as to the importance of their mission, and the necessity for great care as to their conduct and appearance. The drivers of the heavily loaded trucks (with trailers) were particularly cautioned to exercise the greatest care in the handling of a load with which they were inexperienced.

The enlisted personnel of the battery was quartered in the barracks of Battery "A", and the officers repaired to their homes with the feeling that all was in readiness for the start, at the designated hour, on the morrow.

THE MARCH

NOTE.—In the following records of march, the time and distances mentioned apply to the heavy section of the column, unless otherwise stated. The other sections marched more or less independently—the day's march only, being governed by the march of the heavy column.

Friday, September 9, 1927

At 5:30 A.M., the column left park with the following vehicles in order of march:

2 cars, White Reconnaissance. Personnel and Fire Control instruments. Also two caisson reels filled with telephone wire.

1 car, Ford Cross-country. Billeting party.

1 truck, ¾ ton, G.M.C. Battery Headquarters.

PORTEE MARCH BY BATTERY "A," FIRST FIELD ARTILLERY

1 truck, Class "B". Kitchen equipment and towing kitchen trailer.
1 truck, Class "B". Rations and baggage, and towing water trailer.
1 truck, Class "B". Blank ammunition, miscellaneous supplies, and spare parts.
1 truck, Class "B". Six motorcycles with side cars.
1 truck, F. W. D. Gasoline and oil.
1 truck, F. W. D. Miscellaneous supplies.
1 car, Dodge Touring. Battery Commander.
4 trucks, Class "B", each loaded with 1 75-mm. (Fr.) gun and caisson, and towing 3-inch gun trailer loaded with 5-ton tractor and loading ramps.
1 truck, Class "B", loaded with two artillery reels and wire, and towing 3-inch gun trailer loaded with 5-ton tractor and ramps.
1 truck, Class "B", loaded with tractor parts, oil and grease for heavy column and towing trailer and tractor as above.
1 truck, Class "B", loaded with spare parts for Class "B" trucks, and miscellaneous supplies and equipment.
1 F.W.D., Artillery Repair, fully equipped.
1 truck, ¾ ton, Dodge Light Repair.
1 truck, Ambulance, G. M. C.

Place	Miles	Arrived	Left	Remarks
Post Field	0		5:30	Road dry; weather clear. Road paved to Lawton.
	7	6:32	6:48	Minor repairs.
	12	7:20		Oil leak, Class B; replenished 3 quarts.
	17	7:50	8:10	Retimed one Class B.
Walters	27	9:30	9:30	Gas, oil and water.
	36	9:55		Six miles upgrade, sandy—requiring frequent shift of gears. Blew cylinder head gasket, one Class B. Delayed 17 minutes. Water pump sheared gear key.
	40	11:50	12:05	Broken culvert.
Hastings	47	1:40		Through.
	49	1:55		Noon halt. Gas, oil and water. Replaced two cylinder head gaskets, Class B, and one water pump.
			2:55	Delayed 18 minutes, two miles west of Waurika by heavy sand.
Waurika	56	4:20	5:10	Gas, oil and water.

Place	Miles	Arrived	Left	Remarks
Ryan	67	5:30	7:45	From 3 miles west of Ryan to Ryan, heavy sand. Column moved with difficulty. One truck blew cylinder head gasket—towed to Ryan—trailer transferred to another truck at Ryan.
Terral	81	10:00		One trailer slid into ditch and bent drawbar; cause—heavy sand. Very heavy sand west of Terral; extremely difficult going. One truck in attempting to turn in heavy sand twisted drawbar—towed to camp by tractor. One drawbar straightened, one drawbar made by Ordnance Detachment by using loading ramp for 3-inch gun trailer; finished job at 5:30 A.M. Rear bearing and spacer on Ford worn out—loaded on F.W.D. Parts not available. Aligned front wheels of two trailers. Changed oil, all trucks. Camped at Tourist Camp Grounds.
		Distance marched—81 miles.		
		September 10, 1927		
Red River Bridge		8:50		Crossed Red River Bridge, 1930 feet, about 12 years old; floor in poor condition. Crossed in low speed—all men except drivers dismounted. One tractor unloaded previous night was run
Ringgold	5	10:15		two miles after crossing bridge.
	6	11:00	11:40	Loose, deep sand. Column assembled, vehicles inspected. Brakes adjusted on two vehicles; one water pump leaking; hub bolts on trucks tightened.
	15	12:30	12:42	Flexible joint, pump shaft, Artillery repair truck replaced.
Bowie, Texas	25	1:20		Gas, oil and water.

PORTEE MARCH BY BATTERY "A," FIRST FIELD ARTILLERY

Place	Miles	Arrived	Left	Remarks
	27	2:45	3:20	Noon halt. Due to poor brakes on one Class B, trailer was shifted to another truck. From 6 miles to 27 miles roads dry and graveled, numerous grades, causing frequent shift of gears.
Sunset	34			
Alvord	43			Old graveled road extremely rough, many turns and grades (9 miles).
	58			Clogged gas line delayed 20 minutes.
Decatur	60			Alvord to Decatur paved, numerous steep grades, necessitating shift of gears in ascending and great care in descending; poor time made.
Camp	62	7:30		New ring and bevel gear for D.L.R. New wheel bearing and spacers in Ford. Adjusted steering gear in Artillery repair.

Distance marched—62 miles.

September 11, 1927

Camp (Decatur)	3		7:45	Column started at 7:25. Camp was made in patch of large prickly pear cactus, which when crushed beneath the truck wheels caused loss of traction. Five trailer loads had to be towed to road. Broken fan belt on F.W.D. Dodge light repair differential adjusted.
	21	9:50	11:10	Gas from reserve to service tanks. Three ball bearings, front wheel, ambulance, cracked; left vehicle; procured bearings at Fort Worth, rejoined column at noon halt.
	30			Replaced spark plug; one broken gas line.
Ft. Worth (Stockyards)	35	11:20		Column assembled, arranged for traffic guide through city.
Filling station, 13th and Main		11:45	12:05	Gas, oil and water.

Place	Miles	Arrived	Left	Remarks
City limits and W. 7th	42	1:05	2:20	Noon halt. Replaced one each, carburetor, pump shaft key and gas line.
Lake Winola	54	3:55		
	60	4:10		Three trucks overheated, one needle valve stuck.
Weatherford	67			Road narrow, paved, many grades, very heavy civilian traffic, requiring drivers to be constantly alert. One motorcycle with side car put in service with heavy section.

Distance marched—67 miles.

September 12, 1927

Weatherford			6:20	
Mill Sap	12	7:25		
	14			Very steep grade, brick pavement from top of grade.
Mineral Wells	20	8:10	9:30	Gas, oil and water. Rear of column arrived at 9:25—having delayed to adjust tappets two trucks, repair one gas line, adjust one carburetor and drain excess oil from two trucks.
Brazos River Bridge	26	10:15		Flooring weak, being repaired.
Palo Pinto	33	10:55		Adjusted tappets one truck, adjusted carburetor.
Wink City	43	11:50	12:45	Noon halt; gas from reserve to service tanks. Road practically level, pavement excellent.
	54			
Strawn				Through.
	59			Very steep grade; made one mile in 32 minutes with heavy column.
	63	3:25		Connecting rod bearing, artillery repair, burned out. Left.
Ranger	66	3:50		Closed up column.
	67			Broken gas line on Class B.
Eastland	76	5:15		Through.
Camp	82	5:35		Changed oil, 4 Class B's. Packed one water pump, welded brake pedal, G.M.C. Replaced one gas line, Class B; Artillery repair arrived camp 3:50 A.M.

Distance marched—82 miles.

PORTEE MARCH BY BATTERY "A," FIRST FIELD ARTILLERY

September 13, 1927

Place	Miles	Arrived	Left	Remarks
Camp 6 miles W. of Eastland			6:15	
Cisco	7			Through.
Baird	34			Detour to Clyde 7 miles. Detour rough, steep grades, deep sand in places. One truck retimed; two truck tappets adjusted; valves on one badly pitted; truck and trailer towed by tractor four miles. This truck relieved of trailer, Flexible coupling pump shaft, Artillery repair, broken.
Clyde	41	11:35		First truck. Noon halt, gas, oil and water.
		12:40		Last truck.
Clyde			1:10	Pavement.
	50			End of pavement.
Bridge	56	2:30		Floor in bad condition. Delay in crossing.
Abilene	57	2:40		Through.
Sand Pit	64	3:10	4:50	For one-half mile road was covered with drifted sand, deeply rutted and impassable for heavy loads. Tractors were unloaded and all Class B trucks were towed. Two F.W.D. trucks were able to get through under their own power.
	65			Trailer broke through small bridge. Artillery repair in attempting to detour stuck in soft ground; towed out by tractor.
	71			Artillery repair truck burned out connecting rod bearing; towed to Merkel.
Merkel	76	6:50		Camp for the night. Ground two sets valves, Class B; replaced two bushings on trailer drawbar; new connecting rod bearing, Artillery repair. Tires on two trailer wheels loose on rims.

Distance marched—78 miles.

September 14, 1927

Place	Miles	Arrived	Left	Remarks
Merkel				Light shower during night; light column moved out at 6:15. Heavy column delayed to replace gas lines on two Class B's. Heavier rain before repairs were completed, left roads impassable for heavy column. Light column halted three miles west. Civilian traffic and clear weather dried roads rapidly. At 10:00 A.M. tractors were unloaded and march of heavy column begun. Rain had extended only about three miles west, where tractors were reloaded.
			10:15	
	5	11:40		Noon halt. Cleaned oil pump of Artillery repair. Replaced drive shaft, Class B.
			1:10	Adjusted motorcycle clutch.
	9			Replaced two spark plugs, Class
	18			B. Broken valve spring, Class B.
Sweetwater	27	3:55		Beginning of pavement.
Roscoe	36	4:45		Through.
	43	5:20		End of pavement.
Loraine	47	5:40		Repaired two gas lines, Class B. Made two spring center bolts for water trailer.

Distance marched—47 miles.

September 15, 1927

Loraine			6:00	
	7	6:40	7:25	Class B overheating, water pump dismounted, cleaned, fan belt replaced.
Colorado	9	7:40		One Class B ignition trouble.
	11			Replaced one spark plug on above truck.
	15			Replaced same plug on above truck.
West brook	20	9:00		Through.
	25	9:35	10:15	Adjusted tappets one Class B.
	26			Retimed one Class B. Valve spring broken, locked valve and cam shaft.

PORTEE MARCH BY BATTERY "A," FIRST FIELD ARTILLERY

Place	Miles	Arrived	Left	Remarks
Coahoma	39	11:50		Through.
	43			Burned out connecting rod bearing F.W.D. Crank case oil changed the night before. Towed.
Big Spring	50	1:00	2:15	Noon halt. Gas, oil and water. Removed lower crank case F.W.D.; discovered three plys of cloth wrapped around oil strainer. Rear cylinder head removed from Class B which had blown out spark plugs. Found section blown out of gasket at narrowest part between the two cylinders, and about one pint of water in each cylinder. Put on new cylinder head.
	51	2:20	6:45	Truck No. 428192 rear end locked. Differential removed and examined. Found both roller bearings on worm shaft badly worn and the rear bearings cage collapsed and rollers loose in axle housing. Truck towed to State Highway Department Garage and left. Artillery reels formerly carried on this truck trailed behind other vehicles.
Stanton	72	8:15		Last three trucks. Remainder of column had arrived here at 6:00 P.M. Tightened bearings on White Reconnaissance Car.
Stanton				Drained all differentials and transmissions. Installed three new spark plugs on Class B, and one new fan belt. Replaced burned-out bearing in F.W.D. This F.W.D. had been towed for 35 miles.

Distance marched—72 miles.

September 16, 1927

Stanton			6:30	
Midland	18	8:10		Through.
Odessa	39	10:15	10:45	Gas, oil and water.
Judkins	57	12:05	1:00	Noon halt. Gas, oil and water.

Place	Miles	Arrived	Left	Remarks
Monahans	74	3:00	3:55	Two trucks stalled in sand, unloaded tractor, towed. Gas, oil and water.
	81			Broken gas line, Class B.
Grandfalls	92	5:55		Road, Monahans to Grandfalls, gravel, rough in places. F.W.D., which had been left at Stanton with burned out bearing, joined column at 11:00 P.M.

Distance marched—92 miles.

September 17, 1927

Grandfalls			6:20	Road sandy, heavy loads broke through surface; two tractors unloaded and run about four miles, towing when necessary; tractors loaded about one-half mile west of Pecos River.
	23			Stream crossing difficult.
Ft. Stockton	34	10:30	1:35	Noon halt. Oil, gas and water. Men bathed in city swimming pool. First twelve miles out of Ft. Stockton upgrade. Much motor trouble. Made thirteen miles to top of incline by 4:30 P.M.
Hovey	68	6:50		Replaced three spark plugs, Class B, and one fan belt.

Distance marched—68 miles.

September 18, 1927

Hovey			6:20	
	2			Began ascent to Mountain Pass. Road good, graveled.
	8	7:35		Very steep grade.
	9	7:50		Very steep grade. Summit of Pass.
R. J. Alpine and Marathon Road	20	9:40		Through.
Alpine	27	10:30	10:55	Paved road from R. J. into Alpine. Gas, oil and water.
	30	11:35	12:10	Noon halt. Road graveled.
Paisana Pass	40	1:35		Light shower made road slippery, reduced speed.
Marfa	52	2:55		Made camp in area, allotted the battery.

Distance marched—52 miles.

September 19, 1927

Matériel unloaded. Gun tubes removed, cleaned and oiled, carriages cleaned, tractors serviced and inspected. Overhaul of motor vehicles begun. Cleaned and inspected fire control instruments.

Information was received on this date that the battery would probably leave Marfa for the maneuver area during the following day. List of necessary spare parts and replacements was compiled and sent to the Commanding Officer, Camp Normoyle, Texas, by radio.

September 20, 1927

Matériel, necessary supplies and equipment were loaded. Equipment not needed during the maneuvers was stored. During the forenoon, the Battery Commander received orders from the Commanding General, First Cavalry Division, to report to the Commanding General, First Cavalry Brigade, at 3:00 P.M. that date, at a point on the Marfa-Lajitas Road, some twelve miles south of Marfa. Having no information of the other troop movements along this road, it was decided to leave Marfa at 1:00 P.M. A detail of eleven men, consisting of the supply sergeant, battery clerk, five mechanics and four drivers (Class "B" trucks), was designated to remain in camp for the purpose of overhauling such vehicles as were badly in need of repairs.

Promptly at 1:00 P.M. battery moved out of park and started south on the Lajitas Road. At a point one mile south of camp, the First Cavalry Brigade was discovered debouching from the reservation and taking up the march ahead of us on the Lajitas Road. No road priority or order of march, having been given the Battery Commander, the battery was moved forward into the first available interval and continued the march in the cavalry column. This was found quite difficult and detrimental to the motors by reason of the fact that the rate of march of the cavalry was approximately half that which could have been made by the Portée Battery on this road. Had the Battery Commander been informed as to the movement of other troops on this road, request would have been made to precede the column.

At a point about ten miles out the battery was delayed about forty minuets in passing a culvert which was considered unsafe. With the assistance of a platoon from Company "A", 8th Engineers, a by-pass was constructed, and with all available man power pushing, the heavy loads passed the obstruction without dismounting the tractors.

At the designated hour, the Battery Commander reported to the Commanding General, First Cavalry Brigade, and was directed to

camp along the Lajitas Road opposite and about one-half mile from the brigade bivouac.

At 9:00 P.M., the Battery Commander reported to the Brigade C. P., where Field Order No. 5 was dictated.

September 21, 1927

The battery having been assigned no Portée mission, and in view of the fact that paragraph 11, Terrain Guide, Hq. 1st Cavalry Division, confined heavy trucks and hard-tired motor vehicles to the public roads, tractors, guns and caissons were unloaded and the firing battery formed as a motor-drawn battery. As thus formed the battery moved south on the Lajitas Road and joined the cavalry column in its order of march. The battery remained in column moving forward slowly behind the Cavalry, which began its deployment about two miles west of the Lajitas Road. At about 8:45 the battery was ordered into position to support the Cavalry in defense of the position then occupied. Battery remained in position some two hours, simulating fire at various targets presented. During the course of the maneuver it became necessary to change the direction of fire some 1200 mils to meet a flank attack by opposing troops. Upon leaving firing position the battery marched west up a rocky gulch and through a low pass to the vicinity of Charco Largo, where instructions were received to return to the Lajitas Road and move south, bivouacing for the night September 21–22 on the Lajitas Road in the vicinity of Bishop's Ranch. The firing battery in command of the Executive moved back over the road covered during the morning, to its junction with the Lajitas Road and then proceeded south along the latter road. The Battery Commander with other Battery Officers proceeded by way of Division Headquarters, for the purpose of delivering a message from the Brigade Commander, thence to the junction of the Presidio-Lajitas Road, thence south to the battery bivouac. The remainder of the battery was then moved south along the Lajitas Road, passing the firing battery en route, and bivouaced about one-half mile north of the gate leading into Bishop's Ranch house. Anticipating instructions to report to the Brigade C.P. during the night, the Battery Commander reconnoitered the Bishop Ranch—136—Charco Largo Road and returned to bivouac.

Day's march, tractor drawn, 30 miles. Replaced one track shoe and one track pin. Mileage, trucks, 9 miles.

The Battery Commander reported to the Brigade C.P. at 9:30 P.M., where Field Order No. 6 was dictated.

September 22, 1927

The mission assigned the battery on this date was to cover the withdrawal of our brigade through a narrow defile opening about

one mile west of the Lajitas Road and extending approximately two miles to the west. The movement for the day being a withdrawal to the south, the portée trucks and maintenance section joined the brigade field trains on the Lajitas Road about 6:30 A.M. and proceeded under command of the Train Commander. The firing battery was moved south about one-half mile and went into position along the Lajitas Road opposite Bishop Ranch. Forward O.P. was established and from this position fire was conducted by the advance observer upon the leading elements of the enemy column. Acting upon instructions from the Brigade Commander the battery was later moved to a point about three-quarters of a mile south, where it continued firing blanks, to the end of the problem. Its mission having been accomplished, the battery then joined the cavalry and proceeded south to Alamito where it joined the remainder of the battery at noon. Having no order of march and not being able to precede the Cavalry column, the battery joined the column at the first available opportunity and proceeded, with much difficulty, due to rate of march, to its bivouac at *Ruins*. This march clearly demonstrated the necessity for assignment of road priority to motorized units.

March for the day, 20 miles.

Repairs: Tractors: Replaced three track pins, drilled out and replaced one spring bracket bolt, replaced one bell crank, one pintle latch, and one outer track support spring. Tightened one track support roller.

Motorcycles: Replaced one spring on side car, one headlight lens.

September 23, 1927

At 7:00 A.M. the firing battery moved out and went into the position selected the previous afternoon to support the First Cavalry in defense of its position. Established wire communication with First Cavalry C.P. and at 8:00 A.M. opened fire (simulated) on advance approaching Cavalry in column. From an unusually good position, and with excellent observation the battery was able to fire upon the enemy column from 6000 yards to 2000 yards. During the morning five tanks (portée) were observed in column at a range of about 4000 yards. Advantage was taken of this opportunity to use direct laying and one gun of the battery was moved forward to the second crest in front of the battery position and opened fire on the approaching tanks at a range of 2800 to 3000 yards. A short time later when the tanks had approached within about 2000 yards of our line, upon call from the Brigade Commander, one gun was again moved forward to the same crest and fired on approaching tanks. At about this time orders came from

the Brigade Commander to have a *"Roving gun"* report to him at once. This gun was immediately limbered and dispatched under command of an officer to the vicinity of the Brigade C.P. Before use could be made of this gun the maneuver for the day was concluded. Battery was then limbered, assembled and marched to bivouac.

March for the day: 8 miles.

Repairs: None.

September 24, 1927

Battery, less maintenance section and portée trucks, left bivouac at 8:00 A.M. and joined the Cavalry column at 8:30 at a point about one-half mile west of camp. No special mission assigned battery. Leading elements of command began deploying almost immediately after clearing bivouac area, as did succeeding elements. At the junction of the Lajitas-Ellison road, one mile west of bivouac, the preceding Cavalry unit deployed to the west and the battery turned north along the Lajitas road, halting in rear of the Brigade C.P., about one-half mile north of road junction, and awaited orders. Some forty minutes later the battery was ordered to take position west of the Lajitas road to support the attack of our left flank. Guns were placed in position about 200 yards from the road and the Battery Commander hurried forward to the most suitable O.P., some 900 yards to the front. From this O.P. only friendly troops were visible, at a distance of from 5000 to 6000 yards. Without loss of time the battery was limbered and directed to march north along the Lajitas road and halt under cover of the crest to which the Brigade C.P. had been moved.

The Battery Commander hurried to the Brigade C.P. and reported his action and asked for further instructions. The mission given was to support the attack of the 5th Cavalry which was to execute a flank movement against the enemy right. Battery position and O.P. were selected from the Brigade C.P. and the battery moved quickly into position. Firing (simulated) was begun almost immediately upon enemy forces easily visible from the new position. Firing was soon stopped upon information from a messenger who informed the Brigade Commander that the maneuver had terminated some time before—the signal rocket having failed to ascend to a height sufficient to make it recognizable.

The battery was limbered, and moved north along the Lajitas Road. The maintenance section and portée trucks which had remained in bivouac under the Train Commander were released and joined the battery en route. The assembled battery was halted for lunch, permitting the Cavalry column to precede us rather than attempt the march in column.

Battery reached assigned bivouac, one mile west of Alamito Creek, at 1:45 P.M.

Distance marched, tractor drawn, 10 miles.

Repairs: Tractors: Replaced 4 truck rollers.

Two Class "B" trucks sent to Marfa to be overhauled.

September 25, 1927 (Sunday)

No maneuver. Officers attended critique of Brigade maneuvers by the Division Commander.

Repaired motorcycle and made some minor adjustments on White Reconnaissance Car. Two trucks returned from Marfa to replace those sent in the previous day for overhaul.

September 26, 1927

Left camp at 7:00 A.M. as part of Division Reserve, following Battery "B", 82nd Field Artillery, in column from south end of Division bivouac. At a point about one mile farther south the battery was delayed on account of conflicting orders until the Division Commander placed us under the orders of the Commanding Officer, 82nd Field Artillery Battalion. The battery was then ordered into position and given the mission of general support. The battery fired upon chance targets and prepared data for concentration when the attack should begin. Pulled out of position at 10:45 and, having road priority, reached bivouac at 11:30 A.M.

Distance marched, tractor drawn, 10 miles.

September 27, 1927

Left camp at 7:00 A.M. as part of screening force. Took position in practically same place as day before. Established wire communication to forward O.P. and battery ready to fire at 9:07. No firing. At 10:15 received instructions to return to bivouac and prepare to march (portée) to Marfa as soon as ready. Reached bivouac at 11:02.

Distance marched, tractor drawn, 10 miles.

Under the provisions of Field Orders No. 4, Hq. 1st Cavalry Division, dated September 27, 1927, the battery was ordered to march (portée) to Marfa, Texas, leaving bivouac at 3:00 P.M. This was supplemented by verbal orders which permitted the march to begin at such time as the Battery Commander might choose. The hour set by the Battery Commander was 1:00 P.M.

Upon arrival in bivouac the firing battery was loaded and preparations begun for the return march. Heavy rains having fallen over a considerable portion of the route on September 24 and again during the night September 26-27, the battery expected to encounter heavy going. All personnel was accordingly advised

as to the importance of making the best possible time and directed to dismount and assist in every way possible whenever difficult road was encountered.

THE MARCH (HEAVY COLUMN)

Place	Miles	Arrived	Left	Remarks
Alamito (bivouac)		12:57		
	.5			Dry run, sand and gravel bottom, heavy pull—cannoneers dismounted and pushed.
	2.3		1:28	Ditto.
	7	2:02		Weak culvert, detour.
	10.8	2:30	2:42	Mud, road overflowed, put on chains.
Stream Bed	11.5	2:45	2:52	Dismounted one tractor, towed some trucks across.
Bishop Ranch	12.7		3:16	Dry wash, heavy grade.
	14.5		3:43	Mud, dismounted two tractors.
	19	4:35	4:49	Stream, hard pull, stopped for gas, loaded tractor.
	19.2	4:58		Heavy grade, soft road for one and one-half miles.
	21.3	5:09		Same for one mile.
	22	5:20	5:35	Halt for gas.
	26.4			Deep mud, difficult.
	28.4	6:20		Deep mud, difficult.
Camp at Marfa	30.2	6:33		Heavy column parked on gravel road. Ground in camp area too soft and wet for heavy vehicles. Weather damp and disagreeably cold.

September 28, 1927

Day spent in preparation of motor equipment for return march. Tractors washed, guns thoroughly cleaned and oiled, crank cases drained and refilled, all motor vehicles inspected and serviced. The detail which had been left in camp had, during the absence of the battery, overhauled seven Class "B" trucks, made the necessary repairs to the Artillery repair truck and had removed and replaced one tire on trailer. Replaced shackle bolt on F.W.D. and changed tires on four Class "B" trucks.

September 29, 1927

Changed tires on ten Class "B" trucks, finished overhaul of White Reconnaissance cars, F.W.D., and G.M.C. trucks. Loaded all matériel and a considerable portion of supplies and repair parts. Obtained supply of oil and gas.

PORTEE MARCH BY BATTERY "A," FIRST FIELD ARTILLERY

September 30, 1927

Finished loading all supplies and equipment. Formed heavy column, turned in unserviceable tires to salvage, formed and paid battery at 10:30, dinner at 12:00 o'clock.

RETURN MARCH (HEAVY COLUMN)

Place	Miles	Arrived	Left	Remarks
Marfa (Camp)			1:18	Roads dry, weather clear.
	7	2:15	2:20	Inspection and minor adjustments.
Paisano Pass	14.7	3:15		Steep grades, road good.
R. R. Crossing	20.3	3:42	3:50	Inspection, water, tightened down magneto, F.W.D.
Alpine	26.6	4:23		Camped on vacant block close to center of town. Gas, oil and water. Adjusted brake band, one trailer.

Distance marched—26.6 miles.

October 1, 1927

Alpine				Heavy rain beginning at 1:00 A.M.; breakfast 7:00 A.M. Two officers reconnoitered road toward Ft. Stockton. Returned at 9:55 A.M. and reported road impassable for heavy column from end of pavement 7 miles east of Alpine. Reports of heavy rains further north and east and absence of even light traffic coming through caused change of route. Received information that roads *via* Ft. Davis and Pecos were in good condition and decided to take that route. Heavy loads were moved from their parking place with considerable difficulty. Column delayed 15 minutes in getting trucks on to hard road bed.
			10:25	Road paved.
	8.6	11:07		End of pavement. Foothills of Davis mountains, graveled road with numerous grades.
	10.5	11:25	11:41	Sandy-bottomed stream, difficult crossing, cannoneers dismounted and pushed.

Place	Miles	Arrived	Left	Remarks
	11	11:47	12:30	Noon halt. Gas from reserve to service tanks, oil and water.
	11.2	12:32	1:03	Sub-irrigated roadbed, trailer broke through crust down to axle. Unloaded tractor, towed four heavy loads through.
	13.8		1:40	Very steep grade, trucks in low gear to 14.5 miles.
	15.4			Very steep grade to 15.9 miles; men dismounted and pushed.
	18			Very steep grade to top of pass at 20 miles; one truck stuck, due to poor driving. Dismounted tractor, towed.
		3:10		Last truck top of grade. Gas from reserve tanks, oil and water.
Ft. Davis	25	3:55	4:20	Halt, closed column and serviced trucks.
	28.3			One truck stuck, detour cattle guard.
	28.8			Broken cattle guard filled in with stone, detour impossible. Two broken gas lines.
	30.5	5:20		Broken gas line.
	31.8	5:33		Difficult stream crossing—towed.
	31.9	5:35		Difficult stream crossing—towed.
	32.1	5:36		Difficult stream crossing—towed.
	32.3	5:38		Difficult stream crossing—towed.
	32.6	5:53		Difficult stream crossing—towed.
	32.9	6:01		Difficult stream crossing—towed.
	33.3	6:35		Difficult stream crossing—towed.
	33.7	6:38		Difficult stream crossing—towed.
	34	6:40		Difficult stream crossing—towed.
	34.3	6:42		Difficult stream crossing—towed.
	34.4	6:44		Difficult stream crossing—towed.
	34.7	6:48		Difficult stream crossing—towed.

PORTEE MARCH BY BATTERY "A," FIRST FIELD ARTILLERY

Place	Miles	Arrived	Left	Remarks
Sheep Ranch	35.2	6:52		Camped over night. Replaced key in gear shift lever, Class B. Rear spring D.L.R. broken, no replacement.

Distance marched—35.2 miles.

October 2, 1927

Sheep Ranch			7:01	Roads hard surfaced—graveled, weather clear.
	.3			Very steep grade to 1.5 miles. Two trucks stalled at beginning of grade—poor driving.
	9.6	8:05	8:30	Halt, closed up column, serviced trucks. Last truck arrived at 8:25. Slow drivers admonished to take advantage of down grades where road was clear and to keep up with leading trucks. Road recently graded, soft.
	10.4			Road rough, narrow—winding through rocky formations.
	12.6			Lane—road fair.
	13.9			Road rough and narrow, steep grade too at 14.5
	16			Beginning of gentle decline to Madera Valley.
Balmorhea	25	9:45	10:15	Gas, oil and water.
	47	11:39	12:55	Noon halt. Gas from reserve tanks, oil and water. Delayed waiting arrival of kitchen.
Pecos	61	1:55		Through.
Pecos River Bridge	64	2:20		Very difficult to keep trailers on narrow runways—two planks in floor broken by trailers leaving runway. Road from Pecos very rough.
	69			Road recently paved—covered with loose crushed rock—heavy.
	74			Detour old dirt road, rough, very dusty.
	76	3:15		Main Highway. Road recently paved—covered with loose crushed rock—heavy.
	80			Road smooth.

Place	Miles	Arrived	Left	Remarks
Pyote	85	3:49	4:02	Gas from reserve, oil and water.
Monahans	98.7	4:52		Excellent run considering roads. One trailer arrived with half of new tire, installed at Marfa, gone. Welded truss rod front axle Artillery repair, and pipe connection water cart. Removed wheel from trailer; took same 35 miles to Odessa in hope of finding tire press with which new tire could be pressed on. No success.

Distance marched—98.7 miles.

October 3, 1927

Monahans			8:15	Delayed by motor troubles, replaced broken gas line; new breaker points for one magneto. Trailer with bad tire left at 7:00 A.M. with instruction to proceed alone with best possible speed. Sent detail, one officer and 8 men forward in Reconnaissance car to repair truck left at Big Springs en route to Marfa.
Odessa	35	11:45		Through.
	37	11:55	12:42	Noon halt. Gas, from reserve tanks, oil and water.
Midland	55	1:55		Through.
Stanton	73.7	3:30		Through, water,
Big Spring	93.5			Through.
Ball Park	95.2	5:05		Camped for the night. Truck left in Big Springs had been repaired. Joined column. Another new trailer worn out. Installed rear spring on D.L.R. Installed steering arm on Ford. Borrowed stock and die from Railroad shop—rethreaded kitchen trailer spindle. Connecting rod bearing on G.M.C. burned out, no replacement available, towed. Trailer with bad tire which left Monahans at 7:00 A.M. had arrived at 3:00 P.M.

Distance marched—95.2 miles.

PORTEE MARCH BY BATTERY "A," FIRST FIELD ARTILLERY

October 4, 1927

Place	Miles	Arrived	Left	Remarks
Big Spring			7:15	Road paved, weather clear. Truck which was picked up here was found to have little compression due to badly pitted valves. Run light.
	12	8:10	8:35	Halt, closed up column.
	18			End of pavement. Dirt road, rough from recent rains only beaten track, solid.
	30			Sandy, heavy going.
	33.2		11:00	Broken bridge. Unloaded one tractor. Road very rough.
Colorado	37.8	11:15		Through.
	40	11:40		Noon halt. Gas, oil and water; last trailer arrived 12:00 o'clock.
			12:40	Road sandy—freshly graded—very heavy going to 44 miles.
				Ditto from 46 to 56 miles.
	61			Beginning of pavement.
Sweetwater	66			Through.
	66.6			End of pavement. Road rough but solid.
	73			Broke three spring center bolts on water trailer; rear wheels slipped forward, broke brake rod. Rear axle lashed to frame with tow chains.
Merkel	89.2			Camped for night. First four trucks arrived 5:00 P.M. Fifth at 5:45 and last at 6:15. Last 23 miles, road very rough, due to recent rains. Two new gas lines and adjusted valves two Class B's. Loaded water trailer into Class B.

Distance marched—89.2 miles.

October 5, 1927

Merkel			6:55	Road rough, surface soft outside of beaten tracks.
	2.7			Very soft. Three trucks stalled, towed.
	7.1	7:45	8:40	Weak culvert, very soft detour—unloaded tractor, towed. Road rough and soft to 14 miles.

Place	Miles	Arrived	Left	Remarks
Sand Pit	14	9:15	10:15	First heavy truck. Unloaded tractors and towed all vehicles except two F.W.D. trucks and other light vehicles.
	19			Pavement (Abilene).
Abilene	21	10:50		Left G.M.C. to have connecting rod bearing replaced.
	22.1	11:00		Bridge, weakflooring, slow crossing. Road very rough.
	28			Pavement.
	29.2	11:50		Noon halt. Gas, oil and water. Bad rubber on trailer wheel completely gone—rim cutting pavement. Wheel removed and sent to Abilene to be re-tired. Tire from front wheel of Class B used. Tractor unloaded and run ahead in order that truck with light trailer might rejoin column more quickly.
			12:45	
Clyde		36.5		Through.
	40.5			Truck with empty trailer overtook tractor, tractor loaded.
Baird	43.6	2:00		Through.
Putnam	55.8	3:15		Through.
Dothan	61.6	4:05		Through.
Cisco	68.6			Through.
Eastland	84.5	5:15		Camped for the night. Ground valves Class B, adjusted tappets Class B.

Distance marched—84.5 miles.

October 6, 1927

	No Run			General inspection and minor adjustments. One trailer wheel removed, sent to Ranger to be re-tired. Rest.

October 7, 1927

Eastland			6:45	Rain. Brick pavement.
Ranger	11	7:45		Through.
Hillcrest	19	8:15		Last truck through 8:30. Beginning one mile of steep winding decline, raining hard, trucks put in low gear and personnel dismounted.
Strawn	26	9:15	9:30	Gas from reserve tanks, oil and water.
Wink City	36.8	10:25		Through.
Palo Pinto	46	11:05		Through.

PORTEE MARCH BY BATTERY "A," FIRST FIELD ARTILLERY

Place	Miles	Arrived	Left	Remarks
	50	11:50	12:30	Noon halt. Gas, oil and water.
Brazos River	52.5			Bridge under repair—flooring bad—crossing slow.
Mineral Wells	58			Through.
	63.8			End of brick pavement. Badly worn and rough.
	65.8		2:10	Closed up column.
Weatherford	80		3:25	Retimed and replaced two spark plugs, Class B.
	93			Retimed one Class B.
	96			Retimed one Class B.
Outskirts of Ft. Worth	103.6	5:30		One key replaced in starting crank shaft.

Distance marched—103.6 miles.

October 8, 1927

Ft. Worth			7:10	Cleared city 9:00 A.M. Heavy rain. Took dirt road around north edge of Ft. Worth to avoid traffic. Road slippery, much difficulty in making grades.
	14			Halted. Closed up column.
	17	9:40	10:20	Trailer off road. Unloaded tractor, double-headed with F.W.D., pulled trailer back on road.
	40	12:45	1:50	South edge of Decatur. Noon halt. Gas, oil and water.
Alvord	57	3:00		End of pavement.
	64	4:25		Freshly graded, heavy mud and sand for four miles.
	65.5	4:30		Through.
Bowie (1½ mi. S.E.)	72.8	5:40		Camped for the night. Retimed and adjusted tappets one Class B.

Distance marched—72.8 miles.

October 9, 1927

Bowie (1½ mi. S.E.)			6:30	Towed one Class B to start. Road heavy, sand and gravel surface—much cut up. Soft.
Stoneburg	10	8:10		Through.
	14.6	8:50	9:15	Halted on narrow fill—engine which was difficult to start accidentally killed by driver. Replaced distributor head.

Place	Miles	Arrived	Left	Remarks
Ringgold	20.5	10:15		Through.
	22.6			Bad mud holes—ruts deep and narrow. Dismounted tractors—ruts deep and narrow. Dismounted tractors—towed to bridge.
Red River	24.7			Vehicles crossed bridge with a distance of 75 to 100 yards. Tractors dismounted. Last tractor crossed bridge at 12:30.
Terral	26			Through.
	27.2	12:50	1:35	Noon halt. Gas, oil and water. Deep sand, no beaten ruts—tractors loaded.
	27.5		2:10	Deep sand. Dismounted tractor, towed three trailer loads through.
	28	2:18		Loaded tractor.
	28.4	2:30		Tank stalled—towed.
				Note: One narrow-tread tire on each of two trailers made pull much heavier. Narrow tire breaks through surface where others do not.
Ryan	37.6	3:40		Through. Next four miles very heavy sand. One Class B but little power. Class B without trailer, pushing.
	48			Transmission gears on one Class B locked. Delayed 30 minutes.
	48.5			One Class B, one valve stem, two valve springs broken. Tractors dismounted, and towed truck.
Waurika	49.4	6:45		Through.
School House	51.8	7:30		Camped for the night. No repairs. Mechanics very tired.

Distance marched—51.8 miles.

October 10, 1927

				Delayed to replace one valve and two valve springs. Two tractors dismounted and towed heavies
School House			7:50	through one-half mile deep sand.
Hastings	8	8:55		Through. Roads much better.
Temple	17.8	10:15		Halted. Closed up column. Oil, gas and water.

PORTEE MARCH BY BATTERY "A," FIRST FIELD ARTILLERY

Place	Miles	Arrived	Left	Remarks
Walters	28.1	11:35	12:40	Noon halt. Gas, oil and water. Roads dry and smooth.
	49			Halted, closed up entire column.
Lawton	51	3:30		Through.
Post Field	56	4:05		Convoy parked. Battery dismissed.

Distance marched—56.0 miles.

GENERAL REMARKS

Motor Vehicles

Condition.—The motor vehicles used for transporting matériel were Standard Class "B" trucks which have had some nine years of general service. No selection for this particular purpose could be made, since only the required number of serviceable trucks were available. As previously mentioned, five of the eleven Class "B" trucks used on this march were taken from storage on September 5; and, since the battery was scheduled to march on the 8th, only three days were available in which to prepare these vehicles for the long march. Naturally, only minor repairs and adjustments were attempted. Subsequent difficulties indicated that, due to lack of time for thorough testing, many adjustments were not complete.

Though not evident prior to loading, the first day's march made it apparent that several trucks were lacking in power, consumed excessive quantities of gas and oil and required considerable "nursing."

Tires were, generally, in poor condition. Some front tires had become so worn as to cause difficult steering; others had chipped along the sides in such a manner as to have but about half of their original bearing surface, and cut more deeply into soft ground. Lack of time and the absence of replacements prevented the elimination of these defects prior to departure.

Performance.—Considering the service which these trucks have had and bearing in mind the excessive load handled during the march, their performance is considered quite satisfactory for this type of vehicle. Not originally designed as a towing vehicle, their use in towing such loads for this distance is considered unusual and highly creditable.

Driving.—None of the drivers was experienced in the handling of such a heavy trailer load. For this reason, the drivers were assembled prior to departure, and admonished to exercise great care at turns and on all descending grades. It soon became apparent that the warning given had impressed the drivers. This care, approaching timidity on the part of some, was observed with satisfaction, even though it had the effect of slowing the march of the

column. It was felt that when the drivers had become accustomed to the feel of the load and had had the opportunity to test their control of same, more speed with greater safety would be made.

The drivers, with two exceptions, were capable men. One was careless and unconcerned; the other was obviously lacking in the mental alertness and sound judgment necessary for such an undertaking. That he completed the trip without serious mishap, reflects credit upon those responsible for his constant supervision.

Drivers soon learned to take advantage of all down grades where the road was straight and clear; and in this way added greatly to the day's march. The handling of such loads required a driver who is alert, quick, bold, but not reckless, and constantly attentive to his duty.

Under this heading, it is desired to mention what is considered the outstanding feature of the march—the fact that the column covered a distance of more than 1400 miles, for the greater part along a transcontinental highway, without a single accident or collision.

Suitability of Type.—Lacking in actual experience with other types, remarks under this heading are based upon observation of other types seen in similar service en route, and upon the difficulties actually encountered with the vehicles used.

Experience on this march clearly demonstrated the difficulty to be expected in moving the Class "B" truck on other than hard surfaced roads. In every case where sand, even in a moderate amount, was encountered, difficulty was at once experienced. Relieved of its trailer load the truck was, in many cases, unable to move under its own power, where other vehicles were able to move without great difficulty. Needless to say, the same difficulty was experienced on muddy roads or on any ground not sufficiently well packed to support the vehicle without deep wheel impression.

Undoubtedly the Class "B" truck is a powerful vehicle, if it can get traction; the difficulty being that it has but little or no traction except on a hard surface.

Since the vehicle is clearly not suitable for maneuvering when off of improved roads, its use for portée purposes must therefore be confined to transportation over considerable distances. For such purpose it does not possess the necessary speed. Under the most excellent road conditions encountered during the march, Class "B" trucks attained a maximum speed of 21 miles per hour. This speed rapidly decreased on even a slight grade and when a noticeable grade was encountered, a shift of gears was usually necessary.

The route of march, passing through several oil fields, situated usually in desert country, afforded opportunity to observe the types of motor vehicles used for heavy hauling in these districts. Almost

without exception, trucks were equipped with pneumatic tires. A truck so equipped and heavily loaded passed the column on the worst stretch of roadway encountered on the march. This truck moved steadily along through deep, loose sand while vehicles of the convoy were being towed by tractors. At other times, trucks heavily loaded passed the column at a speed of thirty to thirty-five miles per hour.

Information obtained from operators at various places along the route was to the effect that the use of solid tires had been discontinued almost entirely in parts of the country where there is but little improved road and where sand or mud is encountered almost continuously.

Trailers

Condition.—New—not previously used. Wheels not properly aligned. These trailers were designed to carry the 3-inch gun and for towing by tractor. Their use to carry the 5-ton tractor gave them an overload of approximately 100 per cent. The following modifications were necessary in order to prepare the trailers for use on this march: The short drawbars, designed for use with tractors, were replaced by longer ones to permit coupling to trucks; the guide rails (channels) were filled in with timber; loading ramps were replaced by longer and heavier ones.

Difficulties Experienced.—The overload is believed responsible for several sprung axles; and this in turn for excessive wear on tires.

The modified drawbars were equipped with lunettes from 155-mm. caissons and had an interior diameter of at least five inches. This permitted excessive side play on the drawbar and caused the trailer to "weave" to a great extent—particularly when not in heavy draft. This also permitted the vehicle to trail to one side or the other—usually, due to crown of the road, to the right, and necessitated driving the truck nearer the center of the road, thus reducing passing room for other traffic.

Another serious difficulty experienced on all but hard-surfaced roads was due to the width of tread of these vehicles. The tread of the rear wheels on a Class "B" truck (outside to outside) is 81 inches; the tread of the trailer is 84½ inches. This difference in tread is sufficient, in all cases, to fill at least one track of the truck and when not trailing true, to fill both truck tracks. This not only makes the passing of the first vehicle difficult but adds accumulatively to the difficulty of each succeeding vehicle.

Conduct of Convoy.—Early in the march it became apparent that an attempt to maintain a specified distance between vehicles of the heavy column would lower the rate of march to a considerable

extent. A minimum distance was therefore prescribed and drivers instructed not to diminish this distance except when specifically directed to close the column. The slower trucks were soon discovered and placed at the rear of the column, where they would not delay others. Drivers were frequently cautioned to observe the rules of the road and to exercise great care at all times. Upon leaving camp or any halt, drivers were given free rein to conduct their vehicles at the best possible speed, without regard to other vehicles. The Battery Commander and the officer in charge of the heavy section moved up and down the column, or line of march, observing the march. Where difficult ground, weak culverts or bridges were likely to be encountered, one officer habitually preceded the column in order to direct the drivers in the passage of such obstacles.

The distance from the leading to the rear vehicle of the column was frequently as much as three miles. When deemed advisable, for any reason, the leading vehicle was slowed or halted and the column closed up. No difficulty was experienced which might be traced to this method of permitting vehicles to move independently.

It is believed that the rather great distances between vehicles greatly facilitated the passage of civilian traffic.

The light truck column was marched with distances of approximately fifty yards and maintained this distance very well throughout the march.

When the column was halted and closed up, one or two open spaces were left in the column to permit the passage of civilian traffic and officers or reliable enlisted men were posted to direct traffic. This precaution is believed to have prevented some serious accidents.

Service, Inspection and Repair

Gas.—Prior to departure the following provisions were made for fuel supply. Service and reserve tanks on both trucks and tractors were filled. A reserve of 250 gallons was carried on an F.W.D. truck in the light section.

It was planned to replenish this supply during the day from convenient filling stations along the route. During the second it was noted that considerable marching time was lost in gassing, and it was then decided to have gas brought to the camp and refill vehicles after the day's march. This plan was used throughout the remainder of the trip.

To facilitate the handling of gas, additional cans and several eight-foot lengths of garden hose, for use as syphons, were procured and carried on the heavy vehicles. At each halt gas was transferred from reserve tanks, on truck or tractor, to service tanks.

At the noon halt gas was taken from the reserve drums to fill any empty tanks.

Lubrication.—Crank cases were filled each night from the main supply carried in one of the maintenance trucks. For an emergency supply, a one-gallon safety can, carried on each tractor, was kept filled.

The supply of grease was carried in the truck with the gas drums. Each day, immediately after reaching bivouac, all vehicles were well greased and cups refilled when necessary. It is believed that the close attention given to lubrication had much to do with the successful operation of the vehicles.

Inspections.—During the march, inspections made by the driver at each halt, were confined principally to gas, oil and water, except where the operation of his vehicle gave indication of other difficulty. Cannoneers looked for hot bearings and brake adjustment on the trailers.

At the end of the day's march each vehicle was serviced and inspected by drivers and mechanics; the latter making any repairs and adjustments found necessary. Crank-case oil was examined and changed when necessary. But few instances were noted where these inspections failed to disclose a defect which existed at that time.

Repairs.—Repairs of a nature to effect the operations of a vehicle were usually made on the spot. Two excellent motor mechanics trailed the heavy column in a light repair truck for this purpose. In some cases it was found expedient to relieve the vehicle of its trailer and to run light to camp where repairs were made during the night. One vehicle was left en route, due to lack of necessary spare parts.

The Artillery repair truck with complete equipment, including a motor-driven generator which provided electric lights, was of inestimable benefit during the march—not alone for the work actually done, but also for the light made available for night repair work.

SUMMARY OF COST

Items	Amount Authorized	Amount Expended
Gas and oil	$3,000.00	$1,965.94
Excess cost of ration	265.00	67.89
Bridge toll	150.00	124.00
Camp sites	360.00	25.00
Wood and water	100.00	2.50
Repair of vehicles	150.00	81.50
Telephone and telegraph	10.00	None
Incidentals	100.00	36.00
Ordnance repairs	500.00	496.00*
Ice	150.00	12.45
Total	$4,785.00	$2,811.28

* Not including soldier labor.

Items	Amount Expended
Gas and oil to Marfa	$799.10
Gas and oil during maneuvers	179.06
Gas and oil return to Fort Sill	987.78
Total	$1,965.94

PERSONNEL

Health and conduct:

Sickness ..... None
Injuries ..... None
Absence from duty ..... None

Distance marched (portée)—1,457 miles.

HEADQUARTERS THE F.A. SCHOOL

Office of the Commandant.

FORT SILL, OKLAHOMA,
October 19, 1927.

Subject: Commendation.

To: Captain Edward F. Hart, 1st Lt. John G. Brackinridge, and 1st Lt. Thomas M. Tiernan, 1st F.A.; 1st. Lt. Leonard S. Arnold, and 1st Lt. William R. Schaefer, 18th F.A., and all enlisted men assigned and attached to Btry "A," 1st F.A., during the recent expedition to Marfa, Texas.

1. Your recent successful march to Marfa, Texas, and return, and your participation in the Cavalry Division Maneuvers as an experimental portée battery, were followed with intense interest by the entire garrison. The results accomplished by you, and the officers and men of your command, is a source of great gratification to me, personally, and to the Field Artillery School.

2. Considering the age and doubtful utility of the matériel taken by you on the expedition, the success of the march can be attributed, solely, to the untiring efforts of everyone connected with the experiment, and the determination to overcome what it first appeared to be unsurmountable difficulties. Efforts such as these, are always born of a very high sense of duty, and a pride in achievement typical of the American soldier.

3. In recent correspondence, on this subject, your Chief, Major General Snow, said in part as follows:

> "That only hard and wonderful work on the part of the personnel, kept the motors going. Personnel and not matériel, is entitled to credit . . . only their fine soldierly and loyal spirit, enabled the march to be successfully completed at all."

In this, I fully concur, and take this opportunity to extend heartiest congratulations to every member of the expedition on the highly successful completion of a most difficult mission.

G. LER. IRWIN,
Brigadier-General, U. S. A.,
Commandant.

FIELD ARTILLERY: PAST, PRESENT, AND FUTURE

BY GENERAL HERR OF THE FRENCH ARMY

FOURTH INSTALLMENT

(This treatise by General Frederick Georges Herr, published in French by Berger-Levault, Paris, is believed to be an outstanding book on the subject of field artillery. In the belief that heretofore there has not been an opportunity to read this in English, it is hoped that its publication in serial form, beginning in the May-June, 1927, JOURNAL, will be the means of acquainting more of our officers with this excellent work. During the World War, General Herr was successively the commander of an artillery brigade, an infantry division, an army corps and of an army detachment. He then became Inspector General of the French Artillery.—EDITOR.)

CHAPTER II. CONTINUED

THE FIELD ARTILLERY DURING THE WAR

V. OPEN WARFARE ONCE MORE (1918)

A. THE GREAT GERMAN ATTACKS

Preparation for the Defensive Campaign.—The year 1917 did not give the Allies what 1916 had led them to hope for. It closed on an anguishing situation. Russia signed an armistice on December 3d and her defection could not fail to have grave consequences. The German High Command immediately began to move to the western front, the divisions thus freed on the eastern front.* On the other hand the Entente's resources in man power were failing. Between November, 1917, and the end of January, 1918, it was necessary to eliminate five French divisions. The British who had lost 800,000 men during 1917 in Artois and Flanders, had replacement requirements which their depots could not fill and they had to reduce the number of their battalions by a fourth.

Equilibrium could be reëstablished only by the entry into line of the American Army. However this could not take place, with really trained divisions, for several months. Until that time we must, under penalty of irreparable usury, maintain a passive attitude with the clear out idea, however, of passing as soon as possible to the offensive, which alone could give victory.

Accordingly the first thing to do was to prepare for a hard defensive battle. The two great operations which the Germans had conducted during the latter part of 1917, at Riga in September and on the Caporetto in October, let us foresee the form which the fighting would

* On November 1, 1917, there were still but 149 German divisions, of which thirty were in reserve. This was about the same effective strength as existed in August and September. However, on December 15th we had opposite us 154 divisions, of which 30 were in reserve; on January 1st there were 157, of which 40 were in reserve; on January 10th there were 161, of which 47 were in reserve; finally on March 1st we had verified the presence of 179 divisions, of which 70 were in reserve, but we had good reason to believe that there were really 200. The Allied Command calculated that the German heavy field artillery, available for attacks, had reached 900 batteries by February 1st, 1000 by March 1st, 1150 by May 1st.

doubtless take. The Germans would suddenly deliver an offensive, characterized as an attempt at complete surprise, by the shortness of the artillery preparation and by the strength of the attack. This would be followed by exploitation in depth or by successive attacks following each other at intervals as short as possible. Experience had shown that before an attack of this kind, the defense was always powerless to prevent the rupture of the front. Accordingly the Commander-in-Chief in his Directive No. 4, dated December 22, 1917, laid down the methods to be followed in the coming battle as follows:

> The first positions were to be held so as to break down or at least slow up and disorganize the first enemy rush. However, there should be employed in this fighting only sufficient troops to insure good use of the existing field fortifications and in any event to give the main body time to man the second positions and the switch positions;
>
> The second positions and the switch positions were to be held at all cost;
>
> Reserves were to be used not only for local counter-attacks, but also for counter-offensives either against the flanks of the attack zone or on a part of the neighboring front.
>
> Loss of terrain was to be accepted, so as to choose a battle position which would be at least as far back as the second position. The troops in the first position were not to be reënforced. The first position was to be disputed and the second position held. In a word we were to maneuver. Above all things, the defensive battle should be fought with the most rigorous economy in man power.

The Regulations of January 27, 1918, relative to the application of Directive No. 4, set forth the fundamental ideas of the *field of battle for the army*. Thus was the ensemble of the organized terrain on which the army had the mission of stopping and defeating the enemy. The Regulations laid down instructions relative to tactical dispositions. The defense should be made in depth and its essential element is the *battle position*, which the enemy should be able to approach only after a series of combats which would have disrupted his assault formation and would have necessitated his moving artillery from its initial positions.

As concerns field artillery, a series of documents set forth the tactics which should be employed, which may be summed up as follows:

> Our attacks in 1917 had been prepared for over a long period in minutely organized terrain and with a large quantity of matériel available. We had become accustomed to a considerable density of artillery deployment which reached, as we have seen, about one piece per 6.5 meters front at La Malmaison.
>
> On the contrary, the Germans in their defensive fighting, had acquired distinctly different methods. They did not feel it necessary to have more than 12 batteries per kilometer, or one piece per 20 meters front, in the sectors where the fighting was extremely severe.
>
> Echelonment in depth is imposed on the field artillery for various reasons. The attack, even when there is warning of it, always obtains important results in the beginning. Continued progress, however, is easily stopped by troops, even though few, who are kept in hand by their commanders and whose location is not known to the enemy. Furthermore, ammunition supply for densely deployed artillery

becomes practically impossible when it must be improvised under crushing fire, particularly under heavy gas concentrations.

However, it is not enough to echelon the artillery in depth. There is frequently the temptation to keep all the artillery deployed in an overworked state, due to a desire to secure the same density of fire that we were accustomed to use when on the offensive. This temptation must be resisted, and a part of the artillery must be kept in rear, resting and training. This artillery constitutes a true mobile reserve whose employment must be planned for the defense of the second position and to support counter-attacks, in case of enemy penetration. The resting artillery should occupy some of the battery positions pertaining to the defense of positions other than the first. It should constitute part of the security garrison of these positions. It should make all preparations for firing and should maintain and improve existing installations.

The High Command foresaw that an offensive would doubtless compel it to withdraw from armies not attacked, all their reserves of heavy field artillery, leaving them only their organic division and corps artilleries and the sector artilleries. The corps artillery 75-mm. gun regiments were being converted to portée and were to become a very mobile strategic reserve of capital importance to the High Command. They were to be subject to being taken away on forty-eight hours notice.

In this way, the High Command, thoroughly appreciating the necessity for a powerful general reserve of field artillery, took measures so that this reserve would always be immediately available.

It prepared to maneuver with its general field artillery reserve as it maneuvered with its reserve divisions. These maneuvers would require rapid road marches and truck movements for which traffic regulations must be prepared in advance, the reserved itineries posted, and the traffic control personnel organized, so that throughout the rear areas all movements would be regulated and coördinated. All this organizing work was executed without delay and was finished in time.

The Battle of Picardy (March 21st-April 9th).—The Germans intended to finish the war in 1918. Accordingly their plan was to try for decisive results and, as a start, to break through the front.

Their first offensive had a particularly important strategical objective—to separate the British and the French and to reach the seaboard so as to render this separation irremediable.

Their blow between Amiens and Arras was to follow the direction of the lower Somme. The break through was to be attempted on the British front in the region where the two allied armies, separated by the Oise, were not firmly welded together and where the British, who had just relieved our III Army, were still not thoroughly organized.

The initial attack was thus to be against the British alone, from their junction with us on the Oise, to the Sensée, a front of about eighty kilometers. Later attacks were planned in Flanders and Champagne to prolong the battle, to exploit the results, and to finally accomplish the breaking up of the Allies' front.

As the French High Command had estimated, the offensive was conducted in exact conformity to the principles which had already been tried at Riga. Preparations were carefully camouflaged, especially the

artillery deployment and ammunition dumps. All concentration movements were carefully concealed, taking place only at night. Movements by railroad were stopped quite a way from the front and finished by road. Methods of artillery employment were similar to those used at Riga, *i.e.*, the artillery preparation was preceded by no preliminary adjustment and the attack was supported by fires in which neutralizing effect was sought by use of gas on a large scale instead of destructive effect. In other words, every effort to the finest detail was made to obtain surprise.

On March 21st at 9.10 A.M., after a five-hour bombardment, forty German divisions assaulted the British positions. They immediately made a large breach in the British front which was enlarged and deepened in the following days. This breach would have infallibly led to the desired result, that is to say the separation of the British and French armies, if the French High Command had not succeeded in filling the gap with two armies, first with the III Army north of the Oise on March 22d and then with the I Army near Montdidier beginning about March 27th.

Nevertheless the Germans made rapid and continued progress until March 28th. On that day a gap of a dozen kilometers empty of all troops, offered itself to them in the Montdidier region but, due to lack of cavalry, they were ignorant of it and could not profit by it.

From March 30th to April 1st, the enemy tried in vain to reach the railroad from Beauvais to Amiens. But all his reserves had been engaged and he had to mark time several days so as to bring up supplies, reorganize his troops, advance his heavy field artillery, and bring up fresh divisions.

The strategic penetration counted on between Amiens and Arras having failed and there appearing to be a gap between the Oise and the Somme, the break through was again attempted in the Montdidier region (April 4th) but with no greater success. According to Ludendorff himself, "the Allies' resistance proved itself superior to the German offensive powers. The Supreme Command was compelled to make a truly painful decision and to stop the attack on Amiens."

After an attempt south of the Oise (April 6th-9th) which only led to an unimportant straightening out of the front on the Ailette, the first act of the great German spring offensive could be considered closed. It is true that this offensive had considerable tactical success, an enormous booty, 70,000 prisoners and over 1000 cannon had been taken. A salient 60 kilometers deep had been created in our front and the Germans were that much nearer Paris and the sea. The great lateral artery of the Paris-Calais railroad was under German artillery fire. But, as Ludendorff admits, the offensive did not secure the great strategic results counted on; it did not separate the Allied armies, it did not bring the Germans to the sea.

The Battle of Flanders (April 9th–May 20th).—In spite of its profound disappointment, the German High Command did not give up the execution of its plan. Even though the first act had not given what was counted on, it was necessary to go on with the second. The break through which could not be obtained at Amiens must now be tried for, in conformity to the initial plan, in Flanders between Ypres and Lens.

The attack took place April 9th on a 20-kilometer front between Le Bassée and Armentieres. It was delivered in the same style as the former one. This time the British front was again completely crushed. The success was considerably more rapid and extensive than the German High Command had counted on, and it hurriedly brought up its reserves in order to extend the breach in the British front towards the north and west. On April 11th the front of the attack had increased to 30 kilometers. On the 14th the British lost Bailleul and Neuve-Eglise. However, the French, unhindered in their movements, intervened with unexpected celerity. General Foch, who had just been appointed Commander-in-Chief of all the Allied armies, constituted, from French divisions, the Detachment of the Army of the North in the region of the Monts de Flanders.

On April 18th the enemy renewed his attacks westward toward the Forêt de Nieppe north of Mount Kemmel.

From the 18th to the 21st he reorganized his forces, pushed forward his heavy field artillery and his ammunition, and on April 25th delivered a violent attack on Mount Kemmel, followed shortly on the same day by a new push along the whole attack front. He obtained only local results of no importance and on May 5th admitted his check by ceasing his attacks.

Battle of the Aisne (May 27th-June 5th).—Thanks to the unreserved assistance which the French Army gave its Allies, the rupture of the British front was definitely checked. However, this assistance cost the French dearly. The reserves of the French were diminished, their maneuvering capacity was lessened and the French front had been pretty well stripped by reason of the divisions which it had been necessary to take from it.

The Germans were to profit by these circumstances. Their new project included:

An offensive between Soissons and Reims, a region where the French front seemed particularly weak. This was to be immediately followed by an extension of the two flanks, toward Reims on one side and as far as the Oise on the other.

A second attack between Oise and Montdidier.

Contrary to the formal orders of the French High Command which had, as we have seen, prescribed that battle should not be accepted on the first position, the Commanding General of the VI Army, which held the front along the Ailette, decided to defend his first position north of the Aisne, this in spite of the extreme weakness both of his reserves and his effectives in the first line.*

At 1 A.M. of the night of May 26th-27th, the enemy put down a violent bombardment from Coucy-le-Château to Reims. This bombardment was to a depth of 10 to 12 kilometers and covered all the terrain of our front lines and the zone of our batteries. A severe interdiction fire covered our rear areas. The enemy artillery used gas intensively, inundating with it our batteries and the zones where our reserves could be implaced. Never, either in 1916 or in 1918 had the enemy deployed

* There was an average of one division per 8 kilometers of front. One division which was attacked by six enemy divisions, even held an 11-kilometer front.

so much artillery for the attack. He concentrated over 30 batteries per kilometer of front in those sectors where he made his main effort and the total number of cannon put in action was over 5000 (1450 batteries). Thanks to this powerful mass of artillery, the duration of the artillery preparation could be considerably reduced. It was half as long as that of March 21st.

At 3.40 A.M. the infantry assaulted on a 60-kilometer front extending from Brimont to Leuilly. It was preceded by an extremely dense rolling barrage. On the east, around Craonne and in the Aisne valley, it was supported by tanks.

The Commander of the VI Army at first persisted in trying to hold the north bank of the Aisne. When at 10 A.M. he gave the order to cross the bridges, it was too late. The enemy was already master of them, and that afternoon succeeded in establishing a large bridgehead south of the river, from Loivre to Saint-Mard. The enemy continued to advance on the 27th, and on the 28th crossed the Vesle, thus attaining all the objectives assigned for these attacks.

Faced with this unexpected success, the German High Command decided on the evening of the 28th to exploit it to the utmost and to push resolutely to the Marne so as to cut the Paris-Nancy railroad, and even to cross the river if possible and establish a solid bridgehead on the south bank for use in further operations.

The attack was accordingly resumed with fresh troops on the morning of the 29th. It brought the Germans to the Marne, but attempts to cross to the south bank failed (June 4th).

The French High Command first threw reserves into the unceasingly widening breach. Also, convinced that the best way to limit the depth of the breach was to prevent its widening, the French High Command ordered the Group of Armies of the North to hold on its right on the Montagne de Reims, and on the left to bar the Aisne valley. The Group of Armies of the North was given the V and X Armies for this purpose. Henceforth all the German attempts were futile, and on June 4th the offensive was stopped.

Battle of Matz (June 9th-12th).—However, the German High Command intended to profit from the considerable advance made in the direction of Paris by immediately executing the attack previously planned to be launched on the Montdidier-Noyon front. It hurriedly moved its heavy field artillery over the Oise. But either because it desired to act quickly or because it considered that our capacity for resistance had failed, the German High Command's preparations were not made with precaution and these preparations did not escape our vigilance.

Beginning June 4th numerous and accurate intelligence reports relative to the imminence of a German offensive in this region came into our General Headquarters. The error committed on the Aisne of trying to hold the first position was not to be repeated. The Commander-in-Chief drew the attention of the Commander of the Group of Reserve Armies.* to this point and measures were immediately taken to apply the prescriptions of Directive No. 4. The position of resistance on which the army was to accept battle was clearly defined and the majority of batteries were moved to in rear of this position. On June 6th the order was given to put down counter-preparation fires every night. On June 8th,

* The group of reserve armies held the Montdidier-Noyon front.—EDITOR.

it appearing that the attack would take place that night, the artillery was ordered to execute intense fires on the presumed enemy assembly zones along with interdiction fires, then from 11.30 P.M. to midnight to deliver a general counter-preparation.

The attack took place, in fact, on June 9th. Following the well-known formula, it commenced at midnight with a formidable bombardment which beat our front from the Oise to Montdidier to a depth of 10 to 12 kilometers. On our side as we have just noted, beginning at 11.30 P.M., June 8th, accordingly before the enemy fire opened, our artillery delivered a vigorous counter-preparation which inflicted considerable losses on the German infantry.

Nevertheless at 3.45 A.M., June 9th, the enemy attacked on a 35-kilometer front. However, this new effort did not have the power of that we were submitted to on the Aisne. On the two flanks, the enemy was completely checked by morning. In the center, on the contrary, there was a rapid success. By 11 A.M. our second position had been overrun on a 12-kilometer front between Méry and Mareuil-la-Motte.

On the 10th the enemy's center still advanced and reached the valley of the Aronde, only 7 kilometers from Compiegne. On his left he took the whole of the wooded ridge between the Divette and the Matz. On his right he approached the Paris-Montdidier railroad near Tricot.

About 11 A.M., on the 11th, while he was trying to enlarge the breach by pushing south from Montdidier, a counter-attack made in considerable strength (4 divisions, 12 battalions of tanks, 2 regiments of portée artillery) fell on his right flank. Favored by mist, it completely surprised the Germans whose right wing recoiled in disorder, entailing the retreat of their center which had to give up the Aronde.

On the 12th the German High Command, seeing its attack still sagging on the right, and not being able to advance south of the Metz on the left, suspended the attack and ordered the conquered terrain organized.

The Battle of Champagne (July 15th-18th).—After the preceding hard battles, it was evident to the French High Command that the enemy would need considerable time to reconstitute his reserves and to prepare himself for a new effort and that we would not be attacked before July 14th.

By July 1st it was almost certain that the enemy was preparing to execute a great operation in Champagne at an early date, that he would surely deliver an offensive east of Reims between the Suippe and the Argonne and that he would try to cross the Marne in the vicinity of Dormans. The base of departure was this time nearly 100 kilometers long, which led us to think that the enemy would be unable to make simultaneously any effort of importance on any other part of the front.

By July 6th our information was precise and all dispositions for battle were taken. The principles set forth in Directive No. 4 bearing on the necessity for defense in depth were scrupulously applied in the IV Army. Moreover, the terrain in Champagne, which had been organized for several years, lent itself marvelously to this defense in depth. On the contrary, in the V Army which had just became stabilized, the organization of the ground was still too sketchy for a continuous second position to exist and the application of the new principles was more difficult.

In the IV Army, beginning on July 6th, counter-preparations and interdictions of enemy communication were fired every night. At 10 P.M., on July 14th, a successful coup de main gave us 27 prisoners. Through questioning them we learned that the German attack would be delivered that night, that the artillery preparation would commence at ten minutes after midnight and would last three or four hours. This information was immediately disseminated and between 11 P.M. and 11.40 P.M. the French artillery began its action along the entire front of the Group of Armies of the Center. Enemy batteries were counter-batteried and the assembly places of the enemy infantry in the front lines were battered.

The enemy, beaten to it in the opening of fire, stupefied by the number of our batteries, most of which revealed themselves for the first time, could not doubt that we were warned of his attack. Nevertheless, at the indicated hour, ten minutes after midnight, the German artillery in its turn entered violently into action and at 4.45 A.M. the infantry assaulted on the enormous front of over 90 kilometers which had been covered with projectiles.

In front of the IV Army the enemy from the beginning found himself in great difficulty. Applying a carefully prepared plan of employment, the French artillery accompanied the German infantry with its shells without a let up. The destruction or gassing of shelters had compelled the German infantry to submit to our counter-preparation in the open. Between 8 and 9 A.M. the attack died in front of the battle position, and the battle was lost to the Germans.

In front of the V Army, west of Reims, the enemy advanced much more rapidly. The violence of his effort showed that he had not, during his approach march and while moving through our outpost position, undergone such a disorganization as he had in front of our IV Army. At midday he attacked our second position which he overran in part. On the 16th he still continued to advance, notably in the valley of the Marne where by night we had been driven back 2 or 3 kilometers. On the 17th he still made some progress.

In front of the VI Army, the enemy succeeded in crossing the Marne; by 10 A.M. he had made a pocket south of the river 14 kilometers wide and 5 or 6 deep, and henceforth possessed a bridgehead sufficient to continue his offensive. However our field artillery, at first reduced to relative inaction because of the disruption of its arrangements by the German advance, vigorously reëntered into action on points of passage signaled by our airplanes. Our bombing aviation intervened in its turn. Henceforth an avalanche of projectiles beat the valley of the Marne. "It was hell to cross the bridges over the Marne" read a message carried by a German pigeon which was taken in our lines.

The enemy did not succeed, either on that day or the following days, in getting over a single cannon to the south side of the river except some accompanying mountain guns. His ration and ammunition supply grew more and more difficult. His reënforcements could cross the river only at the price of bloody losses. His advance was blocked. On the 17th he clearly passed to the defensive.

Beginning with the 18th, the French counter-offensive between Château Thierry and Soissons made itself felt. On the 20th and 21st the enemy evacuated the south bank of the Marne, abandoned the small gains of his attacks in Champagne, and retreated north.

Fortune, which had seemed to rest in the enemy's camp since spring, returned to ours, never again to leave it.

LESSONS

Confirmation of the Correctness of Our Principles Relative to the Employment of Field Artillery in the Offensive.—From July, 1916, to the end of March, 1918, or for over eighteen months, the Germans did not execute any large scale offensive on their western front, but made their efforts on their eastern front against Roumania and Russia, and on the Italian front. However, their attacks on these fronts, and especially their offensive at Riga, had given us perfect information as to the tendencies of their tactical doctrine. Accordingly their great offensives of the spring of 1918 were not, from any point of view, a surprise for us.

All their operations were conducted in the same way. The system thus uniformly applied was characterized by:

1. *Surprise*. This was obtained by the brevity of the artillery preparation and by the bringing of their attack units into line at the last moment, approach marches being made only by road and at night. The infantry advance was preceded by a rolling barrage in which a large proportion of smoke shells were used so that our troops, infantry and field artillery too, did not see the enemy until he was within a few meters of them;
2. *Violence*, which was realized by the intensity of the bombardment. Shells of every kind and caliber were simultaneously put down to a depth of as much as 10 kilometers. The infantry assembled, during the artillery preparation, at 200 or 300 meters from our first lines and then launched the assault in dense masses;
3. *Rapidity of execution*, due to the rate of advance of the infantry, which during its movement was first protected by a rolling barrage, then by a special accompanying artillery;
4. *Maneuver*, which consisted in rapidly enlarging the breach obtained by the frontal attack, by attacking the flanks of the breach;
5. *Lastly by penetration in depth*.

Concerning field artillery more particularly, the processes employed were as follows:

1. *Amount of artillery employed*. The attack was prepared by a very dense artillery deployment.

At Riga on August 31, 1917, there were 157 batteries and 550 trench mortars for an attack front of four and a half kilometers. The density realized was 35 batteries per kilometer. The average number of heavy batteries engaged on each division front, including counter-battery heavy artillery, was 22, of which about one-third were guns.

In Picardy on March 21, 1918, Von Hutier's army had 21 batteries per kilometer on an attack front of 20 kilometers. Eleven of the twenty-one were heavy artillery.

On the Aisne on May 27th, the front of the main attack from Berry-au-Bac to Loeuilly was 45 kilometers. There were 1450 batteries used, which represented 32 batteries per kilometer.

Finally in Champagne on July 15th the average density exclusive

of railroad artillery was 25 batteries per kilometer. Of these, 15 or 16 were heavy field artillery.

2. *Deployment*. All this artillery was concentrated by night marches. Every precaution was taken to hide the movement of troops during the night and their camps or bivouacs during the day. There were stringent orders that batteries moving into position should avoid any noise which would disclose their movement; wheels were wrapped and the horses' shoes were padded; measures were taken to prevent shields and iron work from clattering.

3. *Organization of command*. The artillery supporting the attack was organized into several groupings:

One grouping of artillery for destruction and for direct support of the infantry (Ika, Infanterie-kampf-artillerie), divided into as many subgroupings as there were infantry regiments in the first line. Each of these groupings consisted of two parts: an Ika[a] charged with the destruction of the first positions; an Ika[b] charged with fire on the other positions: There was one Ika grouping per first line division;

A grouping of counter-battery artillery (Aka, Artillerie-kampf-artillerie) whose mission was to neutralize enemy batteries. There was one grouping per army corps;

A long-range action grouping (Feka, fern-kampf-artillerie) for the bombardment of villages, camps, command posts, radio stations, routes of approach, balloons, etc. There was one grouping per army corps;

Finally a single grouping for the whole army, of long-range artillery (Schwefla, schwerste-flach-feuer-artillerie) with the mission of very long-range bombardment.

The command of all this artillery was organized on completely new bases which completely avoided former errors. We noted in Chapter I that in the German Army of 1914, all field artillery was placed in the division and that there was no echelon of command for it above the division. During the first years of the war this organization functioned without change. All reënforcing field artillery, even the heaviest long-range pieces, was placed under the order of division commanders. The division alone was then responsible for all missions, not only for missions of destruction for its own immediate benefit, but also for counter-battery missions in which several divisions were interested and with long-range missions in which several army corps were interested. We know that on the contrary, in the French Army of 1914, the division artillery command and the corps artillery command were coexistent. Moreover, the first months of the war showed the necessity of creating the echelon which was still lacking, namely the army artillery command.

Under the influence of experience, a very clear doctrine was slowly established in the French Army relative to the assignment of missions along the various echelons of command, each large unit having attached to it and directly controlling those matériels whose range permitted their action over a zone approximately equal to the front of action of the unit. The division has the light guns and medium howitzers whose range varies from 8 to 12 kilometers which it uses for destruction and for direct support in its zone of action. The army corps has and commands directly, the heavy guns or howitzers which, with an average range of 12 to 15 kilometers, can act for the benefit of several divisions. The army corps is charged in principle with counter-battery and interdiction in its zone of action. The army keeps under its control matériels

of great power and long range and uses these matériels for executing missions which are of interest to all the corps, and for executing missions which are beyond the powers of the matériel in the subordinate units. Each echelon of command coördinates the action of the artilleries of its immediately subordinate units; the army coördinates the action of the artilleries of its army corps; the army corps, the action of the division artilleries.

It is incontestable that the French organization was infinitely more logical than the German system. Only the French organization permits of coördinating the battle action of all field artillery and of assuring perfect coöperation and reciprocal action. Only the French organization guaranteed that all action in detail was united into a harmonious ensemble. Only the French organization permitted of full utilization of the range and power of the various matériels and by using each matériel for the most suitable missions, gave an efficient return.

The Germans undoubtedly did not fail to be struck by the advantages of our organization. Although not daring to immediately jump, in their evolution, to the logical conclusion, which would have been the creation of an artillery command in army corps and in armies, they organized, beginning with the Riga affair, the artillery command for a large scale offensive, in accordance with the following principles:

The whole mass of artillery was placed directly under the orders of the army commander during all the preparation and during the first few hours of D day. Since they had no army chiefs of artillery and staffs, these had to be created at the moment of need out of whole cloth. Since they had scarcely any officers whose previous experience fitted them for such a rôle, they had at general headquarters, a specialist—a sort of traveling salesman in handling masses of artillery—who was sent in turn to the various interested armies to exercise this function.*

At Riga it was only after the occupation of the enemy's second position that each division regained control of its division artillery, and received in addition a certain number of heavy batteries. The army, however, still kept the heavy howitzers and mortars under its direct orders.

It was also at Riga, that for the first time, there was constituted a mass destined for counter-battery work. Up to that time, on the contrary, existing regulations prescribed that counter-battery, like all other missions, was to be executed by the divisions.

The dispositions made for the great offensives in France in 1918 were, with some variations in small details, along the same lines; during the preparation and the first hours of the attack, there was extreme centralization; during the course of the attack there was progressive decentralization.

Beginning with the battle of May 27th, the rigidity of the system was modified a little, and the German organization became about the same as ours:

The Schwefla was retained under the army commander's control;

The Aka and Feka were under army corps commanders;

The Ika was under the immediate control of division commanders.

* This "traveling salesman" in the employment of masses of field artillery was Colonel Georg Bruchmüller.—EDITOR.

After the missions in the artillery preparation were completed, the artillery mass was divided into two parts:

(a) An army reserve to be used according to circumstances.

(b) The artilleries remaining at the disposal of army corps and divisions. Each division theoretically resumed control of its organic artillery which was comprised of a light regiment, two batteries of 150-mm. howitzers, and one battery of 10-cm. guns. The remainder constituted the army corps artillery which included, in any case, all the 210-mm. mortars, all 13-cm. and 15-cm. guns, and a certain quantity of light artillery and heavy howitzers.

In each attack division, one of the 77-mm. battalions of the organic division artillery was designated as an accompanying battalion. This was reassigned so that each infantry regiment had one battery. A certain number of divisions also possessed mountain artillery detachments, some had infantry batteries, some had batteries of landing guns, and some had light trench mortars.*

4. *Attainment of surprise*. Surprise was attained:

By secrecy in concentration marches and deployment;

By eliminating adjustment on the part of reënforcing batteries, which, in this way, did not reveal their presence before the day of the attack. Adjustment was replaced by the most careful preparation of fire, the remaining inaccuracy being compensated for by the methodical use of zone fire and by a tremendous expenditure of ammunition;

By the reduction of the length of the artillery preparation to a minimum.

5. *Length of the preparation*. The preparation was no longer expected to destroy everything but only to neutralize enemy batteries and infantry fire weapons. It lasted:

At Riga	5 hours
On March 21st	5 hours
On May 27th	2 hours 40 minutes
On June 9th	3 hours 45 minutes
On July 15th	4 hours

Neutralization was obtained by an intensive use of gas shell. Thus, at Riga the initial supply for the batteries consisted of:

For light gun batteries—2300 gas shell, 600 high explosive shell;

For 10-cm. gun batteries—800 gas shell, 500 high-explosive shell;

For light howitzer batteries—1200 gas shell, 500 high-explosive shell;

For heavy howitzer batteries—700 gas shell, 300 high-explosive shell;

And in the 1918 offensives the proportion of gas shell was somewhat increased.

6. *Execution of the preparation*. The preparation was subdivided into several phases, during each of which the artillery action was

* All the belligerent armies had the problem of infantry *accompanying guns*, intended to overcome local resistance which escaped the action of artillery of direct support. The Germans attempted to solve the problem with the means here indicated. It does not seem that they were much to be felicitated on the solution adopted. Their accompanying batteries suffered fearful losses before they could render any real services, and sometimes, as on July 15th while crossing the Monts they were literally mowed down. The two great difficulties to be overcome in the organization of this special artillery are to reduce its vulnerability and to assure its ammunition supply.

minutely regulated. One interesting feature was that the first of these phases, lasting according to circumstances from one to two hours, was devoted to the execution of a *general counter-battery*, in which all the artilleries participated, Ika as well as Aka, and all the trench mortars. During this phase all known enemy battery or trench mortar positions were taken under fire in such a way that there were at least three batteries concentrating their fire on the same position. After this first phase, Aka alone continued the neutralization of the enemy artillery, Ika, and Schwefla firing on their own particular objectives. In the last phase, Ika laid down its fire on the initial line of the rolling barrage, 300 meters behind our front line.

7. *Execution of the attack*. At H hour the barrage started to roll by bounds of 200 meters every four to six minutes. It marked time for a variable period (twenty to forty minutes) on important positions so as to thoroughly pound these before the infantry assaulted them.

As soon as a battery became available after executing its missions it was pushed to the front as far as possible to follow closely the march of the infantry.

There was nothing new in all that, nothing that we had not ourselves done in our big offensives, even those of 1916. The only difference was in the length of the artillery preparation. The rapidity of fire of the German matériel, the progress in firing technique which permitted of doing without adjustment, and especially the well-taken decision not to attempt the destruction of enemy field works but to be satisfied with their neutralization, all these permitted the length of the artillery preparation to be reduced more and more. We have seen above how the French High Command had since 1917 insisted on these methods and how our field artillery employed them in so far as the characteristics of our matériel and our firing technique permitted. In 1918, the progress made from both these viewpoints was such that as soon as we took the offensive, we obtained results more surprising than those of our adversary.

To sum up, relative to the employment of field artillery in the offensive, there are good grounds for saying that by the end of the spring of 1918, unity of doctrine had been established, not only in each belligerent army, but even in the two enemy camps, and that this doctrine is only the logical outcome of the evolution which had taken place since the beginning of the war.

Crystallization of Doctrine on the Employment of Artillery in the Defensive.— Defensive tactics necessarily underwent an evolution paralleling that of offensive tactics. New offensive methods must be met with new defensive arrangements.

Our experience at Verdun gave us the basis for establishing a certain number of points of our defensive doctrine and defensive methods. During 1917 the Germans met our spring break through offensive with the natural maneuver of partially evacuating their front lines so as to avoid the destructive effects of our artillery preparation and of counter-attacking with divisions which were held out of the fire zone during the early stages of the fight. These tactics having later failed before our fall offensives with limited objectives, they were abandoned. However, they showed the method which should be followed.

The principle of defense in depth is certainly not a new invention. But since 1914 there was a dogma in the French Army that not the least bit of national soil should be voluntarily abandoned, and that we should allow ourselves to be cut to pieces in place, in order to defend to the limit our most advanced lines. Any recoil, any loss of terrain was formally forbidden.

During the winter of 1917–1918 the French High Command arrived at the conclusion that adhering to this dogma in the face of the new German offensive tactics, would amount to suicide. The examples of the Russians at Riga, and the Italians at Caporetto showed this. Our High Command, as we noted before, put out a series of documents (notably Directive No. 4 and the Regulations relative to the application of this directive) which officially formulated our new conception and which very clearly stated that in principle we were not to fight on the first position but on the second, and accordingly that it was to be expected that terrain would be lost, which, however, would later be retaken by counter-attack.

These new prescriptions were so violently opposed to established ideas that the High Command was not at first successful in getting them applied.

In May, on the Chemin des Dames, neither the army command nor the troops could resign themselves to the voluntary sacrifice of terrain. The consequences are known.

The new principles had made some headway by the time of the Battle of Matz and the partial application of them gave conclusive results.

A bulletin dated June 24th emphasized the principles on which our defensive tactics should henceforth be based. The application of these principles in the field artillery was made the object of a special bulletin dated June 27th, which set forth a few simple rules relative to the deployment of batteries, their echelonment in depth and their dissimulation.

The normal place for the field artillery was to be behind the battle position. The location of this position should be such that the artillery could have sufficient depth of action on the terrain beyond our outposts.

The field artillery should be echeloned in depth so as, on the one hand, to oblige the enemy to disperse his fire, and on the other to assure continuity in the execution of missions.

The battery positions should be camouflaged. Batteries should not deliver routine daily fires from their combat positions, but from other positions which should be varied frequently.

Counter-battery should not be by single batteries, but should be done by heavy concentrations.

By July all were convinced of the wisdom of these prescriptions. Their thorough application in the IV Army on July 15th gave this army its well-known success.

Our defensive doctrine was now established.

Employment of the R.G.A. in the Defensive Maneuver.—The rupture of the front by the Germans on March 21st, May 27th and June 9th presented difficult problems to the French Command. The breach must be closed at any price by the most rapid processes.

The infantry of reserve divisions could be brought up in trucks, but

the light and heavy field artillery, which followed by marching, always arrived long after the infantry. While the infantry was alone, although it could slow up the enemy's progress a little, it could not stop it. It was only after a strong framework of field artillery had been built up, that we succeeded in stopping the enemy. Accordingly it was necessary to have this field artillery as soon as possible and only the mechanized field artillery had sufficient mobility to arrive in time. The R.G.A. tractor-drawn regiments provided the necessary heavy field artillery. As for light field artillery, it was the corps artillery regiments, which were undergoing transformation into portée artillery, which provided it. It is a fact that the French High Command's defensive maneuver was every time successfully supported by these mechanized units which were afterwards reënforced by the organic field artilleries of the divisions and corps which had been thrown into the battle, as well as by the horse-drawn heavy regiments of the R.G.A.*

MEASURES TAKEN TO CORRECT DEFICIENCIES

Inclusion of Portée Artillery in the R.G.A. (June 10, 1918).—The first corps artillery regiments which were converted to portée (September, 1917) were provided, as we have seen, with only one unit of transport per regiment, sufficient to move only one battalion at a time. This organization could, with rigorous care, meet the requirements of stabilized warfare, but it was not adequate to give these regiments mobility sufficient for open warfare.

Stabilized warfare ended with the rupture of our front and the exigencies of open warfare were felt. Particularly was rapidity in the moving of field artillery required.

Fortunately by January, 1918, the progressive increase in our resources in automotive matériel, trucks and tractors, allowed planning a more suitable organization for the portée regiments. The Secretary of War in a bulletin dated January 11th, announced that the portée regiments would henceforth be formed along new lines so that each battalion could move with its own equipment and could, to a certain extent, provide its own ammunition supply. Each battery was to receive four Jeffery tractors and six trucks, five of which were for the transport of personnel and ammunition.†

The first regiments formed along these lines were sent to the armies early in March. The German offensive in the last part of March

* Example: At the time of the rupture of the British front on March 21st, the III French Army was engaged north of the Oise. By March 22nd it had 1 portée regiment, 2 tractor-drawn heavy regiments and 4 horse-drawn heavy regiments of the R.G.A. On the next day, the 23rd, it further received 2 horse-drawn heavy regiments and 4 tractor-drawn heavy regiments, then on the 24th, 1 horse-drawn heavy regiment and 2 tractor-drawn heavy regiments. On April 1st, the I and III Armies had, between them, 8 regiments of portée artillery out of the 9 which existed at that time.

The I Army on March 25th, had only 72 cannon. On March 30th it already had 552 pieces, including I portée regiment, 5 battalions of tractor-drawn heavy field artillery and 7 battalions of horse-drawn heavy artillery from the R.G.A. Finally on April 5th it was supported by 1100 cannon, 420 of which were from the R.G.A. (4 portée regiments, 15 battalions of tractor-drawn heavy field artillery, 7 battalions of horse-drawn heavy field artillery).

† This bulletin also indicated the ultimate assignment to each regiment, of an ammunition train consisting of 3 heavy tractors, 3 caterpillar tractors, and 21 ammunition trucks. However, the supply of automotive matériel was never sufficient to permit of creating these units.

obliged that they be thrown into battle before they were trained. The services which they rendered on this occasion were so highly thought of that the conversion of the remaining corps artillery light regiments was hastened as much as possible. By April 16th there were already 9 regiments, each with 36 Jeffery tractors, and available supplies permitted us to plan the rapid formation of 14 new regiments of the same type.

By June 10th, 26 of the contemplated regiments had received their prescribed automotive matériel.* On this date they were all in action. They had definitely lost any connection with the army corps from which they originally came. They were employed as reserve field artillery at the disposition of the High Command. They also had all the strategical characteristics which distinguish the R.G.A. regiments. Accordingly the decision of the Commander-in-Chief at this time, to include them in the R.G.A., was only giving official sanction to an existing situation.

Henceforth the portée artillery constituted the 5th Division of the R.G.A. and it so continued until the end of the war. It was present in all the offensives and took an active and glorious part in all the victories. Its influence in operations was considerable, particularly in the strategical domain.

* Ultimately, it was planned to form 40 portée regiments. However, all of these could not be raised and there were formed a total of only 34.

(To be continued.)

BOOK REVIEWS

REMINISCENCES OF ADVENTURE AND SERVICE.—By Major General A. W. Greely, U. S. Army, Retired. Cloth. 356 pages. Illustrated. 1927. Charles Scribner's Sons.

A month or two ago I reviewed in THE FIELD ARTILLERY JOURNAL another book by another distinguished soldier. This covered a subject of continuing interest to every officer and I took occasion to disagree to some degree with the author. Inasmuch as the volume which is the subject of this review is the life history of my father, I can hardly be expected to take issue with it to a similar extent. This book, too, is of continuing military interest and much of the matter contained therein might be made the subject of controversy by other actors interested in the events which are covered. It is a story, however, of the past and is founded upon reminiscences and records that few living men are in a position to discuss from personal knowledge. Certainly, I am not one of them.

I find in this book a great deal which will surely be of interest to any soldier who fought in any capacity during the World War, and which should be of equal interest to younger men growing up in the military establishment.

At the age of eighty-three, General Greely has already spent sixty-five years in the service. He entered as a private of Volunteers during the Civil War, which, of course, meant much more to the country of that time than our brief if tremendous effort during the World War meant to the country of ten years ago. From that time he has seen much of the development of the United States, being particularly associated, of course, with military affairs. His discussion of pioneer duties in the West is illuminating to a student of the development of the old Army. The record of intimate matters which he contributes to that tragedy of errors, the Spanish American War, cannot fail to interest the conscientious soldier of any day. And his discussion of the continuing problems of staff and line in the American Army will be read with sympathy by any officer who struggled with similar questions during the World War or in the post-war period of readjustment.

Perhaps the most vital part of this book to a professional soldier is the description of enlisted service in the Civil War. Written from that very restricted, but very intimate, viewpoint, his narrative paints a vivid picture of the individual efforts, errors, sacrifices and achievements in that colossal struggle. This must have been the period which had most to do with his development as a soldier. The practical experience of those days must have been invaluable to him

in reaching important military decisions later in life. One of the dangers of the existing establishment, with its system of excellent schools, is that no provision can apparently be made to pass the young officer through that most vital of courses, the school of experience in actual combat. It was noticeable that most of our older officers in France, who did so much to make the A.E.F. an astounding success, had some personal if restricted knowledge of battle. Our local Indian Campaigns, our short conflict with Spain, our years of guerrilla warfare in the Philippine Islands, together with the expedition to Peking during the Boxer Insurrection, were of inestimable value to officers who served therein. Since the World War our very moderate sized Army has endeavored to keep articulated the skeleton of a defensive force upon which the man power of the nation could be formed in time of sudden great emergency. This has left available only small peace-time garrisons for our permanent overseas departments. All expeditionary forces, such as in Nicaragua and, to a smaller extent, in China, have fallen to the lot of a largely increased Marine Corps. It is too early to say that this policy is ruinous. But there certainly exists a danger that with the passing of older officers our Army may some day be plunged into full battle without any of its officers ever having the slightest personal experience in conflict, and consequently without the slightest idea as to what battle really means.

General Greely's name will probably always be connected with his Arctic Expedition, which attained the farthest north. He has already treated of this fully in other volumes and only touches it incidentally in this record of his life, so we can do the same. His discussion of the part he played during the Spanish-American War is of more professional interest to the soldier. Here we are faced again with a picture that no officer concerned with it can ever forget—the tragic unpreparedness with which we entered upon and fought that war. The same blunders, if committed during the larger effort of the World War, would undoubtedly have caused horrifying casualties, without any commensurate result.

Throughout the book there runs a thread of the continuing problems which always face the Army in its organization and operation. Problems of balance, problems of training, problems of supply, always face the body of professional soldiers and the responsible civilian heads under whom they do their work. These problems can be attacked more intelligently by reading the record of a very old and very wise soldier. My conclusion is that wars are fought by men and that men are measured by character.

JOHN N. GREELY,
Major G.S. (F.A.).

THE MEDICAL ASPECTS OF CHEMICAL WARFARE. By Lieutenant Colonel Edward B. Vedder, M.C., U.S.A. Cloth, 6″ × 9″. 327 pages. 34 plates. 1925. Williams and Wilkins Company. $6.50.

It is the belief of the author that if it is even possible that gas may be used against us at some future time, the Medical Department must be prepared to treat gassed cases, with all that this implies with regard to organization, transportation, personnel, supplies, and training of its personnel. As it has not been found practical to organize a school for medical officers at Edgewood Arsenal, and as even if organized, only a comparatively small number of officers could be sent to such a school, this book was written to provide officers of the Medical Corps with a brief but comprehensive outline of what they should know concerning chemical warfare and the treatment of gassed cases.

The introduction is devoted to a brief discussion of the desirability and more particularly to the practicability of a treaty prohibition of gas warfare. His belief is that the admitted prejudice against the use of gas in warfare is chiefly due to three causes. The Germans, who first used gas, thereby violated their treaty obligations and gas warfare most naturally but quite illogically shared the obloquy that fell upon the Germans for the violation of this and other treaty obligations. Secondly, gas being a new weapon, is now being characterized as were the predecessors of our rifles and guns. History fails to record, however, an instance of the abandonment of an effective weapon. Finally, prejudice exists due to a belief that the use of gas is inhumane.

Colonel Vedder introduces evidence to show that the suffering caused by gas is less than from wounds, while the percentage of fatalities is relatively much greater from wounds. Of all U. S. Army hospital admissions in France, those due to gunshot were only a little over twice the admissions due to gas. The deaths of those admitted for gunshot wounds were about ten times those admitted because of gas. The effectiveness of gas is discussed, as is the amount of reliance that might safely be placed on a treaty prohibition. The author states:

> "We may conclude therefore that gas warfare is not more brutal or inhumane than other forms of warfare, but it is more efficient than other forms of warfare and will therefore continue to be used; and that the very limitation placed by agreement on armament has increased the importance of chemical warfare relatively because the weapon itself, the ability to make chemicals, cannot be abolished."

There are chapters on the history of gas warfare, and on physics, chemistry and meteorology as applied to gas warfare. There is also a chapter on the "Naval Medical Aspects of Gas Warfare" by Lieutenant Commander Duncan C. Walton, M.C., U.S.N. The remainder of the book treats of the various gases, protection and medical organization.

While written primarily for medical officers, the larger part of the book may be read with interest and profit by a line officer interested in the subject only from the combat standpoint.

AIR WARFARE. By Major William C. Sherman, Air Corps, U.S.A. Cloth, 5½″ × 8¼″. 307 pages. 16 illustrations. 1926. The Ronald Press Company. $4.25.

Until recently much of the magazine and newspaper literature on aeronautics consisted of exaggerated statements apparently for propaganda purposes. It is refreshing to find in "Air Warfare" a calm analysis of the subject, devoid of all sensational claims.

In the opening chapter, the author points out the recognized principles of all warfare, such as economy of force, advantages of the offensive, security, surprise, and simplicity, in their applications to air tactics: the new arm uses old principles to a greater extent than is properly appreciated. History is drawn upon frequently to illustrate important points, even going as far back as Hannibal, but most examples relate to World War military situations.

The performance characteristics of each class of aircraft are described and their military effectiveness is discussed; also there are photographs illustrating each principal type of plane. Separate chapters deal with Pursuit, Attack, Observation and Bombardment Aviation. While pursuit aviation is of interest almost exclusively to air pilots, the other branches of air tactical operations do concern ground troops.

Attack Aviation against ground troops by machine guns in low-flying planes was a late development of the World War. The author cites several important situations where these special planes contributed materially to the general success. The chapter on Bombardment Aviation provides information on types of bombs and their tactical employment. The data relating to the destructive effect of aërial bombs of various kinds and sizes will be found useful.

The better known coöperation between ground troops and airplanes, designated as "The Service of Observation," includes photography of enemy terrain and the adjustment of fire for artillery. Another chapter of interest to artillerymen relates entirely to antiaircraft defense. The effectiveness of each type of antiaircraft cannon and machine gun is considered; also the general principles

of their employment for certain tactical situations. The use of aircraft by naval fleets is amplified by stating a specific problem and developing a solution.

There is one fundamental contrast between air and ground combat that has been mentioned scarcely at all heretofore: it is the psychological difference of an air pilot fighting alone, perhaps many miles from possible support, compared to ground troops whose normal method of fighting is near many comrades with the obvious advantage of morale to the latter.

Major Sherman has presented this new subject in a remarkably clear manner, conveniently arranged with frequent subtitles to aid the reader in understanding the precise phase that is under consideration at any point. Only a student having a broad conception of military art in its larger aspects could have written this book. Doubtless the author's service on the operation staffs of the 1st Division and III Corps in France, and subsequent assignment as Instructor in Air Tactics at the Command and General Staff School, had much to do with making this book a valuable and permanent addition to the literature on military art.

ARMY POSTS AND TOWNS. By Captain Charles J. Sullivan, Inf. U.S.A. Cloth, 6″ × 9″. 249 pages and index. 1926. Burlington Free Press Printing Company. $3.00.

The purpose of this book, referred to as the "Baedeker of the Army," is to supply officers with as complete information as possible regarding the facilities and conditions which obtain on posts to which they may be ordered. Data are listed as to the town, transportation, quarters, commutation conditions, schools, churches, servants, markets, hotels, roads and the need of an automobile, sports, climate, kind of clothing required, etc.

The Panama, Hawaiian and Philippine Departments are covered by general remarks appropriate to the entire department, in addition to the data given for each post. To a lesser extent this treatment is followed, where appropriate, in the continental United States. All Army posts are covered.

The book is believed to accomplish its mission admirably. In many instances the information obtained regarding a new post might save considerable unnecessary expense as well as much inconvenience.

FOREIGN MILITARY JOURNALS A CURRENT RÉSUMÉ

ENGLAND

"The Journal of the Royal Artillery," October, 1927

"Problems of Air Warfare," by Colonel J. F. C. Fuller. This is the most interesting article in an issue which is full of interest. Dealing with a subject which is of continuing interest to all military men and upon which there has been a mass of propaganda printed, Colonel Fuller attacks it rationally and states his opinions picturesquely. He breaks his problems into six groups: Internal Security, Fortress Defence, Small War Operations, Attack on the Civil Will, Attack on Fleets, and Attack on Armies. It would be a shame to try to paraphrase his pithy remarks, so resource is had to quotation.

In his preliminary remarks as to the powers and limitations of aircraft, Colonel Fuller says:

> "The power of aircraft rests on their being able to avoid terrestrial obstacles, to attack armies and fleets from above, and to move at great speed for a limited space of time. Their limitations are governed by their inability to protect themselves directly against missiles; to remain at rest in the air (except in the case of airships), and to avoid frequent return to earth to refit and rest.
>
> "From these powers and limitations may be deduced that the aeroplane closely resembles a humanly regulated and directed projectile, a kind of animated rocket, fired not from a trough, or a gun, but from aerodrome, a 'weapon' far more static than the heaviest piece of siege artillery, and one which in existing circumstances cannot be moved from place to place, for it is as immobile as a fortress. Whether air power will ever be able to replace land or sea power largely depends on overcoming this limitation, which means that, at present, tactical power and perfection are in importance secondary to facility of landing and supply."

Under the problems of air warfare in "Internal Security" he says:

> "In Iraq an experiment has been made to overcome lack of communications by air power. If some local sheik rebels, an aeroplane is sent out to bomb his oasis or village, and terror may accomplish his submission without bloodshed. Should he refuse, however, to submit, he and his are bombed and the innocent suffer with the guilty. Is this British justice? It certainly is not. * *
>
> "In place of blowing up sheiks, goats, camels, women and children, why not gas them. To give them acute toothache, or

colic, or to send them to sleep, is surely more humane than bombing or shooting them. Once they are incapacitated the airman should look for a landing ground, plane down to earth, pack up the sheik and go home. What the Air Force require in their internal security problems is imagination and not bombs, they want a flying anæsthetist followed by a winged Black Maria."

In discussing "Small War Operations," Colonel Fuller says:

"There are two points in which an airman is at a greater disadvantage than the soldier: the first is that from the air it is more difficult to see a brown man with a brown rifle behind a brown rock, and the second is that it is more difficult to hit him. To fight small parties of tribesmen on hill tops with aeroplanes appears to me to be about as sensible as hunting fleas with terriers. The airman recognizes this for he says: 'I am not going to hunt brown men behind brown rocks. I can move anywhere, I shall fly to the brown man's village and blow it off the map.' In other words, the brown man has defeated him, so he flits away and bombs the brown woman.

"This may or may not have the desired effect, namely, the surrender of the brown man, but it would be indeed strange if it had the ultimate effect of rendering our frontiers peaceful areas."

Coming to larger problems, the author considers the "Attack on the Civil Will." He says:

"It is far more rational to suppose that this supremely logical possibility will encourage every civilian to accentuate the barbarism of such an attack and restrict it by international law. * * * It may be said: 'Damn morality, win the war and then we can moralize.' This may sound common sense to the fighting man, but rightly and logically no politician would agree to this point of view, because he is not merely engaged in destroying the enemy's will, but in enforcing a policy the success of which will depend on public and world opinion once peace has been reëstablished. To win a war is not sufficient, it must be won with reference to the following peace."

Despite his clever presentation it may be that Colonel Fuller is not always entirely sound. Under "Attack on Fleets" for instance, he says:

"Since the war bombing attacks against battleships have been disappointing, and under war conditions are likely to be more so. To take a naval example: Whilst in peace time gunnery practice shows about twenty-five per cent of hits on the target, in war time the number of hits falls to about two and a half per cent.

I see no reason to suppose that bombing results will prove more satisfactory.

Certainly our American peace-time efforts at bombing battleships have not been disappointing from the air viewpoint. American officers who saw, back in 1921, land aircraft come out of nowhere from the distant and invisible shore, circle, drop a few bombs and sink a ship, are not likely to look upon such an exploit as disappointing.

In discussing air "Attack on Armies," Colonel Fuller makes an interesting prediction which may fittingly serve as the conclusion of this review.

> "We are yet too far distant to dogmatize, but bearing in mind that air power is more intimately tied to its ground organization than an army is to its rear services, it would not, so I think, be very hazardous to prophesy that in another great war the tortoise will beat the hare. Even to-day a fleet of armoured cars could move from Liege to Pairs in one day, and could not be prevented doing so by air action. It is true that an aeroplane can accomplish this journey in an hour, and can do serious damage when it arrives at Paris, but it cannot remain there and continue doing damage; further, that on its return home it may find its own aerodrome occupied by hostile cars or tanks. It is this power of attacking the ground organization rather than the weapon itself which, in my opinion, will constitute the main air defence of the armies of the future."

"Duncan, Commended Essay, 1926–1927" by Captain C. T. Beckett, M.C., R.A. The article which actually won this prize was reviewed in the last number of THE FIELD ARTILLERY JOURNAL. The present article deals with subject-matter which is probably more interesting both to artillerymen and to infantrymen than any other subject, *i.e.*, the battle liaison between these two arms. Captain Beckett insists upon its supreme importance and the first part of his article can be read with much profit by American field artillery officers. In the last part where he goes into matters of organization the article is not of such general interest. The most picturesque part of this essay is quoted by Captain Beckett himself to introduce it.

> "WE BE NOT WELL ORDERED TO FYGHT THIS DAY, FOR WE BE NOT IN THE CASE TO DO ANY GREAT DEDE OF ARMES; WE HAVE MORE NEDE OF REST.
>
> *Complaint of Genoese Bowmen at Crécy-Froissart*."

"British Conduct of War in the XVIIIth Century, 1793–1801," by Colonel G. M. Orr, C.B.E., D.S.O., p.s.c., Indian Army

(Retired). This appears to have been inspired by recent British works in criticism of British methods as exhibited in the World War. Colonel Orr has contributed a picturesque, if rather one-sided, account of British blundering in an earlier century.

"Polo, 1927" (Communicated). An illustrated account of the triumph of the artillery regiment in the English Inter-Regimental polo tournament.

This issue also contains the following articles:

"Nery, 1914," by Major A. F. Becke, late R.F.A.

"The Training of Brigade Survey Parties," by Captain J. O. M. Ashley, R.A.

"Why was Napoleon?" by Colonel C. F. Phipps, D.S.O., (late R.A.).

"Prepare for Tanks," by "Quam Celerrime," and

"The 'Ross' Collection," by Major (Bt. Lt.-Colonel) J. H. Leslie, R.A. (retired list).

FRANCE

"Revue Militaire Française," July–August, 1927

"The Campaigns of a Division of Infantry," by Lieutenant-Colonel Laure and Commandant Jacottet, continued in the July number, traces the history of the 13th Division from July, 1918, to the date of the Armistice.

In describing the action around Somme-Py, Lieutenant-Colonel Laure remarks that during the initial phase of the engagement the artillery command was too decentralized, frequently endangering the assaulting French infantry. Wherever the artillery support was centralized the attack succeeded. However, very frequently an attacking battalion which profited by such a concentration found itself at the point of a salient. It then had to fall back, since artillery munitions were not plentiful enough to immediately support the advance of neighboring battalions. The artillery was unable to keep up with the infantry advance and frequently the infantry had to attack without artillery support.

In this same engagement the advance was through woods so thick that the infantry had to use the long narrow alleys. This resulted in heavy casualties as these alleys were easily covered by German machine guns. The tanks also had to use these narrow passages and were rapidly destroyed by artillery and anti-tank guns.

As a result of the lack of artillery support and the nature of the terrain, the infantry used a large number of 37-mm. guns and Stokes. The 37's destroyed many machine guns and the Stokes were very effective in reducing centers of resistance in the woods. The

machine guns also rendered valuable service in combating enemy machine guns.

Accompanying 75's were frequently used. They were pulled by horses or tanks. In either case they offered ideal targets to the German artillery and machine guns, and were easily destroyed when in advanced open positions. When they were kept back near the infantry regimental command post the problem of communication between the guns and the observation post was too difficult.

The problem of moving artillery under such conditions is very complicated, since the artillery must not only closely accompany the infantry but must also carry a heavy load of munitions.

In keeping up with the infantry, the movement should be made by echelon and by bounds. These bounds should correspond in length to half range (3000 to 3500 meters), the batteries going into new positions each time at 1500 or 2000 meters from the infantry that they are to support.

In the August number, Lieutenant-Colonel Laure reviews the entire tactical history of the Division and also the general conduct and strategy of the war.

He remarks that if the strategist has done his part the tactician will dominate his adversary without a waste of men or matériel. "Under the influence of an intelligent strategy, the rôle of tactics will be considerably reduced. Battles will, in a way, be won in advance, and the engagements in the zone of fire will be reduced in duration and depth."

He goes on to say that strategical advantage can be won by massing the maximum force at a point where the enemy cannot engage his own force.

To assure this strategical power, Colonel Laure advocates a minister of national defense, who will control not only the Army, the Navy, and the Air Force, but also the national railways, commercial aviation, factories and mines.

The article by Colonel Lucas, **"Combat Capacity of Large Units,"** is concluded in the July number.

In previous numbers, Colonel Lucas traced the changes in division organization during the war. These changes altered the size of the division front and the division's capacity for penetration in attack.

In the July number, he discusses the post war regulations. These regulations prescribe an habitual battalion front of from 300 to 400 meters for an attack on a strongly organized position, and an extreme limit of 800 meters for an attack over terrain not strongly organized.

The division, with three battalions in line, will have a front of 1200 meters in a war of position. In attacks on poorly organized

terrain, the division may have as many as 5 or 6 battalions in line and its front may be as long as 4500 meters.

Colonel Lucas feels that the battalion front of 800 meters in the open is too great, and that if the division uses more than four battalions in line, the division front will be so wide that it cannot readily change the direction of its attack.

"Foreign Anti-Avion Artillery," by Commandant Vauthier, reviews the principal ideas expressed in the service publications of various armies during 1925 and 1926. He notes that all armies are attaching to that branch an importance which is proportionate to their progress in aviation. Commandant Vauthier remarks that particularly in the United States is this progress in anti-avion artillery very marked.

Universal technical progress has been made in the following details:

General use of indirect fire with the aid of automatic apparatus, transmitting electrically to the pieces the azimuth, the elevation, and the windage.

Use of monostatic telemeters and particularly stereoscopic telemeters.

Study of automatic listening devices.

Increase in power of anti-avion artillery and machine guns.

There is also a general tendency toward concentration of anti-avion apparatus and arms into larger units.

Commandant Vauthier quotes frequently from our *Coast Artillery Journal*.

"On the Right of the Fifth French Army in August, 1914," by Commandant Padovani, begins in the August number. It is a detailed account of action on the Meuse between Givet and Namur.

Although this battle was relatively unimportant as compared to battles on other parts of the front at this time, Colonel Padovani proposes to show that it exercised a great influence upon the decisions made by the Commander-in-Chief of the French Armies, and the Commanding General of the 5th Army between the 8th and the 23rd of August.

"William the Conqueror at Hastings," is written by Colonel Reval upon the occasion of the 900th anniversary of the birth of that famous Norman, now being celebrated in Normandy.

Colonel Reval relates how the Norman Army was recruited and transported to England, and describes the military qualities which assured the success of William and his Army.

In **"Cross-country Motorcycle Racing,"** General Camon advocates the development of motorcycles for use in reconnaissance and raids.

He suggests that the motorcycle be mounted by two men: a driver and an automatic rifleman. The automatic rifleman dismounts to fire. He points out that there are 300,000 commercial motorcycles in Germany that will surely be used in case of war.

To develop a type of motorcycle suitable to military use, General Camon suggests that cross-country motorcycle racing be introduced to replace the flat racing which now is so popular in France.

"Conversation on the Bridge," by Pierre Genet is written in the form of a dialogue between a captain of a destroyer and a major of infantry who is on board during maneuvers.

They discuss the relative importance of the Navy and the Army in the national defense scheme. The naval officer laments the fact that the Navy is considered the junior service in France, and the fact that it receives such a small appropriation from national defense funds. He points out to the army officer that whereas the Army has only the Belgian and German frontiers to guard, the Navy must defend the entire seaboard, which is a frontier open to all enemy countries.

Other articles that appear in the July and August numbers are:

"Offensive Maneuver," by Colonel Mayrand.

"Events in China," by Captain Girves.

"Concerning a Recent Mission of the Chambers of Commerce of Algeria in the Niger," by General Meynier.

CURRENT FIELD ARTILLERY NOTES

Army Riding Team

THE Army Riding Team made a most excellent showing at the Eastern Horse Shows, and wherever entered, was received with evidence of great popularity. The team was composed of the following:

Major Sloan Doak, Cav.
Major Harry D. Chamberlain, Cav.
Captain Francis H. Waters, Cav.
Captain Richard A. Gordon, F.A.
Captain William B. Bradford, Cav.
Captain Norman J. McMahon, F.A.
Captain Frank L. Carr, Cav.

At the Bryn Mawr Horse Show, September 28th to October 1st, the Army Team won 14 firsts, 14 seconds, 10 thirds and 9 fourths in a total of 23 events and against an aggregate of 397 entries.

At the Brockton Horse Show, October 4th–7th, they won 13 firsts, 13 seconds, 11 thirds and 5 fourths in a total of 20 events, having an aggregate of 400 entries.

At the Cathedral Horse Show, October 12th–15th, their winnings were 15 firsts, 8 seconds, 7 thirds and 9 fourths in a total of 21 events and an aggregate of 380 entries. Included in the winnings were the Cathedral Cup by Proctor; Lightweight Hunter Championship, Benny Grimes, Reserve; Middleweight Hunter Championship, Proctor, Garry Owen, Reserve.

The National Horse Show at Madison Square Garden, November 7th–12th, had a record attendance. The Army Team won 16 firsts, 11 seconds, 7 thirds and 9 fourths in 24 events, having an aggregate of 440 entries. The Cathedral Cup went to Proctor; the Heavyweight Hunter Championship, Garry Owen, Reserve; Middleweight Hunter Championship, Proctor.

Interest centered in the International Trophy, Olympic Course. Poland again won this event and with the remarkably low score of 1½ faults. The United States took second with 3½ faults, a score that would have won last year. Canada was third with 5 faults and France fourth with 14 faults.

In addition to the winnings of the U. S. Army Team, there were many points won by other Army entries. The championship for Polo Mounts was won by Virginia, entered by the 16th Field Artillery, and ridden by Captain Joseph S. Tate. The U. S. Military

Academy and the Squadron "A" Association were also among the winners.

Battery "C," 16th Field Artillery, commanded by Captain Tate, put on their usual excellent drill which, also as usual, was most enthusiastically received.

Courses at the Field Artillery School

The dates of the courses at the Field Artillery School for the year 1927–1928 are as follows:

Regular Army: Battery Officers', September 15, 1927 to June 15, 1928. Advanced Course, September 15, 1927, to June 15, 1928. Refresher Class, February 6 to May 5, 1928.

Special course for National Guard field officers, January 10 to February 18, 1928.

National Guard and Reserve officers, (fall), September 15 to December 15, 1927; (spring), January 30 to April 28, 1928.

Regular Army and National Guard enlisted men: Horseshoers, September 15, 1927 to January 28, 1928. Motor Mechanics, September 15, 1927, to January 28, 1928. Battery Mechanics, February 6 to June 15, 1928. Communications, February 6 to June 15, 1928. Saddlers' (fall), September 15, 1927 to January 28, 1928; (spring), February 6 to June 15, 1928.

Another Barrack Building at Fort Lewis

Contract has been awarded by the Quartermaster General's Office, for the construction of one two-company barrack building at Fort Lewis, Washington. The successful bid amounted to $138,100.

The barrack building is to be completed by June 1, 1928. It is to be similar to those now under construction, three stories high, reënforced concrete floors and frame, with brick walls and tile roof.

Buildings already under construction at Fort Lewis include two artillery battalion barrack buildings and one artillery regimental headquarters battery building. The contract for this construction, awarded in May, 1927, is for the amount of $592,500.

War Department has declared surplus sixty-four temporary buildings located at this post, and has directed that the buildings be disposed of by sale. Three of these buildings are located on the site selected for a new barrack building and will have to be removed at once.

Aërial Photographic Work

In addition to photographs made for purely military training purposes, during the Fiscal Year 1927, the Air Corps photographed for mapping and mosaic purposes a total area of about 48,000 square

miles in various parts of the United States. The major portion of this work was divided among Government Departments as follows:

War Department	3,200	square miles
Engineer's Board, Rivers and Harbors	25,000	square miles
Geological Survey	16,600	square miles
Coast and Geodetic Survey	2,200	square miles
International Boundary Commission	1,000	square miles

Lesser projects for other bureaus of the Departments of Agriculture, Interior and Commerce were also completed. The total area photographed is more than double that of any previous year and registers about the maximum limit of the amount of aërial surveys that the Air Corps can accomplish annually under its existing organization without interference with training.

Motorized Cavalry March

A march of 288 miles from Marfa, Texas, to Fort Clarke, Texas, was recently made by "F" Troop, 5th Cavalry, in trucks, in the remarkably short time of 36 hours. This is the longest march in trucks ever made by Cavalry in the United States, and is thought to set a time record for the transportation of mounted troops by motors.

During the recent Texas maneuvers, near Marfa, daily experiments in the transport of troops by motors were conducted. At the close of the maneuvers, and in order to provide a more exhaustive test of this means of transport, Captain Charles Cramer was directed to utilize motor trucks in the return march of his troop to its home station at Fort Clarke. He was given twelve 3- or 5-ton Liberty trucks, one G.M.C. truck, one tank truck, and one motorcycle for the transportation of horses, men, and full field equipment.

Eight of the Liberty trucks were used to transport the horses, six to the truck, loaded crosswise to the truck and facing alternately to the right and left. One Liberty truck was used for extra equipment, baggage and for men who did not ride in trucks with their horses.

The route of the march through southwest Texas, lay over graded dirt or gravel roads, 75 miles of which were hilly and rough. The weather was fair and dry. On the first day the command covered 160 miles. The remaining distance was negotiated before dark of the second day. The total running time, including halts, was 28 hours. En route the motor column experienced very little mechanical difficulty.

The troop having a strength of 2 officers, 45 enlisted men and 48 horses was completely equipped at all times, ready for such

mounted tactical missions as might be assigned at any time during or upon the completion of the journey.

The movement of mounted troops in motor trucks is a development of the year. If the utilization of motor trucks as a means of transportation increases the rate of march and radius of action for cavalry as much as is indicated by this most recent experiment, it may exercise a considerable influence on the future employment of that arm.

An illustrated article by Captain Cramer describing the march will appear in the January, 1928, *Cavalry Journal*.

Motor Vehicles Disposed of Since the World War

From April 15, 1919 to November 16, 1920, the War Department, under authority of Congress, declared a surplus of 44,225 motor vehicles for transfer to other activities and for other disposition. Since that time 58,704 motor vehicles have been declared surplus and disposed of, bringing the total to 102,929. Of the vehicles disposed of since November 16, 1920, 52.0 per cent have been transferred to other Government activities; 40.3 per cent have been sold; and 7.7 per cent have been salvaged.

During the past fiscal year 2803 motor vehicles were disposed of as follows: Transferred, 1004; sold, 30; salvaged, 1769. Of the 2803 vehicles disposed of during the past fiscal year 1516 were trucks.

West Point Field Artillery Range Discontinued

The Secretary of War has approved recommendations of the Superintendent of the United States Military Academy intended to obviate further necessity for closing the Storm King Highway in the vicinity of West Point.

The highway was constructed on the military reservation by the State of New York under a permit which stipulated in effect that rights were reserved to restrict traffic under certain conditions. The highway penetrates the only part of the reservation over which it is practicable to conduct artillery practice and, as a consequence, during the summer season it has been the custom to restrict traffic during several hours of each day for a number of days. Recognizing that with the increase in motor travel such restrictions caused considerable inconvenience to motorists, the Superintendent of the United States Military Academy has sought for means to hold artillery practice elsewhere.

For several years immediately after graduation the then senior class has been taken to Mitchell Field, Long Island, and Fort Wright on Fishers Island for approximately two weeks. One-half of the class went to Mitchell Field, where for one week they engaged

in theoretical air corps instruction, and each member had from three to five hours in the air. The other half of the class went to Fort Wright for one week of practice in firing anti-aircraft guns, and large caliber coast defense guns. At the conclusion of the first week the two parts of the class interchanged.

Under the proposal approved by the Secretary of War, the class will be sent to Virginia next summer and be divided into thirds for three periods of approximately five days each. While one-third has practice with anti-aircraft and coast artillery guns at Fort Monroe, another will be engaged in air corps instruction at Langley Field, and the other will have field artillery practice at Fort Eustis. After each period the various divisions of the class will be rotated.

160th Field Artillery

At a meeting of the 160th Field Artillery Officers residing in Tulsa, Oklahoma, and near-by towns, a club was organized to more effectively carry out the plans and programs for the coming year.

The purpose of the organization is to promote the military efficiency of the 160th Field Artillery and to build up a Regimental "Esprit de Corps" through the medium of weekly meetings and the study of the technique and tactical employment of Field Artillery. The course of study will follow the Army Correspondence Course subjects and Major General Ernest H. Hinds, Commanding Eighth Corps Area, will give certificates to each officer who satisfactorily completes the course.

Reserve Officers of Field Artillery who reside in Tulsa are invited to attend these meetings. Arrangements will be made to give credit to those Reserve Officers who complete the course.

The study sessions will be supplemented by practical demonstrations in artillery firing by Battery "E," 160th Field Artillery, Haskell, Oklahoma, on the target range near Haskell, negotiations for which are now under way.

Through these meetings, the 160th Field Artillery Officers hope to encourage the "One Army" idea, and hope to bring to Tulsa Officers of the Regular Army and the civilian components of the Army, to lecture on subjects in which they are particularly qualified.

New Infantry Mortar

After a long series of experiments and tests, the War Department has adopted a new mortar for the infantry. The new weapon takes the place of the smooth-bore, muzzle-loading, 3-inch mortar which was used during the World War. The new model obviates undesirable features of the old model with respect to accuracy and safety of operation.

The new mortar is of 75-mm. caliber, rifled and breech-loading. Its range is 1800 yards and rate of fire 15 shots per minute. It and its accompanying caisson can be pulled with one mule. It is light enough so that it can be carried forward by hand when it becomes impracticable to use animal transportation by reason of the terrain or hostile fire.

The experience of the World War indicated that it is necessary for the infantry to be armed with a weapon or weapons which could take under fire immediately such targets as machine guns and tanks revealed during the advance. Often an unavoidable delay resulted in communication with the supporting artillery for this purpose. During the War there resulted a considerable practice of detaching guns from the artillery to accompany infantry assault battalions and to fire with direct laying on such targets as were causing the infantry heavy losses and holding up an advance. The disadvantages of such a solution were the disruption of artillery organization, confusion from an expedient with personnel which had not received the benefits of acquaintance and common training, and the unsuitability of artillery pieces from the standpoint of both maneuverability and their size as a target for hostile fire. It is believed that the new weapon, together with the 37-mm. gun, the two of which are complementary, will give to the infantry a means to combat much of the opposition in the immediate front of an advance.

It is intended that the allowance of the new mortars will be the same as that of the old trench mortars. The rate of issue will depend on the availability of funds for this purpose.

Polo

Inter-Circuit Tournament.—The Army had to relinquish its hold on the Inter-Circuit Polo championship this year. For two years, Army teams had won—Fort Bliss in 1925 and Fort Leavenworth in 1926. This season found Fort Bliss again in the finals against Cleveland, whose team included one Army officer. It was a hard fought game, tied in the eighth chukker and won by Cleveland in overtime play.

1st Game—August 16th, Old Oaks (Rumson, N. J., Southeastern Circuit) defeated the Cavalry School (Fort Riley, Rocky Mountain Circuit) by a score of 10 to 9 in an overtime game.

Old Oaks (10)	*Position*	*Cavalry School (9)*
C. Harrison	No. 1	Lieut. C. C. Jadwin
A. D. Borden	No. 2	Capt. J. C. Short
General H. Borden	No. 3	Capt. L. K. Truscott
W. H. Williams	Back	Major H. G. Higley

2nd Game—August 17—Fort Bliss (Fort Bliss, S. W. Circuit) defeated Rockaway (New York, Eastern Circuit) 10 to 5.

Fort Bliss (10)	*Position*	*Rockaway (5)*
Lieut. J. H. Collier	No. 1	T. Leboutellier
Capt. C. E. Davis	No. 2	C. P. Beadleston
Lieut. E. F. Thomson	No. 3	Major Rex Benson
Major J. K. Brown	Back	W. T. P. Hazard

3rd Game—August 20th—Point Judith Freebooters (New England Circuit) defeated the Sixth Cavalry (Fort Oglethorpe, Southern Circuit) 14 to 13 in an overtime game.

Point Judith (14)	*Position*	*Sixth Cavalry (13)*
C. R. Leonard	No. 1	Lieut. H. T. Sutton
Nelson Talbot	No. 2	Lieut. L. K. Ladue
Gerald Dempsey	No. 3	Lieut. L. A. Smith
T. Ewing	Back	Capt. M. F. Meador

4th Game—Won by Cleveland (Central Circuit) by default—San Mateo (Pacific Circuit) being unable to attend.

5th Game—August 20th, won by Fort Bliss from the Old Oaks 9 to 7 in an extra period game.

6th Game—August 22nd, won by Cleveland from the Point Judith Freebooters 17 to 2.

Final Game—August 26th. The final match between Fort Bliss and Cleveland was a splendid exhibition of polo with no advantage on either side. The score was tied 8 to 8 at the end of the eighth period. In the extra period, Cleveland pushed through the final score to win.

Cleveland (9)	*Position*	*Fort Bliss (8)*
J. A. Wigmore	No. 1	Lieut. J. H. Collier
D. S. Ingalls	No. 2	Capt. C. E. Davis
Capt. W. J. White, F.A.	No. 3	Lieut. E. F. Thomson
T. H. White	Back	Major J. K. Brown

Cleveland	1	3	1	0	2	1	0	0	1	—9
Fort Bliss	2	0	1	0	1	0	1	2	1*	—8

* By handicap.

Twelve Goal Championship.—An Army team won the twelve goal national championship for the third successive year when Fort Bliss (winner in 1925) defeated the Cavalry School 11 to 7. Fort Leavenworth won in 1926.

1st Game—On August 22nd, the Cavalry School defeated Rockaway by a score of 8 to 7. The line-up was as follows:

Cavalry School (8)	*Position*	*Rockaway (7)*
Capt. C. C. Short	No. 1	T. Leboutellier
Lieut. C. C. Jadwin	No. 2	C. P. Beadleston
Capt. L. K. Truscott	No. 3	Major Rex Benson
Major H. D. Higley	Back	W. T. Hazard

Semi-Final Game—Fort Bliss defeated the Sixth Cavalry in the semi-finals by a score of 12 to 6.

Fort Bliss (12)	*Position*	*Sixth Cavalry (6)*
Lt. J. H. Collier	No. 1	Lieut. H. T. Sutton
Capt. C. E. Davis	No. 2	Lieut. L. K. Ladue
Lieut. E. F. Thomson	No. 3	Lieut. L. A. Smith
Major J. K. Brown	Back	Capt. M. F. Meador

Final Game—In the final game in which Fort Bliss defeated the Cavalry School, 11 to 7, both teams were strengthened by the addition of members of their teams who had been with the Army team on Long Island, Captain Huthsteiner playing with Fort Bliss and Captain Wilkinson with the Cavalry School. They lined up as follows:

Fort Bliss (11)	*Position*	*Cavalry School (7)*
Lieut. E. F. Thomson	No. 1	Capt. J. C. Short
Capt. C. E. Davis	No. 2	Capt. C. A. Wilkinson
Major J. K. Brown	No. 3	Capt. L. K. Truscott
Capt. G. E. Huthsteiner	Back	Major H. D. Higley

The Atlantic Cups.—On August 12th, Fort Oglethorpe won the Atlantic Cups at the Point Judith Polo Club from the Point Judith Freebooters, by a score of 16 to 5. The Army team was given a 6 goal handicap but would have won on the flat.

International Polo Match.—First Game—Sept. 10, 1927—United States 13, Great Britain 3.

As predicted in the last JOURNAL, the self-same team that defeated the British three years ago, repeated the performance this year. Webb, Hitchcock, Stevenson and Milburn again proved themselves unbeatable. All but Hitchcock are over 40 but they lacked nothing in speed and stamina and fairly dazzled their opponents from the start. Hitchcock with six goals to his credit was the star of the match. His strokes were even longer than those of the great Milburn, and he drove with such speed and distance that it was almost impossible to see a ball from the time it left his mallet until it landed far out in front.

Nearly 40,000 people were at Meadowbrook for the match.

America (13)	*Position*	*Great Britain (3)*
J. Watson Webb	No. 1	Capt. C. E. Pert
T. Hitchcock, Jr.	No. 2	Major A. H. Williams
M. Stevenson	No. 3	Capt. C. T. I. Roark
D. Milburn	Back	Major E. G. Atkinson

Score by periods:

America	2	0	2	3	2	2	1	1—13
Britain	0	0	1	0	0	0	1	1— 3

Goals—America: Webb (4), Hitchcock (6), Stevenson, Milburn (2). Britain: Pert, Roark, Atkinson.

Referee—Major Louie A. Beard. Umpires for America: Capt. Wesley J. White, U. S. A. For Britain: Capt. Peter P. Rodes, U. S. A.

Second Game—Sept. 14, 1927—United States 8, Great Britain 5.

After their decisive defeat in the first game, the British changed their line-up and put in Captain George and Captain Dening. These two used their weight to advantage and showed fight and dash that their predecessors lacked. Much had been expected of Captain Roark and although he showed to better advantage in the second game, neither he nor his team-mates approached the pace and tremendous

drive of Hitchcock. "Dev" Milburn played a magnificent game throughout and, as the second match was much closer than the first, he had to fight to protect his goal and in so doing proved that he is still the greatest back in the world.

From the first bell the Americans got the jump and before the British could find themselves, had gained a four goal lead. After that it was nip and tuck, with the Americans put to the test to hold their lead.

United States (8)	*Position*	*Great Britain (5)*
J. Watson Webb	No. 1	Capt. Richard George
Thomas Hitchcock, Jr.	No. 2	Capt. John P. Dening
Malcolm Stevenson	No. 3	Capt. C. T. I. Roark
Devereux Milburn	Back	Major Eric G. Atkinson

Score by periods:

United States	3	1	0	1	1	0	1	1	—8
Great Britain	0	0	0	2	0	1	1	1	—5

Goals—U. S.: Hitchcock (5); Webb (2), Milburn. Britain: George (2), Dening, Roark, Atkinson.

Due to an agreement reached some years ago, Great Britain will not be able to challenge American supremacy for three years, so the next great match can be expected in 1930.

For the first time in the history of American Polo, an Army officer had the distinction of being chosen for the International Squad. Captain C. A. Wilkinson, Cav., of the Army team was substitute No. 1. The officials were also army men. Major L. A. Beard who captained the victorious Army team, which defeated the British Army team in England in 1925, was referee. Captain Peter P. Rodes, F.A., who captained the Army team this year, was umpire for Great Britain and Captain Wesley J. White, F.A., was umpire for the United States.

The Open Championship.—The Open Championship of the United States is played on the flat, without handicap and is the final great event of the Polo year.

This year the United States Army team entered the Open Championship for the first time. Never before has it attempted anything better than the Junior Championship.

The following teams entered:

United States Army—Captain C. A. Wilkinson (4), Captain C. H. Gerhardt (6), Captain Peter P. Rodes (7), Captain G. E. Huthsteiner (4). Total handicap 21 goals.

Army in India—Captain Richard George (8), Captain J. P. Dening (8), Major E. G. Atkinson (9), Lieutenant H. P. Guinness (7). Total handicap 32 goals.

Eastcott—Mr. A. Charles Schwarts (3), Mr. E. A. S. Hopping (4), Mr. Earl W. Hopping (8), Mr. J. A. E. Traill (9). Total handicap 24 goals.

Hurricanes—Mr. Stephen Sanford (7), Mr. Winston E. F. Guest (6), Captain C. T. I. Roark (9), Major J. F. Harrison (8). Total handicap 30 goals.

Ramblers—Mr. C. V. Whitney (3), Captain C. E. Pert (7), Mr. Malcolm Stevenson (8), Mr. R. E. Strawbridge, Jr. (8). Total handicap 26 goals.

Sands Point—Mr. W. A. Harriman (5), Mr. Thomas Hitchcock (10), Mr. J. Cheever Cowdin (8), Mr. Louis E. Stoddard (8). Total handicap 31 goals.

The summaries were as follows:

First Preliminary—Sept. 17th, Army in India 11, Eastcott 4.

Second Preliminary—Sept. 18th, Sands Point 10, Magpies 7.

Third Preliminary—Sept. 21st, U. S. Army 6, Ramblers 5.

Fourth Preliminary—Sept. 22nd, Army in India 8, Hurricanes 7.

Semi-final—Sept. 24th, Sands Point 13, U. S. Army 10.

Finals—Sept. 27th, Sands Point 11, Army in India 7.

In its first game against the Ramblers the U. S. Army team played an excellent game, winning in a last moment rally 6 to 5 against a team that would normally have conceded it 5 goals. This is most gratifying in showing that the Army is now in a position to compete with the best teams in the country.

In the semi-finals the U. S. Army team lost 10 to 13, but was playing against a team rated 10 goals stronger than it, and on which Hitchcock, probably the strongest offensive player in the world, was playing.

In the finals the British Army in India team with Lieutenant Guinness in place of Captain Roark put up a good fight. In the third chukker their star player, Captain George, got a spill, breaking his collar bone, and Lieutenant-Colonel Beresford took his place. He made several fine plays but the British team had by that time lost its drive and was defeated.