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18. SUPPLEMENTARY NOTES: The report includes several quarto-sized ordnance manuals which are separately paged as are various sections which comprise the 840-page total. Portions of the report were previously classified and have been made unclassified, UP DOD 5200.30, para d, 3a, 1 Nov 1981, etal.

19. KEY WORDS (Continue on reverse side if necessary and identify by block number): Artillery, Board of Officers, Army Planning, Field Artillery, Matériel, Military Organizations, Military Training, Warfare

20. ABSTRACT (Continue on reverse side if necessary and identify by block number): On December 9, 1918 a Board of U.S. Army officers, chaired by BG Andrew Hero, Jr., was convened to study the experiences learned by the Artillery branch during WWI, while serving with the AEF. Their recommendations were issued in the form of a report during 1919. The study proposed the future organization and matériel to be used by the branch. Copy has been reproduced from the typed or handwritten original.

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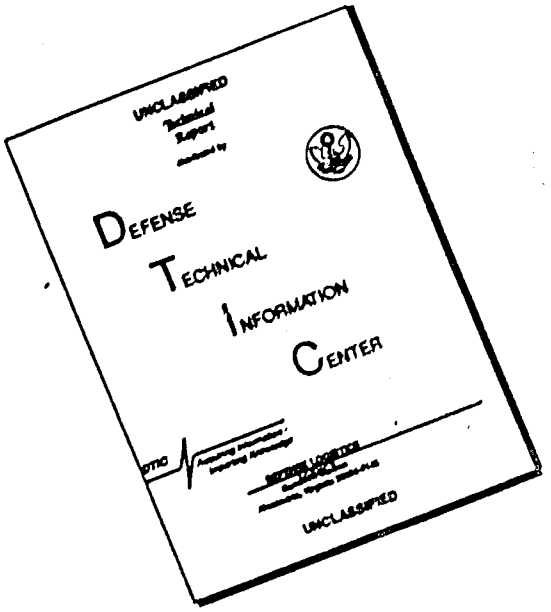

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TABLE OF CONTENTS

Subject		Pages
	Introduction	1,2
I.	General Organization	3
II.	Details of Organization Divisional Field Artillery - The Battery, The Battalion, The Regiment, The Brigade, Heavy Field Artillery - Organization	3-6
III.	Armament Divisional Artillery, Corps Artillery, General Artillery Reserve	7-9
IV.	Staffs Army Artillery Headquarters, General Artillery Reserve	9-13
V.	Equipment Ordnance, Quartermaster, Signal, Motor Transportation, Communication Officers and Detachments, Motor Transport and Tractor-Drawn Guns, Aerial Observation, Liaison and Liaison Officers, Accompanying Guns and Batteries, Placing of Artillery under Command of Subordinate Infantry Commanders, Ammunition Train and Mobile Ordnance Repair Shop, Trench Mortar Batteries, Schools and Training	13-20

Exhibits:

A.	General	21-39
A.	Part 2, Summary of Comments	40-60
A.	Part 3	61-91
B.		92-118
B1.	"Equipment Manuals for Service in Europe," Series C, No. 6	119-209
B2.	"Proceedings"	209
-	"Equipment Manuals for Service in Europe," Series C, No. 1	210-346
B3.	"Proceedings"	-
-	"Equipment Manuals for Service in Europe," Series C, No. 3	347-437
B4.	"Proceedings"	-
-	"Equipment Manuals for Service in Europe," Series C, No. 2	438-56
B5.	"Proceedings"	457-65
B6.	"Proceedings"	466-73

Annexes:

1.	Recommendations - Organization	474-84
-	Addendum to Annex 1	485-97
2.	Recommendations - Organization	498-512
-	Addendum to Annex 2	513-22
3.	Recommendations - Armament	523-34
-	Addendum to Annex 3, Manual of Position Warfare for all Arms	535-94
4.	Recommendations - Staffs	595-608
-	Addendum to Annex 4	609-11
5.	Recommendations - Equipment	612-27
-	Addendum to Annex 5	628-40
6.	Recommendations - Communication Officers and Detachments	641-6
-	Addendum to Annex 6	-
7.	Recommendations - Motor Transport and Tractor Drawn Gun	647-57
-	Addendum to Annex 7	658-60
8.	Recommendations - Aerial Observation; F.R.S. and S.R.S.	661-7
-	Addendum to Annex 8	668-71
9.	Recommendations - Liaison and Liaison Officers	672-81
-	Addendum to Annex 9	682-94

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Subject		Pages
10.	Recommendations - Accompanying Guns and Batteries	695-714
-	Addendum to Annex 10	715-38
11.	Recommendations - Placing of Artillery under Subordinate Infantry Commanders	739-49
-	Addendum to Annex 11	750-69
12.	Recommendations - Ammunition Train and Mobile Ordnance Repair Shops	770-87
-	Addendum to Annex 12	788-93
13.	Recommendations - Trench Mortar Batteries	794-8
-	Addendum to Annex 13	799-800
14.	Recommendations - Schools and Training	801-10
-	Addendum to Annex 14	811-4
15.	Artillery Building Plan and Organization	815-22
16.	Aerial Observers	823-40

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Proceedings of the Board of Officers Convened by the Following Order:
GENERAL HEADQUARTERS, AMERICAN EXPEDITIONARY FORCES,
OFFICE, CHIEF OF ARTILLERY.

December 9, 1918

OFFICE MEMORANDUM:

A Board is appointed to make a study of the experience gained by the Artillery of the A.E.F., and to submit recommendations based upon such study.

Detail for the Board.

Brigadier General Andrew Hero, Jr., United States Army.
Brigadier General John W. Kilbreth, Jr., United States Army.
Lieutenant Colonel Curtis H. Nance, Field Artillery.

References: Paragraph 32, Special Orders No. 335, G.H.C., A.E.F., December 1, 1918.

Memorandum of C. of A., A.E.F., to Chief of Staff, November 29, 1918.

Subject: Retention of Brigadier Generals McIntyre and Spaulding for Duty in the A.E.F.

By direction of the Chief of Artillery:

EDWIN K. SMITH
Lieutenant Colonel, C.A.C.
Secretary

After reporting to the Chief of Artillery, American Expeditionary Forces, and receiving verbal instructions from him, the Board met at ten o'clock A.M., on December 9, 1918, and proceeded to the business before it.

Various papers on artillery questions on artillery questins on file in the office of the Chief of Artillery have been referred to the Board, and have been duly considered.

Individually, the Board has also gotten the opinions and views of various artillery officers on duty at General Headquarters of the American Expeditionary Forces.

On December 11, 1918, the Board formulated the attached letter (Exhibit A), and had it sent to all officers who have commanded artillery brigades, artillery regiments, trains, or schools in France, for an expression of their views on the subjects indicated.

Pursuant to Paragraph 18, Special Order No. 356, G.H.C., A.E.F., December 22, 1918, Generals Hero and Kilbreth, members of the Board, visited the following organizations:

Headquarters	1st Division, 3rd Army Corps.
"	1st Artillery Brigade.
"	6th Field Artillery Regiment.
"	2nd Artillery Brigade.
"	17th Field Artillery Regiment.
"	158th Field Artillery Brigade.
"	3rd Artillery Brigade.
"	10th Field Artillery Regiment.

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Headquarters 67th Field Artillery Brigade.
" 5th Field Artillery Brigade.
" 5th Division.
" 20th Field Artillery Regiment.
" 21st Field Artillery Regiment.
" 55th Field Artillery Brigade.

Conferences with Division, Brigade and Regimental Commanders, and Brigade Staff officers, and other officers connected with these organizations were held, and their views obtained.

The Board has made a careful study of all replies received from Exhibit A, indicated above. Based on this, and from other information it has received, the following report is submitted:

Note. For convenience, subjects are discussed under separate headings. Reference to allied subjects are made in each case. The opinions and recommendations of officers who have served with organizations are appended as annexes and referred to under each heading.

I. General Organization.

1. The artillery of the United States Army to consist of two branches, Field Artillery and Coast (or Heavy) Artillery. The Field Artillery to be organized in regiments, and brigades where three or more regiments are brought together. The Coast Artillery to constitute a Corps, from the personnel of which battalions, regiments and brigades should be formed for anti-aircraft guns, trench mortars, the heavy tractor-drawn guns and howitzers, and the railway artillery. There should be a Chief of Field Artillery and a Chief of Coast Artillery as now provided, whose duties are such as are now prescribed.

2. The Field Artillery will comprise normally all mobile and fairly-mobile guns and howitzers, constituting what is generally termed divisional and corps artillery. The Coast Artillery will be charged with the care, operation and tactical use of the anti-aircraft artillery, of trench artillery, of the heavier calibers of guns and howitzers, normally used for army artillery, and of the railway artillery; including the armament of seacoast fortifications and the mine defence of harbors. (See Annex 1.)

II. Details of Organization.
Divisional Field Artillery.
(Tables of Organization, Series A, Nos. 11-20 incl.)

3. The Battery. - Except for minor changes in personnel, the great majority of reports indicate that the present organization of the battery has proved satisfactory. Several officers advocate the grouping of combat trains of the batteries into a battalion combat train or ammunition battery, or that these ammunition batteries be combined into an ammunition battalion. This recommendation has been spoken of favorably by a large number of officers in conversation.

It is recommended that the battery be reduced by eliminating the 6th, 7th, and 8th sections.

Personnel: Add one Ammunition Sergeant.
Make Chief Mechanic a Sergeant Mechanic.
In motorized batteries, add one Motor Sergeant.

4. The Battalion. - The majority of reports recommend no change in the battalion organization. Almost all recommend the 3-battery battalion for the 75mm. and the 2-battery battalion for the howitzer regiment. A number recommend the combination of the combat trains into an additional battery. This is accepted in principle. Six recommend breaking up the headquarters company and the organization of separate headquarters details for regiment and battalions. Conversation with officers shows that this idea is more common than reports indicate.

It is recommended that the battalion detail, now a part of the headquarters company, be made a distinct unit of the battalion; that the present organization of battalions of divisional field artillery regiments remain otherwise unchanged. (See par. 5).

Battalion Staff. - Experience has shown the necessity for more officers on the battalion staff. Drawing on the batteries for officers for special work should be avoided. It is recommended that the following staff for each battalion be authorized:

1 Captain, Adjutant.
1 1st Lieutenant, Communication, telephone and radio.
1 1st Lieutenant, Munitions officer.
2 Lieutenants, Observing and reconnaissance officers (F.O.O. and O.P. duties).
1 Lieutenant, Motor specialist, in motorized regiments.
2 Lieutenants, Observing and reconnaissance officers (F.O.O. and O.P. duties)

2 Lieutenants, Liaison officers.
1 Lieutenant, Motor specialist, in motorized regiments.

5. The Regiment. - Each light regiment to consist of two battalions of three batteries each. The howitzer regiment to consist of three battalions of two batteries each. This recommendation is based on the views of artillery officers of the American E.F. The Board is inclined to the belief, however, that a two-battalion organization for the heavy regiment would be advantageous for reasons of administration, elimination of one battalion staff, and for tactical reasons, simplifications of liaison. The organization of the supply company, one for each regiment, is satisfactory. The headquarters company has proved unwieldy and has not given satisfaction as regards training. It is recommended:

(a) That the headquarters company be subdivided and that the regimental and battalion headquarters detachments be organized and attached as distinct units to regimental headquarters and to their several battalion headquarters.

(b) That the present combat trains be formed into an additional battalion for each regiment. This battalion to be commanded by a Major and composed of two batteries for 75 mm. regiments and of three batteries for 155 mm. regiments. The staff of each of these battalions to consist of one Adjutant, Captain, and one 1st Lieutenant, Munitions Officer.

Regimental Staff. - All reports on this subject recommend an increase in the regimental staff. The following personnel is generally agreed upon and is believed to be necessary:

1 Captain, Adjutant.
1 1st Lieutenant, Personnel Adjutant.
1 Captain, Operations.
1 Captain, Munitions.
1 1st Lieutenant, Communications, telephone and radio.
1 1st Lieutenant, Intelligence, A.I.S.
1 Captain, 1 1st Lieutenant, Liaison.
1 1st Lieutenant, Gas Officer.
1 Captain, reconnaissance officer, and in command regimental headquarters detachment.

6. The Brigade. - Reports all agree that trench mortar batteries should not form part of the field artillery brigade. With this excepted, the present organization of the brigade is deemed satisfactory as far as artillery is concerned. To make provision for accompanying guns and batteries, discussed later (par. 46) several reports suggest adding a unit of mountain artillery guns to the divisional artillery. It is believed guns of this type are eminently suited for this work. There has been much difference in practice in regard to the exact status of the ammunition train. The opinion is general that this should be always directly under the artillery brigade commander, and form part of the artillery brigade. The Board is also of the opinion that a mobile ordnance repair shop should be assigned to the brigade. This subject is discussed later (pars. 50-51). It is recommended, therefore, that the trench mortar battery be eliminated; that one battalion of mountain guns of 4 batteries, each battery of 4 guns, be added; that an ammunition train for the supply of artillery ammunition only, and a mobile ordnance repair shop be made parts of each divisional field artillery brigade.

Brigade Staff. - The existing organization of the staff of field artillery brigades, is generally satisfactory. The following changes are recommended:

(a) Give the munitions and communications officers the rank of captain.

(b) Add one captain, supply officer, to act in a supervisory capacity over the regimental supply officers.

(c) Exclude the A.D.C.'s from the brigade staff total. These officers should be left free for such duties of liaison and inspection as may arise.

(d) Let the present adjutant be known as the Chief of Staff, and call the officer charged with Administration, the adjutant.

(e) Increase the grade of the following: clerk for adjutant, intelligence draftsman, operatins draftsman, intelligence clerk, operations clerk, in order that the pay may be commensurate with the class of work to be expected.

(f) Under "d" omit "orderly for brigade commander"; substitute, "in charge of stables."

(g) Increase privates by 2; 1 orderly for brigade commander, 1 orderly for supply officer.

BRIGADE HEADQUARTERS, FIELD ARTILLERY BRIGADE.
(includes corrections Sixth Series, Nov. 25, 1918.)

	1	2
	Units	Brigade Headquarters
2	Brigadier General	1
3	Major	1[a]
4	Captains	5[b]
5	1st Lieutenants	6[c]
6	2nd Lieutenants	
7	Total Commissioned	13
8	Regimental Sergeant Major	1
9	1st Sergeant	1
10	Master Gunner	1
11	Radio Sergeant	1
12	Supply Sergeant	1
13	Mess Sergeant	1
14	Stable Sergeant	1
15	Sergeants	5[d]
16	Corporals	7[e]
17	Mechanic	1
18	Cooks	3[f]
19	Wagoners	3
20	Bugler	1
21	Privates, 1st Class	25[g]
22	Privates	23[h]
23	Total Enlisted	75
24	Aggregate	98
25	Horses, riding	10
26	Bicycles	4
27	Cars, motor	2
28	Cars, motor, Staff Observation	1
29	Cars, motor, Reconnaissance	1
30	Motorcycles with side-car	6
31	Trucks, motor, 1½-ton	2
32	Trucks, motor, 3-ton	3
33	Trucks, light delivery	1
34	Pistols	88

(a) Chief of Staff.

(b) 1 Operations, 1 Intelligence, 1 Munitions, 1 Communications, 1 Supply.

(c) 1 Adjutant, and detachment commander, 1 Assistant Operations, 1 Assistant Intelligence, 1 Assistant Munitions, 2 Aides.

(d) 1 Telephone, 1 in charge of motor transportation, 1 clerk for Adjutant, 1 Intelligence draftsman, 1 Operations draftsman.

(e) 1 clerk for detachment, 1 radio, 1 telephone, 1 visual signalling, 1 in charge of courier service, 1 intelligence clerk, 1 operations clerk.

(f) 2 for detachment, 1 for officers' mess.

(g) 5 chauffeurs, 6 motorcycle couriers, 1 adjutant's office, 1 munitions clerk, 4 wireless, 5 telephone men, 2 linesmen, 1 visual signalling.

(h) 1 orderly for brigade commander, 5 care for horses and are orderlies for lieutenants, 6 orderlies for chief of staff and captains, 1 officers mess, 2 telephone, 1 visual signalling, 3 understudies for chauffeurs and motorcyclists, 4 duty.

Heavy Field Artillery.
(Tables of Organization, Series B, Nos. 36-39 incl.)

7. The organization of the battery, battalion and regiment to conform to the organization of these units as recommended above for divisional field artillery with battalion and regimental staffs as therein recommended (pars. 3, 4, 5.).

8. Three regiments, one of 4.7-inch guns, one of 6-inch guns, and one of 155 mm. howitzers should constitute the normal heavy field artillery brigade, under the command of a general officer, with suitabe staff.

Brigade Staff. - Same as that for a divisional field artillery brigade as now authorized, (Table 12 Series A.) with modifications recommended in par. 6.

Motorized Heavy Artillery.

(Personnel from Coast Artillery: Table of Organization,
Series C., Nos. 204, 205, 206; Nos. 219-226 incl.)

9. The complete organization an equipment of these units, 6-inch G.P.F., 8-inch howitzers, 9.2 inch howitzers, ammunition train, army artillery park and brigade headquarters, are very thoroughly discussed in a report of board of officers, Headquarters, 18th Training Area, who have had practical experience in handling equipment concerned. (Exhibit B*). This Board concurs in the views and recommendations contained therein. It is believed, however, that the headquarters company in each case should be subdivided as recommended above in the case of light regiments, for the reason, as stated by that board "(c) experience has demonstrated that a battalion should be reqdy at all times to take the field independently."

10. These heavy tractor-drawn regiments of guns and howitzers should be organized in brigades of two regiments of similar type of armament, under the command of a general officer with a staff as now authorized (Table 204 Series C) modified as recommended, Exhibit B, "Brigade Headquarters",* (See Annex 2).

* One copy of the Proceedings of these boards is attached to the original proceedings only of the present Board.

III. Armament.

11. A general study of the armament, calibers and types of materiel to be assigned to a field army is now being conducted by a special board convened for that purpose. That board will also consider and determine the most suitable guns and howitzers for use with division, corps or armies. This board limits itself, therefore, to the enunciation of the general types of armament to be employed, and in mentioning "type" guns and howitzers, hereafter, the board has reference to armament having approximately the characteristics of the calibers indicated.

12. Bearing in mind the normal difficulties of ammunition supply in the field and questions affecting manufacture and supply of ammunition in general, it is believed most essential to limit the different calibers of guns and howitzers to be employed to the fewest number compatible with tactical requirements. The following list embraces, it is believed, the types of guns and howitzers that will ordinarily fulfill the tactical missions of artillery of divisions, corps and armies:

Type 3-inch mountain guns.	Field Artillery.
Type 75 mm. or 3-inch guns.	
Type 120 mm. howitzers.	
Type 4.7-inch guns.	
Type 6-inch or 155 mm. guns	
Type 6-inch or 155 mm. Howitzers	

Type 6-inch guns G.P.F. and seacoast	Seacoast (Heavy) Artillery.
Type 8-inch guns.	
Type 8-inch howitzers.	
Type 10-inch, or better, 240 mm. howitzers	
Railway artillery: 12-inch and 14-inch guns	
Trench artillery: Calibers 150 mm. and 240 mm.	
Anti-aircraft artillery: 3-inch, 4.7-inch guns.	

One report recommends the use of 3.8-inch, or 105 mm. howitzers and another of a light howitzer of about 4-inch (10 cm.). With full appreciation of the views of these officers of experience, the Board does not recommend the addition of these two types to the list given below.

Distribution.

(a) Divisional Artillery.

13. All experiences indicate that trench mortar batteries should not form part of organic divisional artillery. Recommendations relative to these units are submitted under that heading (pars. 52, 53). Eliminating these from consideration at present, the present organization of the divisional artillery as far as armament is concerned is generally reported as satisfactory. One officer of experience recommends an increase in the armament by the addition of one regiment of 3.8-inch or 105 mm. howitzers organized like a regiment of 75 mm. One report recommends howitzers of about 4-inch (10 cm.) in place of the 155 mm. Three other reports recommend the addition of certain units, one to increase the strength, the other two to provide for accompanying guns. With the exception noted, no one recommends a reduction in the number or caliber of the guns and howitzers.

14. Mobility demands first consideration in the case of divisional artillery both for the materiel and for ammunition supply. The French type 75 mm. gun has given complete satisfaction as to power, accuracy and rapidity of fire. Its carriage should be improved to permit of high-angle fire and of more rapid transport over the roads. The 155 mm. howitzer is an excellent weapon, but from the viewpoint of mobility is too heavy for divisional artillery, especially in regard to weight of ammunition to be transported. The high quality of this

piece makes it more properly fitted for the functions of counterbattery and serious destruction. The Board is of the opinion that a lighter howitzer (type 120 mm.) is preferable for the normal mission of divisional artillery. The Board recommends that there be assigned to each division, constituting its organic artillery, one field artillery brigade, composed of:

2 field artillery regiments, type 75 mm. or 3-inch guns.
1 field artillery regiment, type 120 mm. howitzers.
1 battalion mountain guns, 3-inch guns.
1 ammunition train.
1 mobile ordnance repair shop.

(b) Corps Artillery.

15. The functions of corps artillery are primarily counterbattery work and the neutralization of enemy guns. It assists in the more serious destructions to be done by divisional artillery. It fires beyond the zone of action of the divisional artillery. Mechanical transport is necessary. To fulfill these functions the armament of Corps Artillery should consist of type 4.7-inch guns, 6-inch guns (155 mm.) and 155 mm. howitzers. The amount of artillery to be assigned to any army corps depends on the mission and the tactical situation. It is believed to be essential, however, in order to develop teamwork and to form a cadre, as it were, for other artillery that may be assigned, that each corps should have, organically, the guns and howitzers and other accessories necessary for the average conditions of service. It is recommended that there be assigned to each corps, one heavy field artillery brigade composed of:

1 regiment type 4.7-inch guns.
1 regiment type 6-inch guns (155 mm.).
1 regiment type 155 mm. howitzers. (See par. 8.)

16. The brigade commander should be the heavy artillery commander of the corps, his staff furnishing the necessary personnel for the heavy artillery commander's office. Thus, there would always be in each corps a permanent artillery commander and staff, acting under the Chief of Artillery of the Corps to carry on counterbattery and other corps artillery work and to keep in combat liaison with the observation and aeronautical sections assigned to work with the corps. Experience has shown this to be most necessary.

Corps Artillery Park. - The Board has received no information or comment relative to this organization.

(c) General Artillery Reserve.

17. Artillery not pertaining to divisions or corps should belong to a pool known as the General Artillery Reserve, similar to the R. G. A., of the French. This reserve should comprise guns and howitzers of the calibers indicated (par. 12) available for assignment to divisions, corps or armies, in accordance with plans of action of the Commander-in-Chief. The opinion is general that it is not at all necessary that there should be organic Army Artillery. A specially selected officer of high rank should be in command with a suitable staff composed of technical and administrative officers. The natural divisions of the reserve, would be, field artillery, heavy tractor-artillery, railway artillery, trench artillery, and anti-aircraft artillery. All matters of training, supply, equipment, reinforcement, replacement of personnel and practically all questions other than tactical would be handled by the Commanding General, Artillery Reserve. When by direction of the high command, a portion of the reserve artillery is assigned to an army or army corps for a special mission or for an indefinite period, it should pass to the command of the Chief of Artillery of an army or of the army corps for tactical employment. It should be forwarded to the army or army corps, trained, equipped and ready for service. Whenever these troops at the front should be withdrawn for rest, repair of materiel and for other purposes, they should revert to the reserve.

18. From this reserve units would be assigned in order to:

(a) Reinforce the divisional artillery and corps artillery when it is necessary to increase the density of artillery. Mobility necessary.

(b) Augment the power of the artillery when obstacles become greater, and to extend the action of the divisional and corps artillery in view of offensive operations.

(c) Prepre a grand attack.

(a) To increase the density:

F.A. regiments, type 75 mm. or 3-inch.)
F.A. regiments, typ 120 mm. howitzers.)
F.A. regiments, type 4.7-inch guns.) Motorized.
F.A. regiments, type 6-inch guns. (low power))
F.A. regiments, type 6-inch howitzers.)

(b) To augment the power and extend the zone of action in view of offensive operations:

(Coast Artillery personnel)
Regiment of type 6-inch guns (high power))
Regiments of type 8-inch guns.)
Regiments of type 8-inch howitzers.) Motorized.
Regiments of type 240 mm. howitzers.)

(c) To prepare a grand attack:

In addition to the foregoing.

(Coast Artillery personnel)
Regiments of guns type 8-inch, and howitzers type 240 mm. drawn by caterpillars for exploitation of the success.
Railway artillery - 12-inch and 14-inch guns.
Regiments of trench artillery, calibers 150 mm. and 240 mm.

19. Battalions or batteries of antiaircraft artillery, 3-inch 4.7-inch guns, would be assigned to corps and armies in accordance with tactical requirements of the situation. (See Annex 3).

IV. Staffs.

20. Battalion, regimental and brigade staffs have been already considered under those units.

Chief of Artillery, Corps. - Experience indicates that the duties of the Chief of Artillery of a Corps should be entirely separate from the command of the corps artillery. The Chief of Artillery of a Corps should be a permanent member of the Corps Staff and perform only those duties incident thereto independently of those incident to command of corps artillery brigade. Recommendation relative to the necessary staff for the Heavy Artillery Commander, commanding corps artillery brigade, is given in par.8.

The Artillery Section, Headquarters of an Army Corps, should be as follows:

1 Major General or Brigadier General, Chief of Artillery.
1 Lieutenant Colonel, or Major, Chief of Staff.
4 Majors or Captains.
1 operations, 1 A.I.S., 1 munitions, 1 signal and supply.

3 Captains or Lieutenants.
    1 Assistant operations, 1 assistant A.I.S., 1 assistant munitions.
2 1st Lieutenants.
    Liaison with air service, and study of aerial photographs.
Aides are not included.

This section has assigned to it 2 Field Clerks. It is believed, that in addition, it should be provided with a suitable detachment composed of clerical force and the necessary technical personnel and should have its own transportation.

21. Staff. - Army Artillery Headquarters. The formation of a General Artillery Reserve under the command of a general officer with administrative and technical staff, who is responsible for administration, efficiency, and technical instruction of the organizations concerned, relieves the Chief of Artillery of an Army of all administrative duties and permits him to devote his whole time to essential duties; that is, to pepare projects; to estimate the artillery and ammunition needed for different projects; to allocate this artillery and ammunition to divisions, corps and to the army; to assign missions and zones of action; to employ the special groups assigned as army artillery; to insure the steady improvement in technique of all artillery serving with the army - divisional, corps or army; to study and recommend improvements in materiel. His staff will, therefore, be limited to purely tactical functions, will be comparatively small, and will consist of only such number of officers as are necessary for operations and intelligence, in liaison with the general staff sections of the army staff, and such number of technical assistants, as will enable the Chief to fulfill his staff functions in his capacity as advisor to the army commander on all artillery matters.

Based on these considerations the following staff for Chief of Artillery of an Army is recommended:

ARTILLERY STAFF, ARMY HEADQUARTERS.

1	2	3	4	5	6	7	8	9	10
Units	Chief Arty Army	Aides	Chief of Staff	G-1 Duties	G-2 Duties	G-3 Duties	Admin-istra-tion	Hdqrs Troop	Total
Major General	1								1
Colonels			1	1	1	1			4
Lieutenant Colonels									
Lieutenant Colonels or Majors						2	1		3
Majors or Captains					2	3			5
Captains		2	1	1	4	2			10
1st Lieutenants		1			3	2		1	7
2nd Lieutenants					2		2	1	5
Total Commissioned.	1	3	2	2	12	10	3	2	35
Army Field Clerks	1		1	1					3
Regiment Sergeant Majors							1		1
Battalion Sergeant Major			1	1	1				3
1st Sergeant								1	1
Sergeants 1st Class					2	2	2		6
Master Gunners					4	4			8
Mess Sergeants								2	2
Supply Sergeant								1	1
Sergeant, Stable								1	1
Sergeants			1	1	1	1		2	6
Corporals					2		3	2	7
Cooks	2							2	4
Mechanic								1	1

1	2	3	4	5	6	7	8	9	10
1: Units	Chief Arty Army	Aides	Chief of Staff	G-1 Duties	G-2 Duties	G-3 Duties	Administration	Hdqrs Troop	Total
24: Wagoners								8	8
25: Buglers								2	2
26: Privates 1st Class	1		1	1	2	2	2	19	28
27: Privates								28	28
28: Total Enlisted	3		3	3	12	9	8	69	107
29: Aggregate									142
30: Staff Observation Car					1	1			2
31: Reconnaissance Car					1				1
32: Motor Car 7-passenger	1		1						2
33: Motor Car 5-passenger				1	2	2	1	1	7
34: Motorcycles with S.C.								10	10
35: 3-ton trucks								6	6
36: 1½-ton trucks								2	2
37: Night Delivery Truck								1	1
38: Pistols								107	107

22. Staff. - General Artillery Reserve. Under conditions existing in the United States in ordinary times of peace, it is not thought likely that this artillery reserve will ever by formed or that staffs for its headquarters and various subdivisions will be organized. The project which follows is based upon a mobilization for war, when certain centers have been organized for the administration, equipment and training of each of the subdivisions, all under the command of a general headquarters responsible for the efficiency of all its units.

23. The composition of the necessary staffs is based on a study of the French organization, various papers on the subject of army artillery staff, as far as administration is concerned, and several recommendations in regard to staff required for the railway artillery reserve, A.E.F. The number of officers required and the general nature of their duties are shown in the following table:

Headquarters General Artillery Reserve.

- - - - - - - - - - - - - - - - - - -

Commanding General, General Artillery Reserve.

1 Major General
3 Aides
1 Chief of Staff, Brigadier General or Colonel.
1 Assistant Chief of Staff, Colonel or Lieutenant Colonel.

Total - - - - - - - - 6

Technical Staff.

1st Section:

1 Field Officer.
5 Assistants 1 for materiel field artillery.
1 for materiel heavy artillery.
2 for ammunition of all kinds.
1 general organization.
3 Assistants: personnel section. - 9

2nd Section:

1 Field Officer.
3 Assistants Information; Enemy's materiel.
Intelligence Bulletins. - 4

3rd Section: Employment of G.A.E.
1 Field Officer.
3 Assistants.
Aerial observation; Radio:
1 officer.
Technical firing studies; plans.
6 officers. -11

Railways and Motor Service Specialists (working with 1st and 3rd sections)
1 Field Officer
2 Engineer Officers
4 Assistants - 7
Total - - - - - - - - 37

Administrative Staff.

3 Adjutants:	1 field officer.
	2 assistants.
2 Statistical officers:	1 field officer.
	1 assistant.
2 Inspectors:	2 field officers.
5 Quartermasters:	3 field officers.
	2 assistants.
2 Medical:	2 field officers.
1 Engineer:	1 field officer.
2 Ordnance:	2 field officers.
2 Judge Advocate:	2 field officers.
1 Signal:	1 field officer.
2 Headquarters Detachment:	2 officers.
22	

The necessary clerical force, enlisted personnel and transportation should be provided.

24. At a conveniently located point in each regional area in which the branches of this general reserve would be mobilized there should be a headquarters of that particular branch consisting of a chief, with a small staff of technical officers, whose duties and functions would correspond very much to those of our present Coast Artillery District Commanders. These headquarters would have direct charge of questions of personnel, materiel, instruction and training of their respective branches - all in close liaison with the general headquarters of the reserve - and the chiefs should have the functions of technical inspectors for the purpose of coordinating methods, maintaining efficiency of personnel and materiel and thus developing the maximum efficiency of their respective branches.

25. These headquarters should be organized as follows:

Field Artillery: Section	Heavy Artillery: Section	Railway Artillery: Section	Trench Artillery: Section	Anti-Aircraft Artillery Section.
1 Brig. Genl. Chief	1 Brig. Genl. Chief	1 Brig. Genl. Chief	1 Colonel Chief	1 Brig. Genl. Chief

1 Colonel Chief of Staff. 6 officers: 2 Personnel 2 Materiel & motors 2 Training 6 (Aides not included) 1 Regt. Sgt. Major 3 Bn. Sgt. Major 1 Sergeant 3 Corporals 2 Cooks 13 Privates 23 2 Motor-car 7-passenger 1 Motor-car 5-passenger 2 Motorcycles	1 Col. C. of S. 8 officers: 2 Personnel 2 Materiel 2 Motor spec- ialists 2 Training 10 (Aides not included) 1 Regt. Sgt. Major 4 Bn Sgt. Major 1 Sergeant 4 Corporals 2 Cooks 15 Privates 27 2 Motor-cars 7-passenger 1 Motor-car 5-passenger 2 Motorcycles	1 Colonel, C. of S. 6 officers: 1 Personnel 1 Materiel 2 Railways 1 Enginer work 1 Training 8 (Aides not included) Enlisted same as F. A. Section	1 C. of S. 3 officers: 1 Personnel 1 Materiel 1 Training 5 1 Regt. Sgt. Major 3 Bn. Sgt. Major 1 Sergeant 3 Corporals 2 Cooks 10 Privates 20 1 Motor-car 7-passenger 1 Motor-car 5-passenger 2 Motorcycles	1 C. of S. 5 officers: 1 Personnel 1 Materiel 1 Instruction Technical firing studies 1 Training 1 Aviation develop- ments 7 1 Regt. Sgt. Major 2 Bn. Sgt. Majors 1 Electrician Sgt. 1 Radio Sgt. 2 Sergeants 2 Corporals 12 Privates 25 1 Motor-car 7-passenger 2 Motor-cars 5-passenger 2 Motorcycles

(See Annex 4)

V. Equipment.

25. Many different expressions of opinion on this subject have been received, some very detailed, others of a more general nature. The reports themselves are appended, marked Annex 5. Without entering into all details, the following recommendations relative to equipment are submitted:

(a) Ordnance

26. The 75 mm. carriage should be improved to permit of greater elevations and of more rapid transport. If the present French limber is to be continued in use, draft mechanism should be improved. The line of draft is too rigid at present and tends to make sore shoulders, especially on wheel horses. Breast collars were found satisfactory. Abolition of the steel collar recommended. Panoramic sights are strongly recommended. A uniform system of graduation on sights and angle-measuring instruments is considered essential. A durable, efficient lighting system for night-firing and some form of durable illuminated aiming stakes are of special importance and should be provided. The system now in use is too fragile and rapidly deteriorates. A more liberal allowance of grease and oils for care of guns and harness is necessary.

27. Caissons for 155 mm. howitzers should be replaced by trucks or suitable trailers. Eliminate rifle and bayonet from artillery regiments and substitute pistols. Lack of repair parts for motor equipment was a serious handicap. A standard truck and tractor should be selected and provision made for a liberal supply of spare parts. The different kinds of ammunition for both guns and howitzers should be reduced to a minimum. Kinds of projectiles, fuzes and charges in use at present are entirely too numerous. The present reel cart proved unsatisfactory; should be replaced by much lighter cart and provision made for light hand carts. A more liberal allowance of standard flash lights with automatic supply of spare batteries and bulbs most necessary.

(b) Quartermaster.

28. Modify the escort wagon to allow cutting under for short turns. Two-wheeled ration, water and sanitary carts were found severe on animals. Several recommendations are made that they be discarded in favor of four-wheeled vehicles. Motorized water carts should be included in allowance of motorized regiments. It is believed a field range should be included in the kitchen equipment of each battery. Each battery should be allowed one typewriter, and each regimental and brigade headquarters, one mimeograph with necessary supplies. Daily issue of candles very inadequate for amount of night work required and for lighting P.C.'s. etc.

(c) Signal.

29. Allowance of telephones and wire to field artillery organizations should be greatly increased and effort made to make materiel more waterproof; weatherproof cases for telephones recommended. Equip regimental and battalion headquarters with radio sending sets. The American service buzzer and light wire should be retained. Telephone switchboards of twelve drops or more should be put in a box ready for use and a telephone headset and breast-transmitter furnished.

(d) Motor Transportation.

30. Abolish the Nash Quad and all other four-wheel-steer trucks. Abolish the steel ammunition truck body. Adopt 3-ton cargo trucks, four-wheel drive, front-wheel steer. Present allowance of motorcycles for brigade headquarters entirely inadequate. At least six with side-cars should be provided. It is suggested that the design of a truck for a suitable, portable P.C. fitted for day and night work for all units from battery to brigade receive consideration. See also recommendations relative to motor transportation, Exhibit B.
(See Annex 5.)

VI. Communication Officers and Detachments.

31. The entire artillery net should be laid, maintained, and operated by artillery personnel. This should include the lines laid to the infantry supported. There should be no interference by the Division Signal Officer within the Brigade, beyond the necessary supervision of the radio service. Further than this, the function of the signal corps, so far as the field artillery brigade is concerned, should embrace supply only.

32. Existing personnel allowance for communications is not sufficiently large, nor is there enough equipment authorized. It is recommended that the enlisted personnel be doubled, and that a new unit allowance of signal equipment be established after deliberation by a joint board of artillery and signal corps officers. (See Annex 6.)

VII. Motor Transport and tractor-drawn guns.

33. All Corps Artillery and the units of the G.A.R. should be motorized - tractor-drawn for large calibers and port'e for a large proportion of the 75 mm.

34. The howitzers of the Divisional Artillery should be tractor-drawn. Abolish the howitzer caisson and provide trucks or tractors and trailers for ammunition supply.

35. If, after thorough experiment, a satisfactory means of traction for 75 mm. materiel can be found the entire divisional regiments should be motorized. The 75 mm. carriage will have to be modified to meet the increased strain. It may be that the proper tractor now exists, but lengthy experiments should be conducted before the change is made. The difficulties of animal-drawn artillery as developed in France are admitted by everyone. Poor type of animals, lack of replacements, lack of forage, and above all lack of care and understanding for their horses on the part of the personnel, all combined to render the service precarious

under the best conditions encountered. The last-named obstacle, that is, officers and men totally inexperienced in the care of animals, will be met with whenever the American Army is expended. In considerations relative to road space, forage supply for animals, serviceability under field conditions, the advantages are all in favor of the tractor.

36. The 5-ton caterpillar has been found satisfactory for the 155 mm. howitzer. On receipt of the adverse report of Colonel Corey, (Annex 7, page 9), the Board accompanied the Chief of Artillery, A.E.F., to Rimaucourt and made a brief test of the 5-ton tractors belonging to the 350th F.A. The regiment was equipped partly with 5-ton and partly with 10-ton tractors, and all officers preferred the former to the latter. Lieutenant Colonel J. K. Boles, who had been with the 11th F.A., which was equipped with 5-ton tractors and operated with the 1st Army west of the Meuse from October 25th to the armistice, was most enthusiastic in favor of the 5-ton type.

In addition to other tests, the 5-ton tractor pulled a howitzer up a long slope of 16 degrees over fairly soft ground. By reversing and backing the tractor it pulled the howitzer up a considerably steeper slope - probably over 20 degrees.

In the opinion of the Board and of all officers present, the 5-ton tractor showed itself capable of pulling the 155 over any ground where such a gun could reasonable be expected to go.

37. Reference motor transport and tractors for motorized heavy artillery, guns and howitzers of large caliber, see Report, Board of Officers, Exhibit B.

38. The consensus of opinion is that every piece of artillery that can be successfully adapted to motor traction should be motorized. The Board believes that very great expenditures for the purpose of fully developing tractor-drawn or tractor-carried artillery would be fully justified. (See Annex 7.)

VIII. Aerial Observation: F.R.S. and S.R.S.

39. The reports received from officers who have served at the front are unanimous that adjustment by aerial observation was unsatisfactory. Successful results were obtained only in a few isolated cases. There is only one officer who recommends that the observers remain a part of the Air Service. A majority of the officers recommend that aerial observers belong to the artillery and that they be absolutely under the control of the Artillery.

The faults in the existing system appear to be:

(a) Lack of control by the artillery over observers.

(b) Imperfect liaison, due to too distant fields and constantly changing aviation personnel.

(c) Lack of artillery training on the part of observers.

(d) Lack of discipline in the Air Service, which resulted in absolute undependability for results obtained.

(e) Observation planes being relegated to secondary place and being frequently obliged to perform their functions without necessary protection of battle planes.

Complaint is also made of the unmolested flights of enemy observation planes over our battery positions, and, in some cases, of combat planes who bombed and machine-gunned our artillery without being driven off by our own Air Service.

40. It is believed that the control of the planes for observation purposes should be so vested in the commander of the unit which they are serving as to assure that the mission of their service shall be fulfilled. The details of liaison between aerial organizations and the artillery units should be amplified and more opportunity afforded for practice. The aerial observers should be artillerymen, should remain with their artillery units, only leaving when they go on observation. This applies to both airplanes and balloons.

41. It is recommended that an observation squadron be permanently assigned as a part of each combat division and that the aerial artillery observers used therewith be officers of artillery trained as observers and members of the unit for which they are adjusting; and that these officers be required to live with their units and leave them only for the purpose of making the required adjustments. For observation and adjustment of artillery fire, the necessary aeroplanes should be under the direct orders of the artillery brigade commander and should be trained with the brigade. The security of observation planes proper should be assured by battle planes controlled by the corps or army.

42. F.R.S. and S.R.S. These systems were good and gave excellent results. Since the main mission of these services is the furnishing of information to the artillery, it is believed they should be artillery organizations and be placed under the control and direction of the corresponding artillery chief. The artillery personel can grasp the details of these duties and can perform them successfully.

45. It is recommended that the F.R.S. and S.R.S. constitute parts of Army troops under the direction and control of the Chief of Artillery of the Army. The personnel should be artillery and training should be under the artillery. They are essentially artillery information agencies and should operate and function with the artillery at all times, in accordance with paragraphs 4 and 18, A.I.S., G.H., A.E.F., August, 1918. (See Annex 8.)

IX. Liaison and Liaison Officers

44. The system of liaison between the infantry and artillery is generally reported as satisfactory. The importance of this liaison is admitted in all cases, and it was demonstrated that a marked improvement in the cooperation of the artillery with its infantry could be made by constant attention to better liaison work. The two prominent faults reported upon are lack of sufficient personnel and difficulty of communication due to cumbersome telephone equipment.

45. It is recommended that the following changes be made in the existing scheme:

(a) At least the Chief of Liaison in each regiment should be a captain. This incrase in rank will give the officer sufficient experience and inspire sufficient confidence on the part of the infantry for the proper performance of his duties.

(b) That the liaison officers and detachments now provided for be dobled in strength. When properly carried out liaison work is at least as exhausting as the work of the infantryman himself, and sufficient personnel should be provided to insure proper relief.

(c) That sufficient buzzer wire and telephone be provided in equipment of liaison detachments to insure their direct connection with the artillery net.

(d) That a system be established whereby all junior officers of both infantry and artillery perform frequent short tours of duty with the other branch. Such duty will go far toward the education of each branch in the possibilities and limitations of the other.
(See Annex 9.)

X. Accompanying Guns and Batteries.

46. The use of the accompanying gun in the A.E.F., while common, has not givn any fair test of its value. Ignorance of its use on the part of the infantry commanders and of junior artillery officers has often caused it to fail in the rare cases where it might have been of service. Fifty percent of reports are opposed to any such assignment, believing that the 37 mm. and light trench mortar can meet all needs of the infantry. Several advocate the use of a gun of the type of our mountain howitzer, manned by the artillery. One suggests the use of heavy tanks.

47. The Board believes that the use of a horse-drawn, flat-trajectory gun like the 75 as accompanying gun will result only in the loss of men and animals without accomplishment of the mission. Moreover the assignment of these guns in this manner leads to a dispersion of artillery power which should preferably remain concentrated under the authority and control of the artillery brigade commander. Yet the moral and physical effect of a well-served accompanying gun - in this war as in past wars - is sometimes so great that some form of gun which will serve the purpose should be adopted.

48. It is recommended that a four-battery battalion of mountain howitzers be made a part of the divisional artillery brigade for assignment as accompanying guns and batteries when the need of actual physical accompaniment is apparent. (See Annex 10).

XI. Placing of Artillery Under Command of Subordinate Infantry Commanders.

49. Divisional artillery exists for the support of its infantry. If both artillery and infantry officers realize this fact, no question can arise as to the command of artillery passing to a subordinate infantry commander. The latter is occupied with his own difficulties in action and desires only that the artillery support him when and where needed. Arrangements for this support to be quickly and effectively delivered must be made by decentralization of command within the artillery brigade. The colonel, the major, or the captain, as the case may be, is closer in touch with the infantry and realizes their needs more than the brigade commander can. To comply with the infantry's request for fire, quickly and effectively, must be a mission of first urgency. The first artilleryman who has the means at hand must furnish the desired support on his own initiative. Proper teamwork between artillery and infantry will ensure results, and there will be no desire on the part of the rational infantryman to command his supporting artillery. At the same time that freedom of action has been given subordinate artillery commanders for the close support of the infantry, the artillery brigade commander will still retain the command in such a way that he can in an emergency furnish such fire as the division commander himself may order. (See Annex 11.)

XII. Ammunition Train and Mobile Ordnance Repair Shop.

50. The present status of the artillery section of the ammunition train and mobile ordnance repair shop is uncertain. Each division seems to have handled the matter differently. Their work is so closely related to that of the artillery and the need for mutual understanding and confidence so urgent that they would function better if continuously under the same command. The infantry section of the ammunition train would better be divorced from the artillery section and controlled by infantry officers. The M.O.R.S. could not be divided economically, but could continue to serve both infantry and artillery; the control should be given the artillery since the greater part of the work is artillery work.

51. It is recommended that an artillery ammunition train, consisting of train headquarters and three truck companies as now organized, with the addition of one motor-carried 2½-ton tractor per company, be made a part of the artillery brigade; that the M.O.R.S. be made a part of the brigade as a separate unit under the brigade commander; that 3-ton cargo trucks (four-wheel drive, front-wheel steer) and a certain number of light delivery trucks be substituted for the ammunition trucks; that 2 machine guns be assigned each company and

personnel necessary for their service be added; and that the spare guns, with suitable trucks or tractors instead of horses, be transferred from the ammunition train to the M.O.R.S. (See Annex 12.)

XIII. Trench Mortar Batteries.

52. The Board recommends that trench mortar batteries be separated from the divisional artillery and made a part of the General Artillery Reserve.

53. Greatly reduced in number, they should be organized into regiments or battalions for administration and training, and, like other elements of the G.A.R., assigned to divisions and corps as needed. The opportunities for advantageous employment with any given division are rare, and can usually be foreseen. These units should be motorized. (See Annex 13.)

XIV. Schools and Training.

54. The training camps, schools and training centers established in the United States and France during the war were based on the necessity of producing officers trained along certain lines, within a comparatively short time, by courses of intensive training designed to meet existing conditions. Excellent results were obtained in many instances; at the same time it was inevitable that lack of coordination, lost motion and deficiencies along certain lines of instruction should occur. It is hardly believed that the experiences thus gained on this subject would serve as a basis for schools and training in the United States to fit conditions of peace, except as a guide to indicate the kinds of schools required and the scope of instruction to be given.

55. The kinds of schools to be established, programs of instruction and amount and kind of training required depend to a great extent upon the organization and nature of the army to be maintained after the war. Without entering into all details, the following general scheme of military training for artillery officer, is recommended:

(a) Officers.

1. School for preliminary training in routine duties of an officer, course, one year. All second lieutenants, 1st year of commissioned service. To be conducted in each branch, Coast Artillery at Fort Monroe, Va., Field Artillery at some large post, or in regiments selected for the purpose. Student officers to be attached to organizations for daily service and practical training. Organization commanders, under a competent field officer as director, to be in charge of elementary theoretical instruction. Curriculum to include:

Coast.	Field.
1. Drill Regulations Firing Manuals.	1. Same.
2. Coast Artillery Materiel.	2. Field Artillery Materiel.
3. Gunnery.	3. Same.
4. Communications Telephones, Radio.	4. Same.
5. Elementary Electricity and Power.	5. Equitation, Hippology.
6. Topography, maps.	6. Topography, maps.

Examinations and written tests to be held, officers found deficient on final examination to be discharged from the service.

On completion of this course officers to be returned to posts and organizations for at least one year.

2. Garrison schools at posts. Course three years. All captains and lieutenants. Object, to perfect officers in the details of their profession. Field officer in charge at each post; selected instructors. Details of curriculum to be prescribed by War Department. The applicatory method of instruction should be followed.

3. Special Schools: Coast Artillery School, Fort Monroe, Va., as now organized with the addition of a School of Fire, for heavy and Coast Artillery, either there or in close liaison with it. Field Artillery School to be established along similar lines, in close liaison with School of Fire, Fort Sill, Okla.. Selected officers, course at artillery schools, 1 year. Artillery materiel and tactics, ballistics and gunnery, explosives, gun construction, topography, engineering electrical and mechanical, including communication and mechanical transport. To be followed by a second year of specialization of those expert in any subject. Schools of Fire, course three months. Balloon units and aeroplane units should be furnished each school of fire, and heavy tractor-drawn artillery and R. R. Artillery the Coast Artillery School of Fire.

School of motor transport, selected officers from both branches. Course, six weeks, at some selected place where special facilities exist for instruction in all details of motor vehicles and motor transportation.

If, in the opinion of the School Board at either school, Coast or Field Artillery, it appears advantageous to send certain graduate officers to civilian institutions to pursue special courses of instruction in any of the subjects pursued at either school, these should be authorized for a limited number of officers. Selected officers, both Coast and Field Artillery, to the fullest extent authorized, should attend the Army School of Line, the Staff College, the Army War College and in the case of Coast Artillery officers, the Naval College.

4. School of maneuver, march and operations. Practical training of battery, battalion, regimental and brigade commanders. August 1st to November 1st. Both branches. Sufficient number of units assembled to constitute at least a brigade. Existing cantonments in various parts of the country might be utilized. Infantry should be made available and the final period of the training take the form of divisional maneuvers. In combination with this, there should be a three months' course for General, Field and Staff Officers of both branches for practical training in artillery operations.

(b) Enlisted Men.

(a) Post schools for instruction in the common branches of education, as at present.

(b) For instruction in military subjects, as at present.

(c) Vocational schools, organized at posts. As many subjects as facilities will permit. Enrollment voluntary - attendance a duty.

(d) Selected candidates and specialists - 1. Enlisted Men's Division, Coast Artillery School. 2. Enlisted Men's Division, Field Artillery School.

1. Electrical course; Artillery course; Clerical course; Radio course; Motor transportation course.

2. Field Artillery course; Telephone and radio course; Stable management horseshoers and farriers; Saddlers and battery mechanics; Motor transportation.

56. Suitable provision should be made for the attendance of reserve artillery officers at any of the foregoing schools.

57. The curriculum in garrison and special schools should be strengthened by incorporating instruction in staff duties, transport and supply in all their details. Care and handling of animals should be emphasized where applicable. War problems involving the technique of all arms shoul be much in evidence and of continual application. The curriculum of all schools should involve a large proportion of practical work than has obtained heretofore.

58. The most important lesson from the experience in France is the absolute necessity of the closest coordination and harmony in the work of Staffs and the various arms engaged and, especially, of a mutual sympathetic understanding between infantry and artillery of the needs, powers and limitations of each other. It is necessary that both infantry and artillery establish and maintain close and intimate relations with each other to insure success. This can be perfected only by practice. For these reasons the school of maneuver, march and operations - centers where officers and units of the various arms will be brought together to work out practical problems under the supervision of high-ranking officers of extended experience in France - is considered most important. The expense involved will be fully justified by the resulting greater efficiency of the army.

The written opinions and recommendations of many artillery officers of the American Expeditionary Forces are appended to this report and have been referred to under the various headings as Annex 1, 2, 3, etc. The Board has fully considered these views, bearing in mind, at the same time, the nature of service of the organization and of the officer submitting them. It has attached greater weight to the opinions of officers who have had experience at the front and has endeavored in making its recommendations to base them on the consensus of opinion of the artillery of the A.E.F. gained by actual experience under war conditions.

There being no further business before it, the Board adjourned, sine die.

/s/ ANDREW HERO, JR.

ANDREW HERO, JR.

Brigadier General, U.S.A.

President.

J. W. KILBRETH, JR.

Brigadier General, U.S.A.,

Member.

C. H. NANCE

Lieutenant-Colonel, U.S.A.,

Member.

GENERAL HEADQUARTERS
AMERICAN EXPEDITIONARY FORCES
Office, Chief of Artillery.

December 11, 1918.

To all officers who command, or who have commanded artillery brigades, artillery regiments, trains or schools, in France:

This board has been appointed to make a study of the experiences gained by the artillery of the A. E. F., and to submit recommendations based upon such study.

You are requested to submit to the board recommendations for changes in organization, armament, transport, equipment, training, supply, etc., based on your experience, or the experience of officers under your command.

The following subjects are suggested for remark, but it is not desired that you discuss them all, merely those in regard to which your experience or observation suggests some definite recommendation:

(a) Organization of the battery, the battalion, the regiment, the brigade.

(b) Organization and armament of the divisional artillery, the corps artillery, the army artillery.

(c) Organization of staffs for any of the above.

(d) Equipment, ordnance, signal, etc. Supply in general.

(e) Communication officers and detachments and their relation to the Signal Corps.

(f) Schools and training camps.

(g) Motor transport; tractor drawn guns, caterpillar mounts, etc.

(h) Aerial observation; F.R.S. and S.R.S.

(i) Liaison and liaison officers.

(j) Accompanying guns and batteries.

(k) Placing of artillery under command of subordinate infantry commanders.

(l) Future relation of the C.A.C. and F.A.

(m) Ammunition trains and parks; combat and field trains; M.O.R.S.

(n) T. M. Batteries.

The work of the Board will be facilitated if suggestions relating to each of the foregoing subjects be placed on a separate sheet. Instances of defects in approved organizations or methods are of value and are desired.

Where report has already been made to the Chief of Artillery, A.E.F., on any subject, a reference to date of report will be sufficient.

/s/ ANDREW HERO, JR.
Brigadier General, U.S.A., President.

EXHIBIT A

Office Chief of Artillery,

March 20, 1919.

My dear Snow:

I inclose for your confidential use an extract from the draft of the report of this office. I shall ask that a complete copy be forwarded as soon as it is completed and submitted. Also a copy of my action on the Report of the Hero Board, a complete copy of which I shall ask also to be forwarded to you and Coe (see Par. 2 of my letter to C. of S., A. E. F.).

Sincerely yours,
Ernest Hinds

Major General Wm. J. Snow,
Chief of Field Artillery, U. S. Army,
War Department, Washington, D.C.

GENERAL HEADQUARTERS
AMERICAN EXPEDITIONARY FORCES
Office of the Chief of Artillery.

*****

BOARD OF OFFICERS TO STUDY THE EXPERIENCE GAINED BY THE ARTILLERY OF THE AMERICAN E. F.

51. Under the provisions of an office memorandum, dated December 9, 1918, a board of officers consisting of -

Brigadier General Andrew Hero, Jr., U. S. Army.
Brigadier General John W. Kilbreth, Jr., U. S. Army, and
Lieutenant Colonel Curtis H. Nance, Field Artillery,

was assemblec to make a study of the experience gained by the Artillery of the A. E. F. and to submit recommendations based upon such study."

This board met on December 9th and has made studies of the following subjects:

(a) Study of after-war reorganization of the Artillery.

(b) Study of development of mechanical transport of Artillery.

(c) Study of armament for -
- (1) The Division
- (2) The Corps
- (3) The Army
- (4) The Reserve

(d) Study of Liaison.

(e) Study of the Training System in France -
- (1) The Artillery Schools
- (2) F. A. Training Camps
- (3) Heavy Artillery O. & T. Centers

(f) Study of Artillery Equipment -
- (1) Ordnance
- (2) Signal
- (3) Miscellaneous

(g) Study of Unit Organization -
- (1) The Battery
- (2) The Group
- (3) Higher Units

(h) Study of Artillery Staffs

(i) Artillery Parks

Ammunition Supply,
etc., etc.

To gather as far as possible the experiences of all artillery officers of experience, a letter was sent to all officers who have commanded artillery brigades, artillery regiments, trains, or schools in France, requesting information along the lines indicated above. Numerous replies were received containing information of value, based upon the experience of these officers.

The report of the Board was transmitted to the Chief of Staff, A.E.F., on March 27, 1919 with the recommendations of the Chief of Artillery, A. E. F.

52. It is believed that this report is the most valuable one that has emanated from this office. Its value consists not only in the views and recommendations of the Board, but to a still greater degree in those of a great number of our ablest and most experienced artillery officers, which are collated and classified in the various Annexes to the report, and which are therefore available in permanent form for future study of the many questions covered by them. From these the War Department authorities can draw their own conclusions, which may or may not agree with those of the Board. The conclusions drawn from these experiences by officers who study them will vary with the weight assigned by them to the views of the various officers quoted. While there is a general agreement in regard to most of the questions considered, the views differ widely on certain points. This is due, of course to the fact that our views depend largely upon our own personal experiences, which are generally the result of local conditions of limited application and which are rarely reproduced elsewhere.

RECOMMENDATIONS OF THE HERO BOARD

53. In view of their great importance the principal recommendations of this board are summarized here so that they may be considered in connection with those contained in this report:

(a) That the proposed consolidation of the Field Artillery and the Coast Artillery Corps should not be made.

(b) That the battery combat trains be organized into ammunition batteries and battalions.

(c) That the battalion detail, now a part of the headquarters company, be made a distinct unit of the battalion.

(d) That the commissioned personnel of the battalion staff be increased.

(e) The Board believes that a two-battalion organization for the heavy regiment would be advantageous.

(f) That the trench mortar batteries should not form part of the field artillery brigade but should be assigned to the General Artillery Reserve. (In order to expedite the development of Trench Artillery materiel, particularly of light mobile and of heavy motorized types, a further thorough study of this question should be undertaken and pushed to a conclusion now while our knowledge and experiences are fresh in the minds of Trench Artillery officers. If a Trench Artillery Center should be established at once in the United States it is believed that rapid progress would be made. A considerable improvement in the present types has already been made at the A. E. F. Trench Artillery Center.)

(g) That the artillery ammunition train and a mobile ordnance repair shop be made parts of each divisional field artillery brigade and kept always directly under the brigade commander, the infantry ammunition train and that part of the repair shop pertaining to the infantry being handled separately.

(h) That a battalion of mountain artillery guns be added to the divisional artillery brigades to make provision for accompanying guns.

(i) That the divisional artillery be provided with a howitzer of smaller caliber than the 155 m/m howitzers.

(k) That the Corps Artillery armament consist of 155 m/m howitzers, 4.7" guns, and 155 m/m guns.

(l) That the 75 m/m gun carriage be modified to permit of high angle fire.

(m) That artillery not pertaining to divisions or corps should be organized into a General Artillery Reserve- that there should be no organic Army Artillery.

(n) That the Army Artillery Staff should be a small tactical staff.

(o) That many modifications should be made in Ordnance, Quartermaster, Signal and Motor Transportation equipment.

(p) That the communications personnel and equipment therefor be increased.

(q) That study and experiment should be energetically continued looking toward the early motorization of every piece of artillery that can be successfully adapted to motor traction.

(r) That aerial observation must be made more satisfactory. That an observation squadron be permanently assigned as a part of each combat division, that the aerial observers used therewith be officers of artillery trained as observers and members of the unit for which they are adjusting, and that these officers be required to live with their units and leave them only for the purpose of making the required adjustments.

(s) That the personnel of the Flash Ranging Service and the Sound Ranging Service should be artillerymen, and that those services should be parts of the artillery organization.

(t) That the strength of our liaison detachments be considerable increased.

(u) That in addition to divisional maneuvers there should be established a course of instruction for General, Field and Staff Officers, of both infantry and artillery for practical training in artillery operations.

ADDITIONAL RECOMMENDATIONS.

54. In addition to the recommendations of the Hero Board summarized in the preceding paragraph, the experience of the Artillery of the A.E.F. leads to the following recommendations:

(a) It is indispensable that an adequate reserve of Materiel and equipment, particularly of ordnance, for our needs upon the outbreak of war be accumulated and maintained in time of peace. Had we not been able to obtain ordnance from the French and the British we would have been a negligible factor in the war until the end of 1918. When the armistice went into effect, nineteen months after we entered the struggle, with the exception of twenty-four 8" howitzers made from British plans by the Midval Steel Co., we had in line not one single piece of Divisional, Corps, or Army artillery manufactured in America after our entry into the war.

(b) We should establish military instruction at all of our principal educational institutions, so that we may from the graduates of these schools build up a Reserve Corps of officers. The one thoroughly satisfactoy source of junior officers was the body of young men recently graduated from our colleges and universities.

(c) We should train in much greater numbers our regular officers fr general staff duty. This was one of the most troublesome questions that we had to consider in the A. E. F. Due to the tremendous expansion of our Army, the lack of trained officers for duty with troops,

and the consequent imperative necessary for the retention as long as possible of such trained officers as we had with the fighting units at the front, the organization of the staffs of our larger units - the corps and armies - was postponed much longer than was desirable. It is believed that earlier formation of these staffs is of the greatest, in fact, of almost vital importance.

(d) There should be a greater amount of time devoted to the combined training of our infantry and field artillery, with interchange of officers of these two arms for a few months period of training.

(e) The liaison between the artillery and the air service must be improved. Our officers must be brought to a realization of the necessity for aerial observation for the artillery.

(f) Our artillery officers must be trained in time of peace in artillery staff duties - for Brigade, Corps and Army Artillery Staff work.

(g) The Artillery Information Service should be retained in time of peace as a prt of our Field Artillery organization. One Artillery Information Service Company (or better one for each corps) should be organized and stationed at the Field Artillery School of Fire - this company to consist of three sections: an A. I. S. Section, a Flash Ranging Section, and a Sound Ranging Section, composed of artillery personnel. This A. I. S. company should establish a short course of instruction by which a nucleus of trained personnel would be provided for the A. I. S. when needed.

(h) The technical knowledge and training of our Field Artillery officers must be greatly increased, not only in matters of theory, but in practice; and with such special bearing on the various phases of motor transport and the application of both pure and applied mathematics to the technical employment of Field Artillery - this without prejudice to the well-known and long-tried principles governing the employment of the arm in what we have heretofore known as open warfare.

To insure the technical proficiency of our Field Artillery officers in handling the fire of artillery units, a large ammunition allowance for target practice is indispensable.

(i) The development of the motorization of artillery of all calibers, including that of caterpillar mounts, should be pursued energetically. It can not be claimed at the moment that we have reached the point where the horse-drawn light guns can be discarded, but it is believed at the present rate of progress that point soon will be reached - we should keep in the forefront of progress by continual study and experiment.

(k) A study should at once be made of the question of Army Artillery organization while our experiences in the A. E. F. are fresh in mind. It is believed that our artillery officers of experience are practically unanimous in the opinion that there should be a General Reserve of all Artillery not assigned to Divisions and Corps.

(l) Some plan - drastic if necessary - must be found and applied which will result in the elimination of unfit officers now in the service, in the prevention of such in the future, as far as humanly and politically possible, and in the timely promotion and reward of those who have provided, and who may in the future prove, their worth. It is believed that our officers throughout the service are now so thoroughly convinced of the necessity for such action that it would be easy to carry out carefully digested regulations for examination for promotion, with a view to eliminating unfit officers. If legislation could be secured whereby it would be possible to retire officers who are found by examination boards to be not fit for further promotion, on a percentage of pay basis (say 2½% of pay for each year of service after six years), it would afford an ideal solution.

Promotion by selection in time of war is not only justified by it is probably the only practicable plan; in time of peace, however, for regimental grades, much injustice would result from one cause or other under our system of government. On the other hand, a properly devised system of elimination will rarely do injustice to the individual or result in injury to the best interests of the service. In any system of promotion by selection many good officers would undoubtedly be passed over, because they are not as well known as others, or have not as attractive personalities as others, etc., and yet they may in reality be - in many cases will be - abler officers than those selected. It is very difficult in time of peace to prescribe methods whereby the best officer may be determined - it is easy to select those whose services are not satisfactory. A good officer once passed over in time of peace is injured; if passed over again he is ruined, and the Government has not only lost a valuable asset but has acquired a continuing liability - a disgruntled officer who is continually thinking of the injustice done him and airing his grievances to those about him, the tendency of which is to breed discontent and dissatisfaction among his brother officers.

55. Accompanying this paper are the following inclosures, which give the details of thesubjects covered in a general way in the report proper:

Part I. History, development and organization of the Office of the Chief of Artillery, A.E.F.
Part II. Field Artillery Training.
Part III. Heavy Artillery Training.
Part IV. Materiel.
Part V. Artillery Information Service.

56. In concluding this report the Chief of Artillery desires to plce on record his deep appreciation of the able, efficient and loyal assistance given him at all times by both the commissioned and enlisted personnel who have been on duty at various times in his office. To them is due mainly the success which it is believed that this office has achieved in the performance of the duties prescribed for the Chief of Artillery in the orders establishing the office.

He cannot speak too highly of the work of the following-names officers especially:

Brigadier General William I. Westervelt (F.A.) who, as Assistant to the Chief of Artillery, - through his initiative, his creative ability as an organizer, his comprehensive knowledge of the technique and the tactics of artillery in all its branches, and in particular his knowledge of artillery materiel, has been of inestimable value to the Government in the work of this office.

Brigadier General Henry J. Hatch (C. A. C.) who, as Chief of the Heavy Artillery Section, - initiated and prepared the important plans under which the Organization and Training Centers for Heavy Artillery in Franch were so successfully operated.

Brigadier General Edward H. DeArmond (F.A.) who, as Chief of the Field Artillery Section, showed remarkable ability in completing the organization and perfecting the system of Field Artillery training in the A.E.F.

Colonel Alden F. Brewster, F.A., who wrote, compiled and translated much of the valuable literature used in the training of the American Artillery in Franch and in the United States, and who, as principal assistant in the Field Artillery Section in charge of the training of the Divisional Artillery, by his ceaseless energy did much toward assuring the correct instruction of the Field Artillery troops in the A. E. F.

Lieutenant Colonel James H. Cunningham C.A.C., who as head of the Information Section was largely instrumental in the development of the plans for the successful carrying out of the training of the Artillery Information personnel of the A.E.F.

Lieutenant Colonel Walter P. Boatwright, C.A.C., who as head of the Materiel Section, through his initiative, ability, tact and energy, greatly hastened the supply of materiel for the equipment of the O. & T. Centers and the Divisional Training Camps, and for the troops in training, and by his profound knowledge of artillery and tractor materiel has contributed much toward the improvement of that materiel.

(signed) ERNEST HINDS
Major General
Chief of Artillery, A. E. F.

March 27th, 1919.

From: Chief of Artillery, A. E. F.

To: Chief of Staff, A. E. F.

Subject: Report of a Board of Officers appointed to make a study of the experience gained by the Artillery of the A. E. F. and to submit recommendations based thereon.

1. There is transmitted herewith the report on this subject submitted by a Board of Officers convened in this office by an Office Memorandum of this Office, dated December 9th last.

2. It is believed that this report is of such value that it should be forwarded to the War Department for consideration in connection with the study of the future organization, armament, equipment and training of the Field Artillery. It will be of great value for use in connection with the Report of the Westervelt Board - the two reports are complementary.

In order to make it available to the War Department authorities without delay so that their studies thereof may be pursued simultaneously with ours in the A. E. F., and that it may be available also in connection with that of the Westervelt Board, I am transmitting herewith an additional copy for that purpose.

It is believed that G-3 has probably a greater interest in this report than the other sections of the General Staff at these headquarters, and in order that that section may have uninterrupted use of this copy the retained office copy of the report will be loaned by this office to G-4 and G-5 for such study as those sections may desire to make of it.

3. The value of the report consists not only in the views and recommendations of the board, but to a still greater degree in those of a great number of our ablest and most experienced artillery officers, which are collated and classified in the various Annexes to the report, and which are therefore available in permanent form for future study of the many questions covered by them. From these the War Department authorities can draw their own conclusions which may or may not agree with those of the Board. The conclusions drawn from these experiences by officers who study them will vary with the weight assigned by them to the views of the various officers quoted. While there is a general agreement in regard to most of the questions considered, the views differ widely on certain points. This is due, of course, to the fact that our views depend largely upon own personal experiences which are generally the result of local conditions of limited application and which are rarely reproduced elsewhere. Tenerally I have concurred in the views of the Board, but in some most important points I do not think their conclusions are justified.

4. My recommendations are submitted in the form of an indorsement in which the various subjects are considered in the order in which they appear in the Report.

ERNEST HINDS
Major General, Chief of Artillery, A.E.F.

Enclosures.

Draft of Ind. on Report of the Hero Board.

C. of A.
E.H.

1st Ind.

O. C. of A., G.H.Q., A. E. F., March 27, 1919. - To the Adjutant General, A. E. F., forwarded.

1. GENERAL ORGANIZATION (PAGE 3).

1. I concur in the opinion of the Board that the Field Artillery and the Coast Artillery Corps should not be consolidated.

2. I do not concur in its views as to the division of duties between the two. We used Coast Artillery troops in the Artillery of the A. E. F., but they were engaged almost wholly in what is properly Field Artillery work. We used them because they were not at the time needed for manning our Coast Defenses and were in consequence available for other uses; they were trained and disciplined troops, an asset that in the great expansion of our Army could not be permitted to remain idle. They rendered efficient service in the A. E. F. Artillery, but it is not open to question that they would have been still more efficient had they been trained for the same number of years in Field Artillery methods and in handling the same materiel to which they were assigned in the A. E. F.

A division of the duties of the Artillery accompanying the armies in the field, along the lines recommended by the Board, would introduce an element of divided responsibility in regard to the training of the artillery, which is vitally wrong in principle. In time of war there doubtless would be a Chief of Artillery for the field forces--there cannot be two, one for the Field Artillery and one for the Coast Artillery personnel assigned to the field forces. The result would be two agencies in time of peace responsible each in part for personnel which is to be combined during time of war for work under the Chief of Artillery of the Field Forces. Such a principle cannot be defended.

It is but a few years since the Field and the Coast Artillery were separated. This separation was the result of many years' study and effort on the part of our ablest artillery officers to secure the necessary legislation, and it behooves us to inquire thoroughly into the demands of the Coast Artillery for a reversal of our policy - for the advocacy of the consolidation so far as artillery officers are concerned appears to be confined practically exclusively to officers of that branch.

A short resume of the history of our artillery organization may be pertinent to the study of this question:- From March 3, 1847, until February 2, 1901, the organization of the Artillery of the United States Army was regimental, each regiment consisting of twelve batteries, two of which were armed and equipped as light artillery. Officers were detailed by roster for two-year tours of duty with the light batteries. With the improvement of the arm, this arrangement became unsatisfactory; there arose a need and a demand for specialization in training. As a result of many years of agitation on the part of artillery officers, andin consequence of the experience of the Spanish-American War, the Artillery in the reorganization of 1901 was organized as a Corps, but was divided into two branches - Coast and Field. Shortly afterwards the introduction into the United States Army of a modern rapid-fire field gun, and the many improvements incident thereto, caused a renewal of the agitation for a greater specialization in training and a permanent assignment of the personnel to one or the other branch of the Artillery Corps. For several years prior to 1907, artillery officers with practical unanimity urgently demanded a separation of the Corps into the two branches - Field and Coast. The reasons for desiring the separation were: that it was wholly impossible for any officer to become expert in both branches; that it was necessary to specialize not only in one or the other branch, but within each branch; that there existed no tactical relation between the two branches; and that the efficiency of the Artillery would be greatly increased by the separation and consequent specialization of the work of the officers.

The Chief of Artillery, General Murray, advocated the separation for the following reasons: -

> "It is a sound military principle that only such arms of the service as have a fighting or tactical relation with each other should be combined for organization purposes. The Coast Artillery, organized solely for the proper handling of the two correlative elements of harbor defense - heavy channels to be defended - constitutes in reality a passive defensive force which has no tactical relation whatever with the active forces of infantry, cavalry or field artillery, the three fighting elements of a mobile army. In all movile armies there is a definite ratio between the three fighting elements whenever these are combined in organizations for tactical purposes, the size of the organization or of the mobile army determining the amount and organization of its field artillery. The Coast Artillery, constituting the defense of harbors against an enemy's fleet, not only has no tactical relation with any of the fighting elements of a mobile army, but there is no definite ratio between the two fighting elements, heavy guns and mines. The number and character of the guns and the number of mines vary with each harbor to be defended. The combination of the Coast and Field Artillery into a Corps as is now done is not only unsound as a military principle, but the frequent interchange of officers between those tactically unrelated arms is considered detrimental to the efficiency of both."

The General Staff as a whole and the Chief of Staff, after several years of study advocated legislation to accomplish the separation. As a result Congress enacted the law of January 25, 2907, creating the two branches.

This law defines these branches as follows: "The Coast Artillery is the artillery charged with the care and use of the fixed and movable elements of land and coast fortifications, including the submarine mine and torpedo defenses." (Section 3, Act of January 25, 1907.)

"The Field Artillery is the artillery which accompanies an army in the field, and includes light artillery, horse artillery, siege artillery, and moutain artillery." (Section 4, Act of January 25, 1907.)

There have been remarkable developments in motorization of artillery transportation since 1907, but it is believed that the true line of demarcation between the Field and the Coast Artillery has not been changed thereby; it is still as it was then, a question of mobility. The Field Artillery should be that which accompanies an army in the field - without regard to caliber or the size of the organization to which it may be assigned - it should include Divisional, Corps, and Army guns of all kinds and calibers which are mobile on the roads or across country. Railway artillery is mobile but it cannot accompany an Army in the field - it is a special arm which will undoubtedly be needed in our Coast Defenses. The Coast Artillery should, therefore, provide its personnel; and doubtless on the rare occasions in our service where it might be needed elsewhere it could readily be provided by the Coast Artillery in such quantity as may be necessary.

3. I recommend, therefore, that the present law governing the organization of the Artillery of the United States Army into Field and Coast Artillery and prescribing the duties of these branche. be not changed.

Should there be a relatively greater increase of the Field Artillery than of the Coast Artillery Corps, there should be provision made for freely transferring suitable officers who so desire it from the Coast to the Field Artillery with a view to equalization of promotion in the two branches.

Besides this step toward the equalization of promotion the question of a single list for promotion to include all combatant officers of the Army should be considered before legislation is enacted for the reorganization of the Army. If promotion were placed upon this basis, most of the partisan advocacy of or opposition to reorganization plans would disappear, and they would be based in much greater degree upon their real merits.

II. DETAILS OF ORGANIZATION.

Divisional Field Artillery.

4. The Battery, the Battalion, and the Regiment. (Pars. 3.4 & 5, pp. 5-6)

The recommendations of the Board are concurred in except as to the organization of the howitzer regiment into three battalions of two batteries each. As to this the Board states that, notwithstanding its recommendation, which is based upon the views of artillery officers of the A. E. F., it is inclined to the belief that the two-battalion organization for the heavy regiment would be advantageous for reasons of administration, elimination of one battalion staff, and for tactical reasons, simplification of liaison. In this latter view I concur. Recommendation 5 (b), page 5, to be modified accordingly, if the howitzer regiment is to consist of two battalions of three batteries each.

With respect to the proposed organization of ammunition batteries and battalions: Under present regulations, on a peace footing, the 6th, 7th, and 8th sections of batteries are not manned or horsed. (Par. 474, Provisional Drill & Service Regulations for Field Artillery, 1916, vol. II). Their organization must therefore be completed upon passing to the war footing. In time of war, "combat trains are usually operated in battalion groups, under the command of the senior officer with them". (Par. 983, Drill Regulations for the 75 French Gun, Vol. III, Sept., 1918). The proposed organization would therefore weld into a compact unit what is in practice a temporary combination of smaller units loosely thrown together. It is believed that the administration, discipline, and messing of these small units would be improved if organized into a single unit under the permanent command of a Captain- a Major for the ammunition battalion.

These ammunition units are not authorized "in time of actual or threatened hostilities" (Sec. 19, of Act of June 3, 1916). It is believed, however, that a small nucleus of personnel should be provided on a peace footing for each artillery brigade, so that upon the outbreak or imminence of war, the organization of these units could be quickly completed - a sufficient number of trained personnel can be taken from the active units to do this, the rest of the personnel can in a very short time be given the necessary training. The greater part do not need a high state of training -- for this reason it is not necessary to organize more than a nucleus in time of peace.

5. The Brigade. (Divisional Artillery, - Par. 6, pages 6 to 8, and Pars. 13 and 14, pages 11 and 12)

The recommendations are concurred in, except as to the best type of accompanying gun. In my opinion, the question as to what is the best type of gun for this work is not yer definitely settled. See discussion of paragraph 46 of the report of the board, (Par. 16 of this indorsement).

6. Corps Artillery.

While there is considerable unanimity of opinion among our artillery officers in regard to what may be called "organic" Divisional rtillery, there is much greater diversity of views as to organic Corps Artillery. This is quite reasonable, because we have had in reality but on bbrigade of Corps Artillery (the 66th F. A. Brigade, 155 mm. G. P. F.s) which has any considerable amount of experience -- some Army Artillery Brigades were temporarily attached to Corps -- only one other Corps Artillery Brigade (the 151st F. A.) got into the line a few

days before the armistice and it was not in an offensive operation. So we have not had a great amount of actual experience with Corps Artillery proper. Depending largely it seems, upon their personal experiences, recommendations are made by artillery officers that the following types should be assigned to Corps: the 4."7 and the 155 mm. G. P. F. guns, and the 155 mm. and the 8" Howitzers. A considerable number of officers think there is no necessity for the 4."7 gun - that the 75 mm. and the 155 mm. guns fully cover the field. In my opinion this gap is too great - there is a field for the use of some such caliber as the 4."7 gun for tasks beyond the power and range of the 75 mm. and in which the 155 G. P. F. can not be economically used. There are many cases of interdiction, harassing and retaliatory fire where the 4."7 gun will do the work just as well as the 155 mm. G. P. F. and at an immense saving in weight and expenditure of ammunition. I therefore concur in the recommendation of the board that the Corps Artillery should include one regiment of 4."7 guns.

As to the assignment of howitzers: - the Board has recommended a howitzer o smaller caliber than the 155 mm. for the Divisional Artillery. In this recommendation I have concurred. The Corps Artillery has the counterbattery work to do. The 155 mm. Howitzer is an excellent weapon for this purpose, but with no 155 mm. Howitzer in the Divisional Artillery one regiment is not enough for the Corps. I recommend two regiments instead of one. We must have enough howitzers to do the counterbattery work. In our campaigns on the Western Front, the Divisional Artillery was called upon to do much of it. If we reduce the caliber of the Divisional Howitzer, it is all the more necessary that the Corps Artillery be strengthened in howitzers. Some of our artillery officers whose ability and experience entitle their views to great consideration believe that one of these regiments should be armed with an 8" Howitzer of longer range than the one we now have. This idea should be given further study before a final decision is reached.

As to whether or not there should be assigned to the Corps Artillery, in addition to one regiment of 4."7 guns and two regiments of Howitzers, also a regiment of 194 mm. G. P. F. guns, opinions are not unanimous. The majority of artillery officers who have had experience with this gun or who have had opportunity to observe its work are in favor of the assignment. In a letter to the C. - in - C., dated October 8, 1918, on "Artillery Building Plan and Organization", Major General Lassiter, then Chief of Artillery, 4th Army Corps, later Chief of Artillery of the 2nd Army, A. E. F., favors the assignment of the 155 mm. G.P.F. gun to the Corps. Major General McGlachlin, Chief of Artillery of the 1st Army, in forwarding General Lassiter's paper on October 11th, says on this point: "I think the 155 mm. G. P. F.'s are not suitable organic Corps guns. They are too good at harassing, prohibitive and retaliatory fire at long ranges and over broad fronts to be given over to corps for counterbattery work. In such general engagements as are now in progress they can be most effectively and economically used as Army guns. When operations special to a Corps are undertaken they can be loaned to it on the principle that the responsible agent should have all the means at his disposal."

A copy of these papers is enclosed - Annex 15.

In writing this in October last, General McGlachlin had in mind, of course, the conditions existing at that time on the Western Front__ a continuous line from Switzerland to the North Sea, a very limited supply of the G. P. F.s available to us at that date, and tremendous concentrations necessary to break through the strongly fortified German lines, --- also the G. P. F. was not very mobile on poor roads or off the roads with the tractors then available, so that it was not as mobile as the ideal Corps Artillery gun should be -- the latest caterpillar tractors have largely overcome this difficulty. It is doubtful whether these conditions will ever be met again in the near future in our most probable theatres of operations. Of course, we can not foresee the possibilities as to where we may have to operate, but on the American continent at least, it seems almost a certainty that there will be more of open warfare than we have had in Europe in this war. We can not have a continuous line from ocean to ocean. Attempts to reach and envelop the opposing flanks will result in a lengthening and thinning of the lines on each side. The lines will be less strongly fortified -- the opposition to be overcome will not require such dense Artillery

concentrations. We now have or soon will have a large supply of G.P.F.s, and with the Caterpillar-tractor they are much more mobile on poor roads and in roadless terrain, such as is generally found on the American continent. We should of course, have a strong General Artillery Reserve of all calibers, but in a more open warfare it will be more difficult to send artillery reinforcements from this Reserve to the Corps Artillery. The latter should therefore be made organically stronger, more independent than was necessary in our fighting on the Western Front.

In every instance during our recent offensives where strong opposition has to be overcome, more artillery than that contemplated above has been needed for the work of the Corps. And it will doubtless be so in future. I therefore believe that a regiment of 155 mm. G. P. F. guns should be a part of the Corps Artillery.

My recommendation is therefore that the Corps Artillery Brigade should consist of four regiments: One of 4."7 guns, one of 155 mm. G. P. F. guns, and two regiments of 155 mm. Howitzers. There is in my opinion no objection to this brigade of four regiments on account of its size. The brigade commanders can readily direct the work of four Corps Artillery units -- They did more than that in the Chateau-Thierry, St. Mihiel, and Meuse-Argonne campaigns -- even in the Divisional Artillery, where the question of size of the command presents greater difficulties.

7. General Artillery Reserve. (See "Motorized Heavy Artillery", pars. 9 and 10, page 9, and "General Artillery Reserve", pars. 17 and 18, pages 13 to 15).

Recommendations concurred in, except that the brigades should consist of three regiments as in the case of the Divisional Artillery. While these are large regiments, requiring an immense amount of materiel, the burden of administration and supply, except as to ammunition, falls mainly upon the regimental officers, and it is believed that the supervision and tactical handling of three regiments can readily be performed by the brigade commander and his staff.

I regard this question of the organization of a General Artillery Reserve as of vital importance in any future war. The decision as to what the organic Corps Artillery should be is of relatively slight moment if we have a sufficient reserve to throw in whenever needed.

Had this war continued a few months longer, it is believed that the impracticability of handling our Army Artillery as it was organized would have compelled us to make a change in that organization. Gen. McGlachlin, Gen. Lassiter, who was Chief of Artillery of the 2nd Army, Gen. Aultman, who succeeded Gen. Lassiter as Chief of Artillery of the 2nd Army; Gen. Callan, who was for a time Chief of Staff of the 1st Army Artillery, and Gen. Kilbreth, who succeeded Gen. Callan as Chief of Staff of the 1st Army Artillery, all agree that the principle of having a small tactical staff only for the Army Artillery is correct, the General Reserve to furnish the units as may be required.

III. ARMAMENT.
(Pars. 11 to 19, pages 10 to 15).

8. I concur in the recommendations of the Board as to the general types of armament. The special board referred to in paragraph 11, as how making a study of armament, calibers and types of materiel to be assigned to a field army, is the board of Field and Coast Artillery officers recently convened at these headquarters by a War Department order, - Brigadier General William I. estervelt, president of the Board.

The recommendations as to the General Artillery Reserve, paragraph 17, page 13, are believed to be sound and of paramount importance in any future organization of field armies.

IV. STAFFS.
(Pars. 20 to 24, pages 15 to 20.)

9. Recommendations of the board are concurred in. With reference to paragraphs 17 (General Artillery Reserve) and 21 (Army Artillery Staff), Major General McGlachlin, who commanded the Army Artillery of the 1st Army, A. E. F., during all of its actual fighting, and who has had therefore more experience in this particular line than any other general officer of the A. E. F., in conversation with me on February 18th last, expressed himself as unqualifiedly in accord with the views of the board as to the desirability of having a General Artillery Reserve -- no organic Army Artillery -- and, in consequence, a comparatively small tactical staff for the Army Artillery.

V. EQUIPMENT.
(Pars. 25 to 30, pages 20 to 22).

10. Attention is invited to the detailed recommendations, - Annex 5. I concur in the general recommendations of the board. (See also par. 7, above).

VI. COMMUNICATION OFFICERS AND DETACHMENTS.
(Pars. 31 to 32, pages 22 and 23).

11. Recommendations of board concurred in.

VII. MOTOR TRANSPORT AND TRACTOR-DRAWN GUNS.
(Pars. 33 to 38, pages 23 to 25).

12. Recommendations of board concurred in. Attention is invited especially to paragraph 38. It is believed that experiments along these lines should be pushed with the greatest energy.

VIII. AERIAL OBSERVATION, F. R. S. AND S. R. S.
Pars. 39 to 43, pages 25 to 27).

13. It is recognized by both the Artillery and the Air Service that aeriel observation was most unsatisfactory. We began by furnishing commissioned aerial observers from the Artillery to the Air Service to be trained as observers. For some cause or other we did not get proper results, and by July, 1918, the situation in the A. E. F. was so unsatisfactory that it was felt that some corrective measures must at once be taken to improve the situation. A study of proposed remedies was made by G-5, G-3, the Office of the Chief of the Air Service and by this Office. As a result of the study made in this Office, the Chief of Artillery, A. E. F., on July 25, 1918, submitted the following:

"It is therefore recommended:

(a) That the aerial observers be commissioned in the Air Service and that they be placed on a footing of absolute equality with other officers of that service as regards command, promotion and pay.

(b) That special schools be established for the exclusive purpose of training observers in aerial observation of Artillery fire.

(c) That the Air Service be then held rigidly responsible for furnishing satisfactory aerial observation for the artillery."

The Chief of the Air Service concurred in those recommendations, the Commander-in-Chief approved them and cabled them to the War Department (Cable #1573-S, August 8, 1918), requesting approval. This was given in Cable #1905-R, September 3, 1918. It required time to put into effect the new system, and the armistice was signed before it had been

satisfactorily tested -- really before it had begun to operate practically. We must consequently form our conclusions largely from a theoretical study of the matter.

The views of the board are, of course, those arrived at from the Artillery viewpoint. The viewpoint of the Air Service should also be considered. The Infantry are likewise interested. It seems therefore that in view of the importance of the question, and in order to reach authoritative conclusions, a War Department Board consisting of officers of Artillery, Infantry, and the Air Service who have had wide experience in actual service in the A. E. F. should be appointed to make a thorough study of it and to submit recommendations thereon.

The results of the studies of G-3, G-5, this Office, and that of the Chief of the Air Service are inclosed - Annex 16.

It is believed that the difficulty lies not so much in the detail of observers from the Artillery or from the Air Service, but in the lack of a sympathetic understanding on the part of both services as to what their mutual relations should be. This is a matter primarily of laying down correct principles; in the next place, of proper training - the thorough grounding of the personnel of both services in a knowledge of those principles, and of the vital necessity for teamwork. It seems that the personnel of the Air Service did not in general realize that their primary duty is that of observation -- the gathering and furnishing information to the ground units. To do this it is indispensable to use fighting planes - but the fighting is incidental. If they destroy the enemy planes and balloons they thereby prevent the enemy Air Service from obtaining information to be used against us, but this is not enough - information of the enemy is above all our greatest need. The making of "aces" has been lauded too much - the work of observers not enough.

14. I concur in the recommendations of the board in regard to the Flash Ranging and Sound Ranging Services, except that I would make the F. R. S. a Corps Agency. (Pars. 42 and 43,- See also especially the views of Gen. Aultman, Gen. Bowley, The Center of Artillery Studies, and Gen. Summerall in Annex S.)

IX. LIAISON AND LIAISON OFFICERS.
(Pars. 44 and 45, pages 27 and 28).

15. Recommendations concurred in.

X. ACCOMPANYING GUNS AND BATTERIES.
(Pars. 46 to 48, pages 28 and 29.)

16. The 75 mm. gun has not been a success as an accompanying gun. See the reports of about 50 officers contained in Annex 10. A considerable number of officers favor the use of the 2."95 Mountain Gun for this purpose. The 37 mm. has not done the work expected of it, and it is doubtful whether a gun manned by infantry personnel will ever be satisfactory. I believe that is is an Artillery manner. The probable solution of this question I believe to lie in developing and perfecting the tank. That solution has not been reached, however, at the present time, pending the development of the tank, which should be continued energetically, we must find a present solution. With the organization of our Divisional Artillery as it now exists, there is a marked and dangerous tendency to fritter away its strength by setting aside guns for this special purpose. Provision for it must be made therefore by the addition of a certain number of pieces, which are intended primarily for this specific purpose, and which are suitable therefor. When not needed for this duty, other work should of course be given them, so they will not remain in idleness.

For this reason I concur in the recommendation of the board contained in paragraph 48. Generally, this Artillery should not be "packed", but the guns should be mule-drawn, supplies of all kinds transported by trucks. "Packs" should be used only in very mountainous or roadless terrain. Pack Artillery requires an immense number of animals, and hence much forage.

The Italians have recently designed a gun which appears to be well suited to this purpose. The Westervelt Board was very favorably impressed with it. Setps are being taken to procure two of them, with a view to making a thorough test in the U. S. The gun possesses approximately the following characteristics:

"Caliber, 7 c.m.
Weight of projectile, 3 kilos,
High explosive charge, in excess of 30 ounces, (that is to say, a greater H.E. charge than that contained in the high capacity, high explosive shell of the 75 mm. field gun).
Range, 2000 meters.
The cannon, including carriage, (wheeled mount) weighs approximately 275 pounds, and breaks into four loads of approximately 70 pounds each."

XI. PLACING OF ARTILLERY UNDER COMMAND OF SUBORDINATE INFANTRY COMMANDERS. (Par. 49, page 29).

17. It is quite evident from many reports received (See Annex 11) that the spirit of paragraphs 11, 12 and 13, "Combat Instructions" issued from G. H. Q., A. E. F., September 5, 1918, has not only been misunderstood by many infantry commanders, including some Division Commanders, but the instructions contained in paragraph 14 thereof, in many cases, have been wholly ignored, thereby unnecessarily dissipating the strength of the Divisional Artillery and reducing its efficiency. This erroneous practice should be corrected promptly.

The correct view of this question is so clearly set forth by General Summerall (page 8, Annex 11) and it is of such vital importance that both the Artillery and Infantry should clearly understand the matter, that it seems advisable to quote his views in the body of this indorsement:-

"Units of artillery must always be under the command of the Commanding Officers of assaulting battalions to the extent that they can call for the fire of these units and their call takes precedence over all other missions. To this extent these officers must command the batteries, battalions, regiments, or brigades designated to supply their needs. Further than this the command over artillery by infantry officers need not and should not extend. It is the duty of the artillery to place these designated units where they can do all tasks in the interest of the Infantry. The Infantry commanding officer is already overloaded with duties and he has neither the desire nor the time to exercise any further command over the artillery than to call for the fire, which he has a right to expect. Even in this he must be mainly dependent upon the artillery liaison officer with him, who not only responds to the call of the infantry commanding officer, but who must anticipate this call by seeking our and discovering targets for the artillery and suggesting to the infantry commanding officer the employment of his guns against these targets. Proper understanding will simplify and clarify the functioning of artillery under infantry commands."-

I fully concur in this, and in the views of the board, paragraph 49.

XII. AMMUNITION TRAIN AND MOBILE ORDNANCE REPAIR SHOP. (Pars. 50 and 51, page 30).

18. I concur in the recommendations of the Board.

Attention is invited to the views of Generals Babbitt, Bowley and Fleming in Annex 12, particularly to the first paragraph and the Note of General Babbitt on page 2, in which I fully concur.

XIII. TRENCH MORTAR BATTERIES.
(Pars. 52 and 53, page 31.)

19. I concur in the recommendations of the Board. These are not very definite, and in my opinion definite decision as to organization and number of organizations should await further development of motorized materiel of much greater mobility and of greater range. This study should be undertaken and pushed to a conclusion now while the questions are fresh in the minds of Trench Artillery officers- it is believed that rapid progress would be made.

XIV. SCHOOLS AND TRAINING.
(Pars. 54 to 58, pages 31 to 35).

20. Detailed recommendations can not be made on this subject until we know what the national policy in regard to our military forces is to be. When Congress has fixed upon that policy, the whole question should and doubtless will be carefully studied with a view to fitting to our new conditions a system based upon our experiences in the A. E. F. With the report of the Chief of Artillery, A. E. F., there will be submitted the reports of all of our Directors of Instruction at the Divisional Training Camps, the Centers of Organization and Training, and the Artillery Schools of the A. E. F.

A study of these in connection with the reports of our operations in the Chateau-Thierry, St. Mihiel, and Meuse-Argonne campaigns, showing our shortcomings in respect to training, should enable us to devise a system of schools and training which will be highly satisfactory.

I concur in the general scheme recommended by the board.

ERNEST HINDS
Major General,
Chief of Artillery, A. E. F.

ssm

2 Inclosures to this Indorsement. - Annexes Nos. 15 and 16.

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1 Nov 1981

SUMMARY OF CONTENTS

OF

A REPORT OF A BOARD OF OFFICERS

ON

ARTILLERY QUESTIONS

BASED UPON

EXPERIENCES OF ARTILLERY OFFICERS

OF THE AMERICAN EXPEDITIONARY FORCES.

- - - - - - - - - - - - - - - - - - -

C. of A.
E.H.

Office, Chief of Artillery, A. E. F.

March 27, 1919.

From: Chief of Artillery, A. E. F.

To : Chief of Staff, A. E. F.

Subj: Report of a Board of Officers appointed to make a study of the experience gained by the Artillery of the A. E. F. and to submit recommendations based thereon.

1. There is transmitted herewith the report on this subject submitted by a Board of Officers convened in this Office by an Office Memorandum of this Office, dated December 9th last.

2. It is believed that this report is of such value that it should be forwarded to the War Department for consideration in connection with the study of the future organization, armament, equipment and training of the Field Artillery. It will be of great value for use in connection with the Report of the Westervelt Board - the two reports are complementary.

In order to make it available to the War Department authorities without delay so that their studies thereof may be pursued simultaneously with ours in the A. E. F., and that it may be available also in connection with that of the Westervelt Board, I am transmitting herewith an additional copy for that purpose.

It is believed that G-3 has probably a greater interest in this report than the other sections of the General Staff at these headquarters, and in order that that section may have uninterrupted use of this copy the retained office copy of the report will be loaned by this Office to G-4 and G-5 for such study as these sections may desire to make of it.

3. The value of the report consists not only in the views and recommendations of the board, but to a still greater degree in those of a great number of our ablest and most experienced artillery officers, which are collated and classified in the various Annexes to the report, and which are therefore available in permanent for future study of the many questions covered by them. From these the War Department authorities can draw their own conclusions which may or may not agree with those of the Board. The conclusions drawn from these experiences by officers who study them will vary with the weight assigned by them to the views of the various officers quoted. While there is a general agreement in regard to most of the questions considered, the views differ widely on certain points. This is due, of course, to the fact that our views depend largely upon own personal experiences which are generally the result of local conditions of limited application and which are rarely reproduced elsewhere. Generally I have concurred in the views of the Board, but in some most important points I do not think their conclusions are justified.

4. My recommendations are submitted in the form of an indorsement in which the various subjects are considered in the order in which they appear in the Report.

ERNEST HINDS,
Chief of Artillery, A. E. F.

Enclosures.

1. Action of the Chief of Artillery, A. E. F. on the Report of the Board . . . . . 1st Indorsement. Annex 15 Annex 16.

(Reference to Annexes 15 and 16 made under subjects in question in summary of report of Board given below).

2. Report of Board which met in Office of the Chief of Artillery, G. H. Q., on December 9, 1919 . . . . . page 1.

Detail for the Board:

Brigadier General Andrew Hero, Jr., U.S.A.
Brigadier General John W. Kilbreth, Jr., U.S.A.
Lieutenant Colonel, Curtis H. Nance, Field Artillery.

Outline of the different methods pursued in obtaining all information available for consideration by the Board, including list of of organizations visited for personal conferences . . . . . Pages 1 - 2. Exhibit "A".

Letter (Exhibit "A") sent to all officers who have commanded artillery brigades, artillery regiments, trains or schools in Franch, for expression of views on the artillery subjects enumerated below. Extracts of recommendations received in reply thereto from these officers are embodied in Annexes 1 to 14, attached.

After the dissolution of the Board many replies to letter (Exhibit "A") were received from different artillery officers, and extracts of their recommendations have been added to the respective Annexes, with reference to the subject considered, in the form of an "Addendum to the Annex" concerned.

SUBJECTS CONSIDERED AND RECOMMENDATIONS OF THE BOARD.

1. GENERAL ORGANIZATION . . . . . Page 3 Annex 1 Addendum to Annex 1.

Future relation of Field Artillery and the Coast Artillery Corps . . . . . .Pars. 1 - 2.

LIST OF OFFICERS WHOSE VIEWS ARE QUOTED IN ANNEX 1.

Name	Rank	Organization	Page of Annex.
Aultman, D. E.,	Brigadier General	Army Artillery, 2nd Army.	1
Babbitt, E. B.,	Brigadier General	4th Field Artillery Brigade.	1
Bailey, C. J.,	Major General	81st Division.	2
Bishop, H. G.,	Brigadier General	3rd Field Artillery Brigade.	3
Bowley, A. J.,	Brigadier General	6th Corps Artillery.	3
Butner, H. W.,	Brigadier General	1st Field Artillery Brigade.	3
Callan, R. H.,	Brigadier General	33rd Artillery Brigade.	3
Campbell, Tilman	Colonel	329th Field Artillery.	4

(Summary of Contents - Page 1).

Name	Rank	Organization	Annex.
Conklin, A. S.,	Colonel	303rd Field Artillery.	4
Cox, A. L.,	Colonel	113th Field Artillery.	4
Cronkhite, A.	Major General	6th Corps Artillery.	5
Deems, Clarence,	Colonel	57th Field Artillery Brigade.	5
Dodds, W. H., Jr.,	Colonel	6th Field Artillery.	5
Doyle, P. C.,	Colonel	305th Field Artillery.	5
Davis, R. P.,	Brigadier General	151st Field Artillery Brigade.	6
Dunlap, R. H.,	Colonel	17th Field Artillery.	6
Haynes, Ira A.,	Brigadier General	64th Field Artillery Brigade.	6
Hinds, Ernest,	Major General	Chief of Artillery, A. E. F.	6
Horn, T. N.,	Brigadier General	7th Brigade.	7
Kennedy, J. T.,	Lieutenant Colonel	5th Field Artillery.	7
McIntyre, A.,	Brigadier General	154th Brigade.	8
McKell, D.,	Colonel	12th Field Artillery.	8
McMaster, R. H.,	Colonel	21st Field Artillery.	8
Platt, W. R.,	Colonel	302d Field Artillery.	8
Smith, W. R.,	Major General	36th Division.	8
Stepford, F. W.,	Colonel	80th Field Artillery.	8
Summerall, C. P.,	Major General	5th Corps.	9
Todd, W. H., Jr.,	Brigadier General	58th Brigade.	10
Walker, J. F.,	Colonel	314th Field Artillery.	10
Wertenbaker, G. L.,	Colonel	345th Field Artillery.	10
Winn, C. D.,	Colonel	306th Field Artillery.	11
Worcester, P. H.,	Colonel	146th Field Artillery.	11 - 12

INDEX
ADDENDUM TO ANNEX 1.

			Page of Addendum.
Glassford, P. D.,	Brigadier General	51st Field Artillery Brigade	1
Hearn, C. C.,	Brigadier General	153rd F. A. Brigade	1
Price, W. G., Jr.,	Brigadier General	53rd F. A. Brigade	1

II. DETAILS OF ORGANIZATION . . . . . (Pages 3 - 9.
(Annex 15
(Exhibit "B"
(Annex 2.

Divisional Field Artillery.

The Battery . . . . . Par. 3

The Battalion . . . . . Par. 4
Battalion Staff.

The Regiment . . . . . Par. 5
Headquarters Company
Combat Trains
Regimental Staff.

The Brigade . . . . . Par. 6
Brigade Staff
T. of O. for Brigade Headquarters

Heavy Field Artillery.

The Battery, Battalion and Regiment . . . . . Par. 7

(Summary of Contents - Page 2)

The Brigade . . . . . Par. 8
Brigade Staff . . . . . Par. 8

Annex 15, comprises a report - Artillery Building plan and organization - from the Chief of Artillery, 4th Corps (Major General William Lassiter - who commanded a Corps Artillery Brigade from May to October 1918) to the C. in C., based upon recent operations, dated October 8th, 1918 . . . . . Page of Annex 1-5

The Chief of Artillery, 1st Army, (Major General E. F. McGlachlin, Jr.) in forwarding the above report also submitted his opinions in this matter, which differed in some respects 6-8

Motorized Heavy Artillery.

The organization of different units, including tractor drawn brigades . . . . . Pars. 9-10.

Exhibit "B" covers the proceedings and recommendations of a Heavy Artillery Board upon the organization and equipment for:

	Paper No.
155 G. P. F. Regiment	1
8-in. Howitzer regiment	2
9.2-in. Howitzer Regiment	3
Brigade Headquarters, Motorized Heavy Artillery . . .	4
Army Artillery Park	5
Ammunition Train, Heavy Artillery	6

LIST OF OFFICERS WHOSE VIEWS ARE QUOTED IN ANNEX 2.

Name	Rank	Organization	Page of Annex.
Aultman, D. E.,	Brigadier General	Army Artillery, 2nd Army	1
Babbitt, E. B.,	Brigadier General	4th F. A. Brigade	1
Bishop, H. G.,	Brigadier General	3rd F. A. Brigade	2
Bowley, A. J.,	Brigadier General	6th Corps Artillery	2
Bryson, J. H.,	Brigadier General	155th F. A. Brigade	3
Butner, H. W.,	Brigadier General	1st F. A. Brigade	3
Campbell, Tilman,	Colonel	329th Field Artillery	4
Conklin, A. S.,	Colonel	803rd Field Artillery	5
Cox, A. I.,	Colonel	113th Field Artillery	6
Center of Artillery Studies (Army)			4
Davis, R. P.,	Brigadier General	153rd F. A. Brigade	6
Deems, C. J.,	Colonel	57th F. A. Brigade	6
Dodds, W. H.,	Colonel	6th Field Artillery	7
Doyle, F. C.,	Colonel	305th Field Artillery	7
Fleming, A. S.,	Brigadier General	158th F. A. Brigade	8
Gilmore, Q. A.,	Colonel	112th Field Artillery	8
Greble, E. St. J.,	Colonel	76th Field Artillery	10
Haynes, I. A.,	Brigadier General	64th Field Artillery Brigade	10
Horne, T. N.,	Brigadier General	7th Field Artillery Brigade	10
Kennedy, J. T.,	Lieutenant Colonel	2d Field Artillery	11
Lassiter, William	Major General	32d Division	11
Lloyd, C. H.,	Colonel	10th Field Artillery	11
McIntyre, A.,	Brigadier General	154th Field Artillery Brigade	12

(Summary of Contents - Page 3)

Name	Rank	Organization	Annex.
Millar, E. A.,	Brigadier General	6th Field Artillery Brigade	13
Mack, J. A.,	Colonel	102nd Field Artillery	13
McMaster, R. N.,	Colonel	21st Field Artillery	16
Platt, W. P.,	Colonel	303rd Field Artillery	14
Pratt, R. S.,	Colonel	18th Field Artillery	14
Rucker, W. H.,	Lieutenant Colonel	16th Field Artillery	14
Summerall, C. P.,	Major General	5th Corps	15
Stepford, P. F.,	Colonel	80th Field Artillery	15
Walker, J. F.,	Colonel	314th Field Artillery	15
Wertermaker, G. L.,	Colonel	345th Field Artillery	15
Winn, C. D., -	Colonel	306th Field Artillery	15

INDEX ADDENDUM TO ANNEX 2.

			Page of Addendum.
Anderson, J. F.,	Lieutenant Colonel	10th Field Artillery	2
Bunker, C. M.,	Colonel	308th Field Artillery	3
Burr, Edward	Brigadier General	62nd Field Artiller Brigade	3
Bush, H. M.,	Colonel	134th Field Artillery	4
Davis, J. R.,	Colonel	15th Field Artillery	5
Hearn, C. C.,	Brigadier General	153rd Field Artillery Brigade	7
Henderson, A. I.,	Captain	7th Field Artillery	8
McVicker, Lansing,	1st Lieutenant	7th Field Artillery	9
Price, W. G., Jr.,	Brigadier General	53rd Field Artillery Brigade	9
Sarratt, E. O.,	Colonel	309th Field Artillery	9
Verbeck, G. F.,	Lieutenant Colonel	106th Field Artillery	10
Wingate, G. A.,	Brigadier General	52nd F. A. Brigade	10

III. ARMAMENT . . . . . Pages 10-15.
Annex 3.
Addendum to Annex 3.

General types of armament to be employed. List of types of guns and howitzers classed as "Field Artillery", and those classed as "Seacoast (Heavy) Artillery" . . . . Pars. 11-12.

Distribution.

Divisional Artillery.

Number and caliber of guns and howitzers for a Brigade. Organizations with armament of each to compose a Field Artillery Brigade to be assigned to each Division. This brigade to include also an Ammunition Train and Mobile Ordnance Repair Shop, but no Trench Mortar Battery . . . . . Pars. 13-14.

Corps Artillery.

Caliber of guns and armament of organizations composing a Heavy Field Artillery Brigade to be assigned to each Corps. Special duties of Brigade Commander and staff of the Heavy Field Artillery Brigade. Re Corps Artillery Park . . . . . Pars. 15-16.

(Summary of Contents - Page 4)

General Artillery Reserve.

Composition and functions of the General Artillery Reserve. Detail list of armaments of units from this reserve necessary for special tactical purposes . . . . . Pars. 17-18.

Re armament and assignment of Batteries and Battalions of anti-aircraft artillery of this reserve . . . . . Par. 19.

LIST OF OFFICERS WHOSE VIEWS ARE QUOTED IN ANNEX 3.

Name	Rank	Organization	Annex.
Autlman, D. E.,	Brigadier General	Army Artillery, 2nd Army	3
Abernathy, R. S.	Colonel	165th Field Artillery	1
Babbitt, E. B.,	Brigadier General	4th Field Artillery Brigade	3
Bowley, A. J.,	Brigadier General	6th Corps Artillery	5
Butner, H. W.,	Brigadier General	1st Field Artillery Brigade	5
Berry, H. S.,	Colonel	115th Field Artillery	4
Cox, A. L.,	Colonel	113th Field Artillery	6
Center of Artillery Studies (Army)			6
Davis, R. P.,	Brigadier General	151st Field Artillery Brigade	6
Deems, C. J.,	Colonel	57th Field Artillery Brigade	7
Dodds, W. H.,	Colonel	6th Field Artillery	7
Doyle, F. G.,	Colonel	305th Field Artillery	7
Dunlap, R. H.,	Colonel	17th Field Artillery	7
Fleming, A. S.,	Brigadier General	156th Field Artillery Brigade	7-13
Gatley, G. G.,	Brigadier General	67th Field Artillery Brigade	8
Gilmore, Q. A.,	Colonel	112th Field Artillery	8
Greble, C. St. J.,	Colonel	76th Field Artillery	8
Horn, T. M.,	Brigadier General	7th Field Artillery Brigade	9
Kennedy, J. T.,	Lieutenant Colonel	5th Field Artillery	9
Lloyd, C. R.,	Colonel	10th Field Artillery	9
McIntyre, A.,	Brigadier General	154th Field Artillery Brigade	9
Millar, E. A.,	Brigadier General	6th Field Artillery Brigade	10
Mack, J. A.,	Colonel	102nd Field Artillery	10
McKell, D.,	Colonel	12th Field Artillery	10
McMaster, R. H.,	Colonel	21st Field Artillery	13
Platt, W. P.,	Colonel	303rd Field Artillery	10
Rucker, W. H.,	Lieutenant Colonel	16th Field Artillery	11
Summerall, G. P.,	Major General	5th Corps	12
Todd, H. D., Jr.,	Brigadier General	58th Field Artillery Brigade	12
Werternbker, G. L.,	Colonel	345th Field Artillery	12

INDEX ADDENDUM TO ANNEX 3.

Name	Rank	Organization	Annex.
Bunker, C. A.,	Colonel	308th Field Artillery	1
Burr, Edw.	Brigadier General	62nd Field Artillery Brigade	1
Glassford, P. D.,	Brigadier General	51st Field Artillery Brigade	2
Price, W. G., Jr.,	Brigadier General	53rd Field Artillery Brigade	2
Verbeck, G. F.,	Lieutenant Colonel	108th Field Artillery	2
Wingate, G. A.,	Brigadier General	52nd Field Artillery Brigade	2

(Summary of Contents - Page 5)

IV. STAFFS . . . . . Pages 15-20
Annex 4.
Addendum to Annex 4.

Battalion, Regimental and Brigade staffs, considered in "II - Details of Organization."

Chief of Artillery, Corps. Duties and proposed organization of the staff of the Artillery Section, Headquarters of an Army Corps . . . . . Par. 20.

Army Artillery Headquarters. Detailed proposed staff organization of the Chief of Artillery of an Army, who will perform purely tactical functions and will not be called upon to perform administrative duties . . . . . Par. 21.

General Artillery Reserve. Proposed staff giving number of officers required and general nature of duties. Not deemed likely in the U. S. in ordinary times of peace, but is based upon mobilization for war . . . . . Par. 23.

Staff proposed for the Chief of each branch of the General Artillery Reserve that would be centrally located with respect to area in which the Branch may be mobilized, for the purpose of developing the maximum efficiency in the respective branches. That is, there would be under the Commander of the General Artillery Reserve a Chief of each of the following -- Field Artillery Section, Heavy Artillery Section, Railway Artillery Section, Trench Artillery Section and Anti-Aircraft Artillery Section, -- who would have headquarters and staff in the mobilization areas of their respective branches . . . . . Pars. 21-25.

In connection with the General Artillery Reserve attention is invited to particular recommendation for the organization of this staff by Major General William Lassiter and approval of Major General E. J. McGlachlin, Jr., - Pages 5 and 7 respectively of Annex 15.

And also, in this respect, to statement made by Major General McGlachlin to the Chief of Artillery, A. E. F., that there should be no organic army artillery. - Page 8, Annex 15.

LIST OF OFFICERS WHOSE VIEWS ARE QUOTED IN ANNEX 4.

Name	Rank	Organization	Page of Annex.
Autlman, D. E.,	Brigadier General	Army Artillery, 2nd Army	2
Abernathy, R. S.	Colonel	165th Field Artillery	1
Babbitt, E. B.,	Brigadier General	4th Field Artillery Brigade	2
Bishop, H. G.,	Brigadier General	3rd Field Artillery Brigade	3
Bowley, A. J.,	Brigadier General	6th Corps Artillery	3
Butner, H. W.,	Brigadier General	1st Field Artillery Brigade	3
Conklin, A. S.,	Colonel	303rd Field Artillery	4
Cos, A. L.,	Colonel	113th Field Artillery	5

(Summary of Contents - Page 6)

Name	Rank	Organization	Page of Annex.
Center of Artillery Studies, Army,			4
Dodds, W. H.,	Colonel	6th Field Artillery	5
Doyle, F. C.,	Colonel	305th Field Artillery	6
Fleming, A. S.,	Brigadier General	156th Field Artillery Brigade	7
Greble, C. St. J.,	Colonel	76th Field Artillery	8
Haynes, I. A.,	Brigadier General	64th Field Artillery Brigade	9
Horn, T. N.,	Brigadier General	7th Field Artillery Brigade	10
Johnson, R. D.,	Lieutenant Colonel	18th Field Artillery	10
Kennedy, J. T.,	Lieutenant Colonel	5th Field Artillery	10
Lassiter, William	Major General	32nd Division	10
Lloyd, C. R.,	Colonel	10th Field Artillery	10
Mack, J. A.,	Colonel	102nd Field Artillery	11
McKell, D.,	Colonel	12th Field Artillery	11
Reinhart, W. E.	Major	Feld Artillery	12
Smith, W. R.,	Major General	36th Division	13
Summerall, G. P.,	Major General	5th Corps	13
Selleck C. A.,	Lieutenant Colonel	Field Artillery	13
Todd, H. D., Jr.,	Brigadier General	58th Field Artillery Brigade	14
Werternbker, G. L.,	Colonel	345th Field Artillery	14

INDEX ADDENDUM TO ANNEX 4.

Name	Rank	Organization	Annex.
Burr, Edw.	Brigadier General	62nd Field Artillery Brigade	1
Davis, J. R.,	Colonel	15th Field Artillery	1
Fisher, A. G.,	Colonel	307th Field Artillery	1
Hearn, C. C.,	Brigadier General	153rd Field Artillery Brigade	1
Price, W. G., Jr.,	Brigadier General	53rd Field Artillery Brigade	2
Wingate, G. A.,	Brigadier General	52nd Field Artillery Brigade	2

V. EQUIPMENT . . . . . Pages 20-22.
Annex 5.
Addendum to Annex 5.

Many different views found to exist on this subject. The annex contains these reports, some very detailed, and some of a general nature . . . . . Par. 25.

Recommendations of the Board upon this matter:
Ordnance . . . . . Pars. 26-27.

Quartermaster . . . . . Par. 28.

Signal . . . . . Par. 29.

Motor Transportation . . . . . Par. 30.

(Summary of Contents - Page 7)

LIST OF OFFICERS WHOSE VIEWS ARE QUOTED IN ANNEX 5.

Name	Rank	Organization	Page of Annex.
Abernathy, R. S.	Colonel	165th Field Artillery	1
Babbitt, E. B.,	Brigadier General	4th Field Artillery Brigade	1
Bishop, H. G.,	Brigadier General	3rd Field Artillery Brigade	2
Bowley, A. J.,	Brigadier General	6th Corps Artillery	2
Butner, H. W.,	Brigadier General	1st Field Artillery Brigade	2
Campbell, Tilman,	Colonel	329th Field Artillery	3
Conklin, A. S., -	Colonel	303rd Field Artillery	3
Cox, A. L.,	Colonel	115th Field Artillery	4
Center of Artillery Studies (Army)			3
Davis, R. P.,	Brigadier General	151st Field Artillery Brigade	4
Dodds, W. H.,	Colonel	6th Field Artillery	4
Doyle, F. A.,	Colonel	305th Field Artillery	5
Dunlap, R. J.,	Colonel	17th Field Artillery	6
Gillmore, Q. A.	Colonel	112th Field Artillery	6
Greble, B. St., J.,	Colonel	76th Field Artillery	7
Horn, T. N.,	Brigadier General	7th Field Artillery Brigade	7
Johnson, R. D.,	Lieutenant Colonel	18th Field Artillery	7
Kennedy, J. T.,	Lieutenant Colonel	5th Field Artillery	8
Lloyd, G. R.,	Colonel	10th Field Artillery	8
Mack, J. A.,	Colonel	102nd Field Artillery	8
McKell, D.,	Colonel	12th Field Artillery	8
McMaster, R. H.,	Colonel	21st Field Artillery	15
Mitchell, P. L.,	Colonel	156th Field Artillery	9
Mehard, C. B.,	Lieutenant Colonel	521st Field Artillery	9
Owen, A.,	Colonel	141st Field Artillery	11
Platt, W. P.,	Colonel	503rd Field Artillery	11
Peck, W. H.,	Lieutenant Colonel	306th Field Artillery	12
Rucker, W. H.,	Lieutenant Colonel	16th Field Artillery	12
Summerall, C. P.,	Major General	5th Corps	13
Stepford, F. W.,	Colonel	80th Field Artillery	12
Todd, H. D., Jr.,	Brigadier General	58th Field Artillery Brigade	13
Walker, J. F.,	Colonel	314th Field Artillery	14
Wertenbaker, G. L.,	Colonel	345th Field Artillery	14
Winn, C. D.,	Colonel	306th Field Artillery	15
Worcester, P. H.,	Colonel	146th Field Artillery	15

INDEX ADDENDUM TO ANNEX 5.

Balch, C. B.,	1st Lieutenant	7th Field Artillery	1
Bunker, C. M.,	Colonel	308th Field Artillery	1
Burr, Edw.,	Brigadier General	62nd Field Artillery Brigade	2
Bush, H. M.,	Colonel	134th Field Artillery	4
Davis, J. R.,	Colonel	15th Field Artillery	5
Fisher, A. G.,	Colonel	307th Field Artillery	5
Hearn, C. C.,	Brigadier General	153rd Field Artillery Brigade	6
Henderson, A. I.,	Captain	7th Field Artillery	6
Hudnut, Dean,	Major	17th Field Artillery	7
McCarthy, D. P.,	Captain	15th Field Artillery	9
Verbeck, G. F.,	Lieutenant Colonel	106th Field Artillery	10
Whitney, Livingston,	1st Lieutenant, Cav.,	103rd Field Artillery	11
Wingate, G. A.,	Brigadier General	52nd Field Artillery Brigade	12

(Summary of Contents - Page 8)

VI. COMMUNICATION OFFICERS AND DETACHMENTS . . . . . Pages 22-23
Annex 6.
Addendum to Annex 6.

Recommendations on the artillery communication net, including lines laid to Infantry supported. Division Signal Officer to be concerned only with supervision of radio service and supply. Artillery personnel to maintain entire communication net . . . . . Par. 21.

Present personnel should be increased and new signal equipment allowance be established by joint board of artillery and signal officers . . . . . Par. 32.

LIST OF OFFICERS WHOSE VIEWS ARE QUOTED IN ANNEX 6.

Name	Rank	Organization	Page of Annex.
Aultman, D. E.,	Brigadier General	Army Artillery, 2nd Army	1
Abernathy, R. S.	Colonel	165th Field Artillery	1
Babbitt, E. B.,	Brigadier General	4th Field Artillery Brigade	1
Bishop, H. G.,	Brigadier General	3rd Field Artillery Brigade	2
Bowley, A. J.,	Brigadier General	6th Corps Artillery	2
Butner, H. W.,	Brigadier General	1st Field Artillery Brigade	2
Campbell, Tilman,	Colonel	329th Field Artillery	2
Cox, A. L.,	Colonel	113th Field Artillery	2
Center Artillery Studies	(Army)		2
Davis, R. P.,	Brigadier General	151st Field Artillery Brigade	3
Doyle, F. C.,	Colonel	305th Field Artillery	3
Dunlap, R. H.,	Colonel	17th Field Artillery	3
Fleming, A. S.,	Brigadier General	158th Field Artillery Brigade	3
Greble, E. St., J.,	Colonel	76th Field Artillery	4
Haynes, I. A.,	Brigadier General	64th Field Artillery Brigade	4
Horne, T. N.,	Brigadier General	7th Field Artillery Brigade	4
Kennedy, J. T.,	Lieutenant Colonel	5th Field Artillery	5
McIntyre, A.,	Brigadier General	154th Field Arillery Brigade	5
Millar, E. A.,	Colonel	102nd Field Artillery	5
McMaster, R. H.,	Colonel	21st Field Artillery	7
Owen, A.,	Colonel	141st Field Artillery	6
Rucker, W. H.,	Lieutenant Colonel	16th Field Artillery	7
Smith, W. R.,	Major General	36th Division	7
Summerall, C. P.,	Major General	5th Corps	7
Wertenbaker, G. L.,	Colonel	345th Field Artillery	7
Winn, C. D.,	Colonel	306th Field Artillery	7

INDEX ADDENDUM TO ANNEX 6.

Bunker, C. M.,	Colonel	308th Field Artillery	1
Burr, Edw.,	Brigadier General	62nd Field Artillery Brigade	1
Bush, H. M.,	Colonel	134th Field Artillery	2
Davis, J. R.,	Colonel	15th Field Artillery	3
Glassford, P. D.,	Brigadier General	51st Field Artillery Brigade	4
Hearn, C. C.,	Brigadier General	153rd Field Artillery Brigade	4
Henderson, A. I.,	Captain	7th Field Artillery	4
Price, W. G., Jr.	Brigadier General	53rd Field Artillery Brigade	4
Wingate, G. A.,	Brigadier General	52nd Field Artillery Brigade	5

(Summary of Contents - Page 9)

VII. MOTOR TRANSPORT AND TRACTOR DRAWN GUNS . . . . . Pages 23-25.
Annex 7.
Addendum to Annex 7.

All Corps Artillery and units of the G. A. R. should be motorized . . . . . Par. 33.

Howitzers of Divisional Artillery should be tractor drawn . . . . . Par. 34.

If satisfactory means of transportation may be found for 75 mm materiel, all Divisional Artillery Regiments should be motorized . . . . . Par. 35.

The 5-ton caterpillar believed to be satisfactory for 155 mm. howitzer . . . . . Par. 36.

Re motor transport and tractors for motorized heavy artillery, guns and howitzers of large caliber . . . . . Par. 37.

All types of artillery possible of successful adaption to motor traction recommended to be motorized . . Par. 38.

LIST OF OFFICERS WHOSE VIEWS ARE QUOTED IN ANNEX 7.

Name	Rank	Organization	Page of Annex.
Aultman, D. E.,	Brigadier General	Army Artillery, 2nd Army	1
Abernathy, R. S.	Colonel	165th Field Artillery	1
Babbitt, E. B.,	Brigadier General	4th Field Artillery Brigade	2
Bowley, A. J.,	Brigadier General	6th Corps Artillery	2
Butner, H. W.,	Brigadier General	1st Field Artillery Brigade	2
Cronkhite, A.	Major General	6th Corps Artillery	10
Conklin, A. S.,	Colonel	303rd Field Artillery	2
Corey, J. B.,	Colonel	8th Field Artillery	9
Cox, A. L.,	Colonel	115th Field Artillery	2
Center of Artillery Studies (Army)			2
Davis, R. P.,	Brigadier General	151st Field Artillery Brigade	3
Dodds, W. H.,	Colonel	6th Field Artillery	3
Doyle, F. C.,	Colonel	305th Field Artillery	4
Dunlap, R. H.,	Colonel	17th Field Artillery	4
Fleming, A. S.,	Brigadier General	158th Field Artillery	4
Gatley, G. G.,	Brigadier General	67th Field Artillery Brigade	4
Horn, T. N.,	Brigadier General	7th Field Artillery Brigade	4
Kennedy, J. T.,	Lieutenant Colonel	5th Field Artillery	5
Millar, T. A.,	Brigadier General	6th Field Artillery Brigade	6
Mack, J. A.,	Colonel	102nd Field Artillery	5
McKell, D.,	Colonel	12th Field Artillery	5
Mehard, C. D.,	Lieutenant Colonel	321st Field Artillery	6
Platt, W. P.,	Colonel	303rd Field Artillery	6
Pratt, R. S.,	Colonel	18th Field Artillery	6
Rucker, W. H.,	Lieutenant Colonel	16th Field Artillery	7
Smith, W. R.,	Major General	36th Division	7
Summerall, C. P.,	Major General	5th Corps	7
Todd, H. D., Jr.,	Brigadier General	58th Field Artillery Brigade	7

(Summary of Contents - Page 10

Name	Rank	Organization	Page of Annex.
Wertenbaker, G. L.,	Colonel	345th Field Artillery	8
Winn, C. D.,	Colonel	306th Field Artillery	8
Worcester, P. H.,	Colonel	146th Field Artillery	9

INDEX ADDENDUM TO ANNEX 7.

Burr, Edw.,	Brigadier General	62nd Field Artillery Brigade	1
Davis, J. R.,	Colonel	15th Field Artillery	1
Hearn, C. C.,	Brigadier General	153rd Field Artillery Brigade	2
Price, W. G., Jr.,	Brigadier General	53rd Field Artillery Brigade	2

VIII. AERIAL OBSERVATION: R. R. S. and S. R. S. . . . . Pages 25-27
Annex 8.
Annex 16.
Addendum to Annex 8.

Why adjustment of fire by aerial observation by our army at the front generally has been so unsatisfactory. List of the apparent faults of the existing system . . . . Par. 39

Recommendations for improvement over the present system. Re assignment of planes to each combat unit; the command of planes assigned a Brigade for adjustment of fire; and detail of the observers for both balloon and aeroplane service . . . . . Pars. 40-41

Annex 16. Contains copies of correspondence dated July-August 1918 between the Chief of the Air Service, A. E. F., and General Staff Sections, G. H. Q., relative to the status and training of Artillery Aerial Observers.

	Page of Annex
Assistant Chief of Staff, G-5 - G. H. Q. (Colonel Fiske)	1-3
Assistant Chief of Staff, G-3 - G. H. Q. (Colonel Connor)	4
Chief of Air Service, A. R. F. (Major General Patrick)	5
Chief of Training Section, Air Service (Colonel Kilner)	6-8
Assistant Chief of Artillery, A. E. F. (Brigadier General Westervelt)	9-10
Chief Field Artillery Section, Office of C. of A. (Colonel DeArmond)	11-12
Chief H. A. Section, Office of C. of A. (Brigadier General Hatch) .	13
Chief of Artillery, A. E. F. (Major General Hinds)	14
Chief of Air Service, A. E. F. (Major General Patrick)	15
Extracts of cables sent and received	16
Deputy Chief of Staff (Brigadier General Eltinge)	17

F. R. S. and S. R. S.

Excellent results obtained from these systems. Recommended that they be composed of artillery personnel under the Chief of Artillery of an Army, since they are artillery information agencies and function with the artillery at all times . . . Par. 42-43

(Summary of Contents - Page 11)

LIST OF OFFICERS WHOSE VIEWS ARE QUOTED IN ANNEX 8.

Name	Rank	Organization	Page of Annex.
Aultman, D. E.,	Brigadier General	Army Artillery, 2nd Army	1
Babbitt, E. B.,	Brigadier General	4th Field Artillery Brigade	1
Bishop, H. G.	Brigadier General	3rd Field Artillery Brigade	2
Bowley, A. J.,	Brigadier General	6th Corps Artillery	2
Butner, H. W.,	Brigadier General	1st Field Artillery Brigade	2
Cox, A. L.,	Colonel	115th Field Artillery	3
Center of Artillery Studies (Army)			2
Davis, R. P.,	Brigadier General	151st Field Artillery Brigade	3
Doyle, F. C.,	Colonel	305th Field Artillery	3
Fleming, A. S.,	Brigadier General	158th Field Artillery	3
Gatley, G. G.,	Brigadier General	67th Field Artillery Brigade	4
Greble, D. St. J.	Colonel	76th Field Artillery	4
Haynes, I. A.	Brigadier General	64th Field Artillery Brigade	4
Horn, T. N.,	Brigadier General	7th Field Artillery Brigade	4
Johnson, R. D.	Lieutenant Colonel	18th Field Artillery	5
Kennedy, J. T.,	Lieutenant Colonel	5th Field Artillery	5
Lloyd, C. R.	Colonel	10th Field Artillery	5
Mack, J. A.,	Colonel	102nd Field Artillery	5
Summerall, C. P.,	Major General	5th Corps	6
Todd, H. D., Jr.,	Brigadier General	58th Field Artillery Brigade	6
Walker, J. F.	Colonel	314th Field Artillery	6

INDEX ADDENDUM TO ANNEX 8.

			Page of Addendum
Glassford, P. D.	Brigadier General	51st Field Artillery Brigade	1
Fisher, A. G.	Colonel	307th Field Artillery	1
Hearn, C. C.	Brigadier General	153rd Field Artillery Brigade	2
Price, W. C., Jr.	Brigadier General	53rd Field Artillery Brigade	2
Sarratt, E. C.	Colonel	309th Field Artillery	3
Wingate, G. A.	Brigadier General	52nd Field Artillery Brigade	3

IX. LIAISON AND LIAISON OFFICERS . . . . . Pages 27-28
Annex 9.
Addendum to Annex 9.

Present system has proven in general satisfactory. Lack of sufficient personnel and difficulty in quick communication experienced to a certain degree . . . . . Par. 44

Recommendations for perfecting the liaison service between the Infantry and Artillery . . . . . Par. 45

(Summary of Contents - Page 12)

LIST OF OFFICERS WHOSE VIEWS ARE QUOTED IN ANNEX 9.

Name	Rank	Organization	Page of Annex.
Aultman, D. E.	Brigadier General	Army Artillery, 2nd Army	1
Babbitt, E. B.,	Brigadier General	4th Field Artillery Brigade	2
Bishop, H. G.	Brigadier General	3rd Field Artillery Brigade	2
Bryson, J. H.	Brigadier General	155th Field Artillery Brigade	2
Butner, H. W.,	Brigadier General	1st Field Artillery Brigade	2
Campbell, Tilman,	Colonel	329th Field Artillery	2
Cox, A. L.,	Colonel	113th Field Artillery	3
Center of Artillery Studies (Army)			2
Davis, R. P.,	Brigadier General	151st Field Artillery Brigade	3
Dodds, W. H.,	Colonel	6th Field Artillery	4
Doyle, F. C.,	Colonel	305th Field Artillery	4
Fleming, A. S.,	Brigadier General	158th Field Artillery	4
Gatley, G. G.,	Brigadier General	67th Field Artillery Brigade	4
Greble, E. St. J.	Colonel	76th Field Artillery	5
Horn, T. N.,	Brigadier General	7th Field Artillery Brigade	5
Kennedy, J. T.,	Lieutenant Colonel	5th Field Artillery	5
Lloyd, C. R.	Colonel	10th Field Artillery	6
Mack, J. A.,	Colonel	102nd Field Artillery	6
McKell, D.,	Colonel	12th Field Artillery	6
McMaster, R. H.	Colonel	21st Field Artillery	9
Mitchell, P. L.	Colonel	136th Field Artillery	7
Mehard, C. B.,	Lieutenant Colonel	321st Field Artillery	7
Rucker, W. H.,	Lieutenant Colonel	16th Field Artillery	7
Smith, W. R.,	Major General	36th Division	7
Summerall, C. P.,	Major General	5th Corps	7
Todd, H. D., Jr.,	Brigadier General	58th Field Artillery Brigade	8
Walker, J. F.	Colonel	314th Field Artillery	8
Weld, D. C., Jr.	Colonel	105th Field Artillery	9
Williams, H. C.	Colonel	320th Field Artillery	9

INDEX ADDENDUM TO ANNEX 9

Hearn, C. C.	Brigadier General	153rd Field Artillery Brigade	1
Henderson, A. I.	Captain	7th Field Artillery	1
Price, W. G., Jr.	Brigadier General	53rd Field Artillery Brigade	1
Wingate, G. A.	Brigadier General	52nd Field Artillery Brigade	1
Bunker, C. M.	Colonel	398th Field Artillery	2
Bush, H. M.	Colonel	134th Field Artillery	2
Fisher, A. G.	Colonel	307th Field Artillery	2

X. ACCOMPANYING GUNS AND BATTERIES . . . . . Pages 28-29
Annex 10.
Addendum to Annex 10.

Re use of an accompanying gun and recommendations of the Board on this subject . . . . . Pars. 46-48

(Summary of Contents - Page 13)

LIST OF OFFICERS WHOSE VIEWS ARE QUOTED IN ANNEX 10.

Name	Rank	Organization	Page of Annex.
Aultman, D. E.,	Brigadier General	Army Artillery, 2nd Army	2
Babbitt, E. B.,	Brigadier General	4th Field Artillery Brigade	2
Bishop, H. G.	Brigadier General	3rd Field Artillery Brigade	2
Bowley, A. J.,	Brigadier General	6th Corps Artillery	3
Brewer, Leo	Captain	6th Corps Artillery	4
Bryson, J. H.	Brigadier General	155th Field Artillery Brigade	4
Butner, H. W.,	Brigadier General	1st Field Artillery Brigade	4
Center of Artillery Studies (Army)			5
Cox, A. L.	Colonel	113th Field Artillery	5
Cronkhite, A.	Major General	6th Corps Artillery	18
Davis, R. P.,	Brigadier General	151st Field Artillery Brigade	5
Deems, C. J.	Colonel	57th Field Artillery Brigade	6
Dodds, W. H.	Colonel	6th Field Artillery	6
Doyle, F. C.,	Colonel	305th Field Artillery	6
Dunlap, R. H.	Colonel	17th Field Artillery	7
Gillmore, Q. A.	Colonel	112th Field Artillery	7
Greble, E. St. J.	Colonel	76th Field Artillery	7
Gatley, G. G.	Brigadier General	67th Field Artillery Brigade	8
Haynes, I. A.	Brigadier General	64th Field Artillery Brigade	8
Horn, T. N.,	Brigadier General	7th Field Artillery Brigade	8
Kennedy, J. T.,	Lieutenant Colonel	5th Field Artillery	9
Leach, George E.	Colonel	151st Field Artillery	10
Lloyd, C. R.	Colonel	10th Field Artillery	10
McMaster, R. H.	Colonel	21st Field Artillery	18
- Advantages -			
Brunzell, O. L.	Colonel	313th Field Artillery	11-12
Marks, Theodore	Captain	129th Field Artillery	11-14
Nash, John	Major	313th Field Artillery	11-12
Fullerton, D. B.	2nd Lieutenant	313th Field Artillery	12-14-15
Dunigan, F. J.	Major	313th Field Artillery	12
Peppard, J. G.	1st Lieutenant	313th Field Artillery	12
Morgan, E. F. A.	- - - -	31st Field Artillery	12
Tilghman, T. C.	Major	332nd Infantry	12
Anzell, M. B.	Captain	321st Infantry	13
Salisbury, S.	Captain	129th Field Artillery	13-14
Walthew, Francis G.	1st Lieutenant	129th Field Artillery	13
- Disadvantages -			
Penniman, J. A. D.	1st Lieutenant	513th Field Artillery	13
Perkins, R. W.	Captain	313th Field Artillery	13-14-15
Morgan, E. F. A.	1st Lieutenant	513th Field Artillery	13
Evans, H. C.	1st Lieutenant	6th Field Artillery	14
Hammersly, L. G.	1st Lieutenant	6th Field Artillery	14
Barton, Robert T.	Captain	313th Field Artillery	14
Plantz, Truman, Jr.	1st Lieutenant	124th Field Artillery	14-15
Logan, John L.	1st Lieutenant	314th Field Artillery	15
Peppard, J. G., Jr.	1st Lieutenant	313th Field Artillery	16

(Summary of Contents - Page 14)

Name	Rank	Organization	Page of Annex.
Mack, J. A.	Colonel	102nd Field Artillery	16
Mehard, C. B.	Lieutenant Colonel	321st Field Artillery	16
Millar, E. A.	Brigadier General	6th Brigade	16
Smith, W. R.	Major General	36th Division	17
Summerall, C. P.	Major General	5th Corps	17
Todd, H. D.	Brigadier General	58th Field Artillery Brigade	17
Walker, J. F.	Colonel	314th Field Artillery	17
Wertenbaker, G. L.	Colonel	345th Field Artillery	17
Williams, H. C.	Colonel	320th Field Artillery	18
Winn, C. D.	Colonel	306th Field Artillery	18

INDEX ADDENDUM TO ANNEX 10.

			Page of Addendum
Bunker, C. M.	Colonel	308th Field Artillery	1
Burr, Edward	Brigadier General	62nd Field Artillery Brigade	1
Bush, H. M.	Colonel	134th Field Artillery	2
Davis, J. R.	Colonel	15th Field Artillery	3
Fisher, A. G.	Colonel	307th Field Artillery	3
Hearn, C. C.	Brigadier General	153rd Field Artillery Brigade	3
Henderson, I. A.	Captain	7th Field Artillery	4
Price, W. C., Jr.	Brigadier General	53rd Field Artillery Brigade	4
Wingate, G. A.	Brigadier General	52nd Field Artillery Brigade	4

XI. PLACING OF ARTILLERY UNDER COMMAND OF SUBORDINATE INFANTRY COMMANDERS . . . . . Pages 29-30
Annex 11
Addendum to Annex 11.

The Board recommended at the same time that freedom of action has been given subordinate artillery commanders for the close support of the Infantry, the artillery brigade commander still retain the command in such a way that he can in an emergency furnish such fire as the division commander himself may order . . . . . Par. 49

LIST OF OFFICERS WHOSE VIEWS ARE QUOTED IN ANNEX 11.

Name	Rank	Organization	Page of Annex.
Aultman, D. E.,	Brigadier General	Army Artillery, 2nd Army	1
Babbitt, E. B.,	Brigadier General	4th Field Artillery Brigade	1
Bishop, H. G.	Brigadier General	3rd Field Artillery Brigade	2
Bowley, A. J.,	Brigadier General	6th Corps Artillery	2
Butner, H. W.,	Brigadier General	1st Field Artillery Brigade	2
Campbell, T.	Colonel	329th Field Artillery	2
Center of Artillery Studies (Army)			2
Cox, A. L.	Colonel	113th Field Artillery	2
Davis, R. P.,	Brigadier General	151st Field Artillery Brigade	3
Deems, C. J.	Colonel	57th Field Artillery Brigade	3

(Summary of Contents - Page 15)

Name	Rank	Organization	Page of Annex.
Dodds, W. H.	Colonel	6th Field Artillery	4
Doyle, F. C.,	Colonel	305th Field Artillery	4
Fleming, A. S.	Brigadier General	158th Field Artillery Brigade	5
Gatley, G. G.	Brigadier General	67th Field Artillery Brigade	5
Gillmore, Q. A.	Colonel	112th Field Artillery	5
Greble, E. St. J., Jr.	Colonel	76th Field Artillery	5
Haynes, I. A.	Brigadier General	64th Field Artillery Brigade	5
Horn, T. N.,	Brigadier General	7th Field Artillery Brigade	5
Kennedy, J. T.,	Lieutenant Colonel	5th Field Artillery	6
Lloyd, C. R.	Colonel	10th Field Artillery	6
McIntyre, A.	Brigadier General	154th Field Artillery Brigade	6
McMaster, R. H.	Colonel	21st Field Artillery	6
Mack, J. A.	Colonel	102nd Field Artillery	6
Mehard, C. B.	Lieutenant Colonel	321st Field Artillery	7
Millar, E. A.	Brigadier General	6th Field Artillery Brigade	8
Rucker, W. H.	Lieutenant Colonel	16th Field Artillery	8
Smith, W. R.	Major General	36th Division	8
Summerall, C. P.	Major General	5th Corps	8
Todd, H. D., Jr.	Brigadier General	58th Field Artillery Brigade	10
Walker, J. F.	Colonel	314th Field Artillery	10
Wertenbaker, G. L.	Colonel	345th Field Artillery	10
Winn, C. D.	Colonel	306th Field Artillery	10

INDEX ADDENDUM TO ANNEX 11.

			Page of Addendum
Burr, Edw.	Brigadier General	62nd Field Artillery Brigade	1
Bush, H. M.	Colonel	134th Field Artillery	2
Davis, J. R.	Colonel	15th Field Artillery	2
Fisher, A. G.	Colonel	307th Field Artillery	2
Hearn, C. C.	Brigadier General	153d Field Artillery Brigade	3
Henderson, A. I.	Captain	7th Field Artillery	3
Price, W. G., Jr.	Brigadier General	53rd Field Artillery Brigade	3
Sarratt, E. O.	Colonel	309th Field Artillery	3
Wingate, G. A.	Brigadier General	52nd Field Artillery Brigade	3

XII. AMMUNITION TRAIN AND MOBILE ORDNANCE REPAIR SHOP . . . . . Page 30
Annex 12
Addendum to Annex 12.

Regarding the status and employment of Ammunition Train and Mobile Ordnance Repair Shop. Division of present Ammunition Train to form Artillery Ammunition Train as part of the Field Artillery Brigade . . . . . Pars. 50-51

(Summary of Contents - Page 16)

LIST OF OFFICERS WHOSE VIEWS ARE QUOTED IN ANNEX 12.

Name	Rank	Organization	Page of Annex.
Aultman, D. E.,	Brigadier General	Army Artillery, 2nd Army	1
Babbitt, E. B.,	Brigadier General	4th Field Artillery Brigade	2
Bowley, A. J.,	Brigadier General	6th Corps Artillery	4
Butner, H. W.,	Brigadier General	1st Field Artillery Brigade	5
Boles, J. K.	Lieutenant Colonel	330th Field Artillery	3
Campbell, Tilman	Colonel	329th Field Artillery	5
Cox, A. L.	Colonel	113th Field Artillery	6
Cannon, G. M.	Major	304th Ammunition Train	5
Gaten, W. R.	Captain	204th Ammunition Train	5
Center of Artillery Studies (Army)			6
Dunlap, R. H.	Colonel	17th Field Artillery	6
Fleming, A. S.	Brigadier General	158th Field Artillery Brigade	10
Faddis, G. I.	Lieutenant Colonel	Infantry, 4th Ammunition Train	7
Fairfax, J. C.	Lieutenant Colonel	305th Ammunition Train	8
Fitzgerald, T.	Lieutenant Colonel	308th Ammunition Train	9
Frank, George J.	Major	117th Ammunition Train	10
Greble, E. St. J., Jr.	Colonel	76th Field Artillery	11
Haynes, I. A.	Brigadier General	64th Field Artillery Brigade	11
Horn, T. N.	Brigadier General	7th Field Artillery Brigade	11
Johnson, R. D.	Lieutenant Colonel	18th Field Artillery	11
Kelville, W. J.	Lieutenant Colonel	101st Ammunition Train	12
McIntyre, A.	Brigadier General	154th Field Artillery Brigade	12
McNair, L. J.	Brigadier General	Field Artillery	12
Marchant, T. E.	Major	105th Ammunition Train	13
Rifenberiek, R. P., Jr.	Colonel	2nd Ammunition Train	13
Rucker, W. R.	Lieutenant Colonel	16th Field Artillery	13
Summerall, C. P.	Major General	5th Corps	14
Todd, H. D., Jr.	Brigadier General	58th Field Atillery Brigade	14
Weld, D. C., Jr.	Colonel	105th Field Artillery	15
Wertenbaker, C. L.	Colonel	345th Field Artillery	15
Worcester, P. H.	Colonel	146th Field Artillery	17

INDEX ADDENDUM TO ANNEX 12.

			Page of Addendum
Hearn, C. C.	Brigadier General	153rd Field Artillery Brigade	2
Price, W. G., Jr.	Brigadier General	53rd Field Artillery Brigade	3
Kerlin, W. L.	Captain	303rd M. O. R. S.	3
Streat, John N.	Colonel (Infantry)	303rd Ammunition Train	5
Wingate, G. A.	Brigadier General	52nd Field Artillery Brigade	5
Verbeck, G. F.	Lieutenant Colonel	106th Field Artillery	5

XIII. TRENCH MORTAR BATTERY . . . . . Page 31
Annex 13.
Addendum to Annex 13.

Complete separation from divisional artillery and made part of general artillery reserve . . . . . Pars. 52-53

(Summary of Contents - Page 17)

LIST OF OFFICERS WHOSE VIEWS ARE QUOTED IN ANNEX 13.

Name	Rank	Organization	Page of Annex.
Aultman, D. E.,	Brigadier General	Army Artillery, 2nd Army	1
Anderson, C. I.	Captain	810th Trench Mortar Battery	1
Babbitt, E. B.,	Brigadier General	4th Field Artillery Brigade	1
Butner, H. W.,	Brigadier General	1st Field Artillery Brigade	2
Davis, R. P.	Brigadier General	151st Field Artillery Brigade	2
Deems, C. J.	Colonel	57th Field Artillery Brigade	2
Fleming, A. S.	Brigadier General	158th Field Artillery Brigade	2
Gatley, G. G.	Brigadier General	67th Field Artillery Brigade	2
Gillmore, Q. A.	Colonel	112th Field Artillery	2
Haynes, I. A.	Brigadier General	64th Field Artillery Brigade	2
Horn, T. N.	Brigadier General	7th Field Artillery Brigade	2
Kennedy, J. T.	Lieutenant Colonel	5th Field Artillery	3
McIntyre, A.	Brigadier General	154th Field Artillery Brigade	3
Millar, R. A.	Brigadier General	6th Field Artillery Brigade	3
Owen, A.	Colonel	141st Field Artillery	4
Smith, W. R.	Major General	36th Division	4
Summerall, C. P.	Major General	5th Corps	4
Todd, H. D., Jr.	Brigadier General	58th Field Atillery Brigade	4

INDEX ADDENDUM TO ANNEX 13.

			Page of Addendum
Davis, J. R.	Colonel	15th Field Artillery	1
Hearn, C. C.	Brigadier General	153rd Field Artillery Brigade	1
Price, W. G., Jr.	Brigadier General	53rd Field Artillery Brigade	1
Wingate, G. A.	Brigadier General	52nd Field Artillery Brigade	1

XIV. SCHOOLS AND TRAINING . . . . . Pages 31-35
Annex 14.
Addendum to Annex 14.

Recommendations for future military training of artillery officers and enlisted men of the Field Artillery and Coast Artillery . . . . . Pars. 54-58

Necessity of maintaining and perfecting by practice the closest liaison between Infantry and Artillery at all times especially emphasized . . . . . Par. 59

LIST OF OFFICERS WHOSE VIEWS ARE QUOTED IN ANNEX 14.

Name	Rank	Organization	Page of Annex.
Bailey, C. J.	Major General	81st Division	1
Babbitt, E. B.,	Brigadier General	4th Field Artillery Brigade	1
Bowley, A. J.,	Brigadier General	6th Corps Artillery	2
Conklin, A. S.	Colonel	303rd Field Artillery	2
Cox, A. L.	Colonel	113th Field Artillery	2

(Summary of Contents - Page 18)

Name	Rank	Organization	Page of Annex.
Center of Artillery Studies (Army)			2
Davis, R. P.	Brigadier General	151st Field Artillery Brigade	3
Dodds, W. H.	Colonel	6th Field Artillery	3
Doyle, F. C.	Colonel	305th Field Artillery	4
Fleming, A. S.	Brigadier General	158th Field Artillery Brigade	4
Greble, E. St. J., Jr.	Colonel	76th Field Artillery	4
Haynes, I. A.	Brigadier General	64th Field Artillery Brigade	5
Horn, T. N.	Brigadier General	7th Field Artillery Brigade	5
Johnson, R. D.	Lieutenant Colonel	18th Field Artillery	5
Kennedy, J. T.	Lieutenant Colonel	5th Field Artillery	6
McIntyre, A.	Brigadier General	154th Field Artillery Brigade	6
Mack, J. A.	Colonel	102nd Field Artillery	7
Mehard, C. B.	Lieutenant Colonel	321st Field Artillery	7
Owen, A.	Colonel	141st Field Artillery	8
Smith, W. R.	Major General	36th Division	8
Summerall, C. P.	Major General	5th Corps	9
Stepford, F. W.	Colonel	60th Field Artillery	8
Todd, H. D., Jr.	Brigadier General	58th Field Atillery Brigade	9

INDEX ADDENDUM TO ANNEX 14.

			Page of Addendum
Bunker, G. M.	Colonel	308th Field Artillery	1
Burr, Edw.	Brigadier General	62nd Field Artillery Brigade	1
Bush, H. M.	Colonel	134th Field Artillery	2
Davis, J. R.	Colonel	15th Field Artillery	2
Fisher, A. G.	Colonel	307th Field Artillery	2
Hearn, C. C.	Brigadier General	153rd Field Artillery Brigade	3
Price, W. G., Jr.	Brigadier General	53rd Field Artillery Brigade	3
Sarratt, N. O.	Colonel	309th Field Artillery	3
Verbeck, G. F.	Lieutenant Colonel	106th Field Artillery	3
Wingate, G. A.	Brigadier General	52nd Field Artillery Brigade	3

(Summary of Contents - Page 19)

F I N I S

EXHIBIT A
PART 3

C. of A.
E.H.

1st Ind.

O. C. of A., G.H.Q., A.E.F., March 27, 1919. - To The Adjutant General, A.E.F., Forwarded.

I. GENERAL ORGANIZATION (PAGE 3).

1. I concur in the opinion of the Board that the Field Artillery and the Coast Artillery Corps should not be consolidated.

2. I do not concur in its views as to the division of duties between the two. We used Coast Artillery troops in the Artillery of the A. E. F., but they were engaged almost wholly in what is properly Field Artillery work. We used them because they were not at the time needed for manning our Coast Defenses and were in consequence available for other uses; they were trained and disciplined troops, an asset that in the great expansion of our Army could not be permitted to remain idle. They rendered efficient service in the A. E. F. Artillery, but it is not open to question that they would have been still more efficient had they been trained for the same number of years in Field Artillery methods and in handling the same materiel to which they were assigned in the A. E. F.

A division of the duties of the Artillery accompanying the armies in the field, along the lines recommended by the Board, would introduce an element of divided responsibility in regard to the training of the artillery, which is vitally wrong in principle. In time of war there doubtless would be a Chief of Artillery for the field forces -- there can not be two, one for the Field Artillery and one for the Coast Artillery personnel assigned to the field forces. The result would be two agencies in time of peace responsible each in part for personnel which is to be combined during tim of war for work under the Chief of Artillery of the Field Forces. Such a principle cannot be defended.

It is but a few years since the Field and the Coast Artillery were separated. This separation was the result of many years' study and effort on the part of our ablest artillery officers to secure the necessary legislation, and it behooves us to inquire thoroughly into the demands of the Coast Artillery for a reversal of our policy - for the advocacy of the consolidation so far as artillery officers are concerned to be confined practically exclusively to officers of that branch.

A short resume' of the history of our artillery organization may be pertinent to the study of this question:- From March 3, 1847, until February 2, 1901, the organization of the Artillery of the United States Army was regimental, each regiment consisting of twelve batteries, two of which were armed and equipped as light artillery. Officers were detailed by roster for two-year tours of duty with the light batteries. With the improvement of the arm, this arrangement became unsatisfactory; there arose a need and a demand for specialization in training. As a result of many years of agitation on the part of artillery officers, and in consequence of the experience of the Spanish-American War, the Artillery in the reorganization of 1901 was organized as a Corps, but was divided into two branches - Coast and Field. Shortly afterwards the introduction into the United States Army of a modern rapid-fire field gun, and the many improvements incident thereto, caused a renewal of the agitation for a greater specialization in training and a permanent assignment of the personnel to one or the other branch of the Artillery Corps. For several years prior to 1907, artillery officers with practical unanimity urgently demanded a separation of the Corps into the two branches - Field and Coast. The reasons for desiring the separation were: that it was wholly impossible for any officer to become expert in both branches; that it was necessary to specialize not only in one or the other branch, but within each branch; that there existed no tactical relation between the two branches; and that the efficincy of the Artillery would be

greatly increased by the separation and consequent specialization of the work of the officers.

The Chief of Artillery, General Murray, advocated the separation for the following reasons:-

> "It is a sound military principle that only such arms of the service as have a fighting or tactical relation with each other should be combined for organization purposes. The Coast Artillery, organized solely for the proper handling of the two correlative elements of harbor defense - heavy guns in fixed emplacements and submarine mines in position in channels to be defended - constitutes in reality a passive defensive force which has no tactical relation whatever with the active forces of infantry, cavalry or field artillery, the three fighting elements of a mobile army. In all mobile armies there is a definite ratio between the three fighting elements whenever these are combined in organizations for tactical purposes, the size of the organization or of the mobile army determining the amount and organization of its field artillery. The Coast Artillery, constituting the defense of harbors against an enemy's fleet, not only has no tactical relation with any of the fighting elements of a mobile army, but there is no definite ratio between the two fighting elements, heavy guns and mines. The number and character of the guns and the number of mines vary with each harbor to be defended. The combination of the Coast and Field Artillery into a Corps as is now done is not only unsound as a military principle, but the frequent interchange of officers between those tactically unrelated arms is considered detrimental to the efficiency of both."

The General Staff as a whole and the Chief of Staff, after several years of study advocated legislation to accomplish the separation. As a result Congress enacted the law of January 25, 1907, creating the two branches.

This law defines these branches as follows: "The Coast Artillery is the artillery charged with the care and use of the fixed and movable elements of land and coast fortifications, including the submarine mine and torpedo defenses." (Section 3, Act of January 25, 1907.)

"The Field Artillery is the artillery which accompanies an army in the field, and includes light artillery, horse artillery, siege artillery, and mountain artillery." (Section 4, Act of January 25, 1907.)

There have been remarkable developments in motorization of artillery transportation since 1907, but it is believed that the true line of demarcation between the Field and the Coast Artillery has not been changed thereby; it is still as it was then, a question of mobility. The Field Artillery should be that which accompanies an army in the field - without regard to caliber or the size of the organization to which it may be assigned - it should include Divisional, Corps, and Army guns of all kinds and calibers which are mobile on the roads or across country. Railway artillery is mobile but it can not accompany an Army in the field - it is a special arm which will undoubtedly be needed in our Coast Defenses. The Coast Artillery should, therefore, provide its personnel; and doubtless on the rare occasions in our service where it might be needed elsewhere it could readily be provided by the Coast Artillery in such quantity as may be necessary.

3. I recommend, therefore, that the present law governing the organization of the Artillery of the United States Army into Field and Coast Artillery and prescribing the duties of these branch be not changed.

Should there be a relatively greater increase of the Field Artillery than of the Coast Artillery Corps, there should be provision made for freely transferring suitable

officers who so desire it from the Coast to the Field Artillery with a view to equalization of promotion in the two branches.

Besides this step toward the equalization of promotion the question of a single list for promotion to include all combatant officers of the Army should be considered before legislation is enacted for the reorganization of the Army. If promotion were placed upon this basis, most of the partisan advocacy of or opposition to reorganization plans would disappear, and they would be based in much greater degree upon their real merits.

II. DETAILS OF ORGANIZATION.

Divisional Field Artillery.

4. The Battery, the Battalion, and the Regiment. (Pars. 3, 4 & 5, pp. 3-6).

The recommendations of the Board are concurred in except as to the organization of the howitzer regiment into three battalions of two batteries each. As to this the Board states that, notwithstanding its recommendation, which is based upon the views of artillery officers of the A. E. F., it is inclined to the belief that the two-battalion organization for the heavy regiment would be advantageous for reasons of administration, elimination of one battalion staff, and for tactical reasons, simplification of liaison. In this latter view I concur. Recommendation 5 (b), page 5, to be modified accordingly, if the howitzer regiment is to consist of two battalions of three batteries each.

With respect to the proposed organization of ammunition batteries and battalions: Under present regulations, on a peace footing, the 6th, 7th, and 8th sections of batteries are not manned or horsed. (Par. 474, Provisional Drill & Service Regulations for Field Artillery, 1916, vol. II). Their organization must therefore be completed upon passing to the war footing. In time of war, "combat trains are usually operated in battalion groups, under the command of the senior officer with them". (Par. 983, Drill Regulations for the 75 French Gun, Vol. III, Sept., 1918). The proposed organization would therefore weld into a compact unit what is in practice a temporary combination of smaller units loosely thrown together. It is believed that the administration, discipline, and messing of these small units would be improved if organized into a single unit under the permanent command of a Captain - a Major for the ammunition battalion.

These ammunition units are now authorized "in time of actual or threatened hostilities" (Sec. 19, of Act of June 3, 1916). It is believed, however, that a small nucleus of personnel should be provided on a peace footing for each artillery brigade, so that upon the outbreak or imminence of war, the organization of these units could be quickly completed -- a sufficient number of trained personnel can be taken from the active units to do this, the rest of the personnel can in a very short time be given the necessary training. The greater part do not nedd a high state of training -- for this reason it is not necessary to organize more than a nucleus in time of peace.

5. The Brigade. (Divisional Artillery, - Par. 6, pages 6 to 8, and Pars. 13 and 14, pages 11 and 12.)

The recommendations are concurred in, except as to the best type of accompanying gun. In my opinion, the question as to what is the best type of gun for this work is not yet definitely settled. See discussion of paragraph 46 of the report of the board, (Par. 16 of this indorsement).

6. Corps Artillery.

While there is considerable unanimity of opinion among our artillery officers in regard to what may be called "organic" Divisional Artillery, there is much greater diversity of views as to organic Corps Artillery. This is quite reasonable, because we have had in

reality but one brigade of Corps Artillery (the 66th Field Artillery Brigade, 155 mm. G. P. F.s) which had any considerable amount of experience -- some Army Artillery Brigades were temporarily attached to Corps -- only one other Corps Artillery Brigade (the 151st Field Artillery) got into the line a few days before the armistice and it was not in an offensive operation. So we have not had a great amount of actual experience with Corps Artillery proper. Depending largely, it seems, upon their personal experiences, recommendations are made by artillery officers that the following types should be assigned to Corps: the 4."7 and the 155 mm. G. P. F. guns, and the 155 mm. and the 8" Howitzers. A good many officers think there is no necessity for the 4."7 gun - that the 75 mm. and the 155 mm. guns fully cover the field. In my opinion this gap is too great - there is a field for the use of some such caliber as the 4."7 gun for tasks beyond the power and range of the 75 mm., and in which the 155 G. P. F. can not be economically used. There are many cases of interdiction, harassing and retaliatory fire where the 4."7 gun will do the work just as well as the 155 mm. G. P. F. and at an immense saving in weight and expenditure of ammunition. I therefore concur in the recommendation of the board that the Corps Artillery should include one regiment of 4."7 guns.

As to the assignment of howitzers:- The board has recommended a howitzer of smaller caliber than the 155 mm. for the Divisional Artillery. In this recommendation I have concurred. The Corps Artillery has the counterbattery work to do. The 155 mm. Howitzer is an excellent weapon for this purpose, but with no 155 mm. Howitzers in the Divisional Artillery one regiment is not enough for the Corps. I recommend two regiments instead of one. We must have enough howitzers to do the counterbattery work. In our campaigns on the Western Front, the Divisional Artillery was called upon to do much of it. If we reduce the caliber of the Divisional Howitzer, it is all the more necessary that the Corps Artillery be strengthened in howitzers. Some of our artillery officers whose ability and experience entitle their views to great consideration believe that one of these regiments should be armed with an 8" Howitzer of longer range than the one we now have. This idea should be given further study before a final decision is reached.

As to whether or not there should be assigned to the Corps Artillery, in addition to one regiment of 4."7 guns and two regiments of Howitzers, also a regiment of 155 mm. G. P. F. guns, opinions are not unanimous. The majority of artillery officers who have had experience with this gun or who have had opportunity to observe its work are in favor of the assignment. In a letter to the C. - in - C., dated October 8, 1918, on "Artillery Building Plan and Organization", Major General Lassiter, then Chief of Artillery, 4th Army Corps, later Chief of Artillery of the 2nd Army, A. E. F., favors the assignment of the 155 mm. G. P. F. gun to the Corps. Major General McGlachlin, Chief of Artillery of the 1st Army, in forwarding General Lassiter's paper on October 11th, says on this point: "I think the 155 mm. G. P. F.s are not suitable organic Corps guns. They are too good at harassing, prohibitive and retaliztory fire at long ranges and over broad fronts to be given over to corps for counterbattery work. In such general engagements as are now in progress they can be most effectively and economically used as Army guns. When operations special to a corps are undertaken they can be loaned to it on the principle that the responsible agent should have all the means at his disposal."

A copy of these papers is enclosed - Annex 15.

In writing this in October last, General McGlachlin had in mind, of course, the conditions existing at that time on the Western Front -- a continuous line from Switzerland to the North Sea, a very limited supply of the G. P. F.s available to us at that date, and tremendous concentrations necessary to break through the strongly fortified German lines, -- also the G. P. F. was not very mobile on poor roads or off the roads with the tractors then available, so that it was not as mobile as the ideal Corps Artillery gun should be -- the latest caterpillar tractors have largely overcome this difficulty. It is doubtful whether these conditions will ever be met again in the near future in our most probable theatres of operations. Of course, we can not foresee the possibilities as to where we may have to operate, but on the American continent at least, it seems almost a certainty that there will

be more of open warfare than we have had in Europe in this war. We can not have a continuous line from ocean to ocean. Attempts to reach and envelop the opposing flanks will result in a lengthening and thinning of the lines on each side. The lines will be less strongly fortified the opposition to be overcome will not require such dense Artillery concentrations. We now have or soon will have a large supply of G. P. F.s, and with the Caterpillar-tractor they are much more mobile on poor roads and in roadless terrain, such as is generally found on the American continent. We should of course, have a strong General Artillery Reserve of all calibers, but in a more open warfare it will be more difficult to send artillery reinforcements from this Reserve to the Corps Artillery. The latter should therefore be made organically stronger, more independent that was necessary in our fighting on the Western Front.

In every instance during our recent offensives where strong opposition has to be overcome, more artillery than that contemplated above has been needed for the work of the Corps. And it will doubtless be so in future. I therefore believe that a regiment of 155 mm. G. P. F. guns should be a part of the Corps Artillery.

My recommendation is thereforethat the Corps Artillery Brigade should consist of four regiments: one of 4."7 guns, one of 155 mm. G. P. F. guns, and two regiments of 155 mm. Howitzers. There is in my opinion no objection to this brigade of four regimens on account of its size. The brigade commanders can readily direct the work of four Corps Artillery units -- They did more than that in the Chateau-Thierry, St. Mihiel, and Meuse-Argonne campaigns -- even in the Divisional Artillery, where the question of size of the command presents greater difficulties.

7. General Artillery Reserve. (See "Motorized Heavy Artillery", pars. 9 and 10, page 9, and "General Artillery Reserve", pars. 17 and 18, pages 13 to 15).

Recommendations concurred in, except that the brigades should consist of three regiments as in the case of the Divisional Artillery. While these are large regiments, requiring an immense amount of materiel, the burden of administration and supply, except as to ammunition, falls mainly upon the regimental officers, and it is believed that the supervision and tactical handling of three regiments can readily be performed by the brigade commander and his staff.

I regard this question of the organization of a General Artillery Reserve as of vital importance in any future war. The decision as to what the organic Corps Artillery should be is of relatively slight moment if we have a sufficient reserve to throw in whenever needed.

Had this war continued a few months longer, it is believed that the impracticability of handling our Army Artillery as it was organized would have compelled us to make a change in that organization. General McGlachlin; General Lassiter, who was Chief of Artillery of the 2nd Army; General Aultman, who succeeded General Lassiter as Chief of Artillery of the 2nd Army; General Callan, who was for a time Chief of Staff of the 1st Army Artillery, and General Kilbreth, who succeeded General Callan as Chief of Staff of the 1st Army Artillery, all agree that the principle of having a small tactical staff only for the Army Artillery is correct, the General Reserve to furnish the units as may be required.

III. ARMAMENT.
(Pars. 11 to 19, pages 10 to 15).

8. I concur in the recommendations of the Board as to the general types of armament. The special board referred to in paragraph 11, as now making a study of armament, calibers and types of materiel to be assigned to a field army, is the board of Field and Coast Artillery officers recently convened at these headquarters by a War Department order, - Brigadier General William I. Westervelt, president of the board.

The recommendations as to the General Artillery Reserve, paragraph 17, page 13, are believed to be sound and of paramount importance in any future organization of field armies.

IV. STAFFS.
(Pars. 20 to 24, pages 15 to 20.)

9. Recommendations of the board are concurred in. With reference to paragraphs 17 (General Artillery Reserve) and 21 (Army Artillery Staff), Major General McGlachlin, who commanded the Army Artillery of the 1st Army, A. E. F., during all of its actual fighting, and who has had therefore more experience in this particular line than any other general officer of the A. E. F., in conversation with me on February 18th last, expressed himself as unqualifiedly in accord with the views of the board as to the desirability of having a General Artillery Reserve -- no organic Army Artillery -- and, in consequence, a comparatively small tactical staff for the Army Artillery.

V. EQUIPMENT.
(Pars. 25 to 30, pages 20 to 22.)

10. Attention is invited to the detailed recommendations, - Annex 5. I concur in the general recommendations of the board. (See also par. 7, above).

VI. COMMUNICATION OFFICERS AND DETACHMENTS.
(Pars. 31 and 32, pages 22 and 23).

11. Recommendations of board concurred in.

VII. MOTOR TRANSPORT AND TRACTOR-DRAWN GUNS.
(Pars. 33 to 38, pages 23 to 25).

12. Recommendations of board concurred in. Attention is invited expecially to paragraph 38. It is believed that experiments along these lines should be pushed with the greatest energy.

VIII. AERIAL OBSERVATION, F. R. S. AND S. R. S.
(Pars. 39 to 43, pages 25 to 27).

13. It is recognized by both the Artillery and the Air Service that aerial observation was most unsatisfactory. We bagan by furnishing commissioned aerial observers from the Artillery to the Air Service to be trained as observers. For some cause or other we did not get proper results, and by July, 1918, the situation in the A. E. F. was so unsatisfactory that it was felt that some corrective measures must at once be taken to improve the situation. A study of proposed remedies was made by G-5, G-3, the Office of the Chief of the Air Service and by this Office. As a result of the study made in this Office, the Chief of Artillery, A. E. F., on July 25, 1918, submitted the following:

"It is therefore recommended:

(a) That the aerial observers be commissioned in the Air Service and that they be placed on a footing of absolute equality with other officers of that service as regards command, promotion and pay.

(b) That special schools be established for the exclusive purpose of training observers in aerial observation of artillery fire.

(c) That the Air Service be then held rigidly responsible for furnishing satisfactory aerial observation for the artillery."

The Chief of the Air Service concurred in these recommendations, the Commander-in-Chief approved them and cabled them to the War Department (Cable #1573-S, August 8, 1918), requesting approval. This was given in Cable #1905-R, September 3, 1918. It required time to put into effect the new system, and the armistice was signed before it had been satisfactorily tested -- really before it had begun to operate practically. We must consequently form our conclusions largely from a theoretical study of the matter.

The views of the board are, of course, those arrived at from the Artillery viewpoint. The viewpoint of the Air Service should also be considered. The Infantry are likewise interested. It seems therefore that in view of the importance of the question, and in order to reach authoritative conclusions, a War Department Board consisting of officers of Artillery, Infantry, and the Air Service who have had wide experience in actual service in the A. E. F. should be appointed to make a thorough study of it and to submit recommendations thereon.

The results of the studies of G-3, G-5, this Office, and that of the Chief of the Air Service are inclosed - Annex 16.

It is believed that the difficulty lies not so much in the detail of observers from the Artillery or from the Air Service, but in the lack of a sympathetic understanding on the part of both services as to what their mutual relations should be. This is a matter primarily of laying down correct principles; in the next place, of proper training -- the thorough grounding of the personnel of both services in a knowledge of those principles, and of the vital necessity for teamwork. It seems that the personnel of the Air Service did not in general realize that their primary duty is that of observation -- the gathering and furnishing information to the ground units. To do this it is indispensable to use fighting planes - but the fighting is incidental. If they destroy the enemy planes and balloons they thereby prevent the enemy air service from obtaining information to be used against us, but this is not enough - information of the enemy is above all our greatest need. The making of "aces" has been lauded too much - the work of observers not enough.

14. I concur in the recommendations of the board in regard to the Flash Ranging and Sound Ranging Services, except that I would make the F. R. S. a Corps Agency. (Pars. 42 and 43. - See also especially the views of General Aultman, General Bowley, The Center of Artillery Studies, and General Summerall in Annex 8.)

IX. LIAISON AND LIAISON OFFICERS.
(Pars. 44 and 45, pages 27 and 28.)

15. Recommendations concurred in.

X. ACCOMPANYING GUNS AND BATTERIES.
(Pars. 46 to 48, pages 28 and 29.)

16. The 75 mm. gun has not been a success as an accompanying gun. See the reports of about 50 officers contained in Annex 10. A considerable number of officers favor the use of the 2."95 Mountain Gun for this purpose. The 37 mm. has not done the work expected of it, and it is doubtful whether a gun manned by infantry personnel will ever be satisfactory. I believe that it is an Artillery matter. The probable solution of this question I believe to lie in developing and perfecting the tank. That solution has not been reached, however, at the present time, and pending the development of the tank, which should be continued energetically, we must find a present solution. With the organization of our Divisional Artillery as it now exists, there is a marked and dangerous tendency to fritter away its strength by setting aside guns for this special purpose. Provision for it must be made therefore by the addition of a certain number of pieces, which are intended primarily fr this specific purpose, and which are suitable therefor. When not needed for this duty, other work should of course be given them, so they will not remain in idleness.

For this reason I concur in the recommendation of the board contained in paragraph 48. Generally, this Artillery should not be "packed', but the guns should be mule-drawn, supplies of all kinds transported by trucks. "Packs" should be used only in very mountainous or roadless terrain. Pack Artillery requires an immense number of animals, and hence much forage.

The Italians have recently designed a gun which appears to be well suited to this purpose. The Westervelt Board was very favorably impressed with it. Steps are being taken to procure two of them, with a view to making a thorough test in the U. S. The gun possesses approximately the following characteristics:

"Caliber, 7 c.m.
Weight of projectile, 3 kilos,
High explosive charge, in excess of 30 ounces, (that is to say, a greater H. E. charge than that contained in the high capacity, high explosive shell of the 75 mm. field gun).
Range, 2000 meters.
The cannon, including carriage, (wheeled mount) weighs approximately 275 pounds, and breaks into four loads of approximately 70 pounds each."

XI. PLACING OF ARTILLERY UNDER COMMAND OF SUBORDINATE INFANTRY COMMANDERS. (Par. 49, page 29).

17. It is quite evident from many reports received (See Annex 11) that the spirit of paragraphs 11, 12 and 13, "Combat Instructions" issued from G. H. Q., A. E. F., September 5, 1918, has not only been misunderstood by many infantry commanders, including some Division Commanders, but the instructions contained in pargraph 14 thereof, in many cases, have been wholly ignored, thereby unnecessarily dissipating the strength of the Divisional Artillery and reducing its efficiency. This erroneous practice should be corrected promptly.

The correct view of this question is so clearly set forth by General Summerall (page 8, Annex 11) and it is of such vital importance that both the Artillery and Infantry should clearly understand the matter, that it seems advisable to quote his views in the body of this indorsement:-

"Units of artillery must always be under the commander of the Commanding Officers of assaulting battalions to the extent that they can call for the fire of these units and their call takes precedence over all other missions. To this extent these officers must command the batteries, battalions, regiments, or brigades designated to supply their needs. Further than this the command over artillery by infantry officers need not and should not extend. It is the duty of the artillery to place these designated units where they can do all tasks in the interest of the infantry. The infantry commanding officer is already overloaded with duties and he has neither the desire nor the time to exercise any further command over the artillery than to call for the fire, which he has a right to expect. Even in this he must be mainly dependent upon the artillery liaison officer with him, who not only responds to the call of the infantry commanding officer, but who must anticipate this call by seeking out and discovering targets for the artillery and suggesting to the infantry commanding officer the employment of his guns against these targets. Proper understanding will simplify and clarify the functioning of artillery under infantry commands."-

I fully concur in this, and in the views of the board, paragraph 49.

XII. AMMUNITION TRAIN AND MOBILE ORDNANCE REPAIR SHOP.
(Pars. 50 and 51, page 50.)

18. I concur in the recommendations of the Board.

Attention is invited to the views of Generals Babbitt, Bowley and Fleming in Annex 12, particularly to the first paragraph and the Note of General Babbitt on page 2, in which I fully concur.

XIII. TRENCH MORTAR BATTERIES.
(Pars. 52 and 53, page 31.)

19. I concur in the recommendations of the Board. These are not very definite, and in my opinion definite decision as to organization and number of organizations should await further development of motorized materiel of much greater mobility and of greater range. This study should be undertaken and pushed to a conclusion now while the questions are fresh in the minds of Trench Artillery Officers - it is believed that rapid progress would be made.

XIV. SCHOOLS AND TRAINING.
(Pars. 54 to 58, pages 31 to 35).

20. Detailed recommendations can not be made on this subject until we know what the national policy in regard to our military forces is to be. When Congress has fixed upon that policy, the whole question should and doubtless will be carefully studied with a view to fitting to our new conditions a system based upon our experiences in the A. E. F. With the report of the Chief of Artillery, A. E. F., there will be submitted the reports of all of our Directors of Instruction at the Divisional Training Camps, the Centers of Organization and Training, and the Artillery Schools of the A. E. F.

A study of these in connection with the reports of our operations in the Chateau-Thierry, St. Mihiel, and Meuse-Argonne campaigns, showing our shortcomings in respect to training, should enable us to devise a system of schools and training which will be highly satisfactory.

I concur in the general scheme recommended by the board.

ERNEST HINDS
Major General,
Chief of Artillery, A. E. F.

sam

2 Inclosures to this Indorsement. - Annexes Nos. 15 and 16.

Office, Chief of Artillery, A. E. F.

March 5, 1919.

My dear Snow:

I enclose for your confidential information an extract from the proceedings of a Goard convened in this Office and my draft of an indorsement thereon, relating to the future relations between the F. A. and the C. A. C. I am preparing and will submit to the C.-in-C in a few days an indorsement dealing fully with the Hero Board Report and will then ask that one copy be forwarded to the War Department for use in connection with the study of future legislative proposals for reorganization. Meanwhile this will serve to inform you as to the views of about thirty of our regular officers of F. A. and C. A. C. over here.

I enclose also a statement of Colonel Nance stating his personal views in regard to this part of the report of the Board. As is frequently the case, it appears that this part of the report of the Board was arrived at as a compromise. I do not know Kilbreth's personal views as he left at once upon the completion of the work of the Board, but I believe that he as well as practically all of our regular F. A. officers would say that the ideal solution is that indicated in my indorsement. The practical question will always arise in war as to the best means of utilizing any surplus trained personnel which the special conditions may temporarily create in a particular arm, just as it arose in this case.

Ernest Hinds,
Major General,
Chief of Artillery, A. E.F.

2 Inclosures.

Major General W. J. Snow,
Chief of Field Artillery, U. S. A.,
War Department, Washington, D. C.

P. S. You wrote some time ago that you wanted some of our F. A. regular officers for duty at the War Department. General Bowley who is C of A of the 6th Corps hasn't very much to do. He has positive views as to F. A. matters (anti-consolidation etc.) and might do us a lot of good over there. Should you need him and care to ask for him by cable I shall recommend that he be returned. He would be very glad to he he informed me a few days ago.

E. H.

General Headquarters,
AMERICAN EXPEDITIONARY FORCES.

France, March 5, 1919.

MEMORANDUM FOR THE CHIEF OF ARTILLERY:

1. In the questionnaire that was sent to various officers of experience in the A. E. F., when the Hero Board began its work, the question of separation or consolidation of the Field Artillery and the Coast Artillery Corps was made one of the sub-heads contained therein. The answers received were I believe without exception, divided into two classes, the officers of Field Artillery declaring for a continuation of the separation, and those of the Coast Artillery Corps advocating a consolidation of the two branches. Instead of reporting this question under this head in the proceedings of the Board, it was decided to include the matter in the recommendation made for General Organization.

2. As is known, I was several days late in joining the Board, Colonel Sturgill having been first named as a member, and later on I was for several days absent, preparing and delivering a lecture at the Third Corps Schools. Upon my return I found that General Hero had already begun to write the draft of the proceedings, and that part which contains the recommendations on General Organization was included in the portion already written. I read this and studied it at some length to see if I agreed. I was surprised to find that although the recommendations received had been of two directly opposite views, the other two members had agreed upon a policy which left the two branches of the service separated as they now are.

3. My own belief was that the Field Artillery should constitute all the artillery that accompanies an army in the field. I was fully aware of the shortcomings of the artillery of the A. E. F. when it came to war of movement, and realized that these shortcomings were the result of a too great expansion. Had there been more officers of Field Artillery trained under the principles in vogue in that arm before the war, there was no doubt in my mind that our mobility would have been more nearly perfect than it was.

4. But I realized that in the event of another war where the defense of our coasts was rendered unnecessary, the C. A. C. would undoubtedly be utilized where their services would be of the most good, and considering also the agitation in favor of consolidation of the two arms, I decided that the plan as outlined by the Board was acceptable to me.

5. It may therefore be said that this recommendation of the Board was in the nature of a compromise.

C. H. NANCE,
Lt. Col., F. A.

hb

Aultman	-	155 too heavy. -- Should go to Corps. 105 German Howitzer was excellent. --
Babbitt	-	Wants 155.
Berry, HS Col CAC	-	155 too heavy for horse drawn. --
Bowley	-	Wants a lighter howitzer - no caliber indicated.
Butner	-	Wants 155 howitzer.
Army Center of Artillery Studies	-	Wants a 4."7. -
Davis, R. P.	-	Wants a medium howitzer - caliber not indicated. -
Horn	-	Wants 155.
Kennedy	-	Wants 155. -
McIntyre	-	155 satisfactory. -
Summerall	-	Wants 1 regiment 155 and 1 regiment 105 howitzer.
Fleming	-	Wants 1 regiment - 16 155s, 8 120s
McMaster	-	Wants 1 regiment - 8 155s, 16 120s
Bunker	-	Wants 1 regiment 4."7 howitzers. -
Burr, Edw.	-	Wants 155 retained. -
Glassford	-	Does not express himself as favoring a change. -
Price	-	1 battalion 155 howitzers - 2 battalions 4."7 howitzers. -
Wingate	-	2 battalions 155s, 1 battalion 105s.
Nance	-	1 regiment of 155s. -

EXTRACT FROM EXHIBIT "A".

GENERAL HEADQUARTERS
AMERICAN EXPEDITIONARY FORCES
Office, Chief of Artillery.

December 11, 1918.

To all officers who command, or who have commanded artillery brigades, artillery regiments, trains or schools, in France:

This board has been appointed to make a study of the experiences gained by the artillery of the A. E. F., and to submit recommendations based upon such study.

You are requested to submit to the board recommendations for changes in organization, armament, transport, equipment, training, supply, etc., based on your experience, or the experience of officers under your command.

The following subjects are suggested for remark, but it is not desired that you discuss them all, merely those in regard to which your experience or observation suggests some definite recommendation:

* * * * * * * *

(b) Organization and armament of the divisional artillery, the corps artillery, the army artillery.

* * * * * * * *

(1) Future relation of the C.A.C. and F.A.

* * * * * * * *

The work of the Board will be facilitated if suggestions relating to each of the foregoing subjects be placed on a separate sheet. Instances of defects in approved organizations or methods are of value and are desired.

Where report has already been made to the Chief of Artillery, A.E.F., on any subject, a reference to date of report will be sufficient.

(signed) ANDREW HERO, JR.
Brigadier General, U.S.A., President

EXTRACT FROM:

Proceedings of the Board of Officers convened by the following order:

GENERAL HEADQUARTERS, AMERICAN EXPEDITIONARY FORCES,

OFFICE, CHIEF OF ARTILLERY.

OFFICE MEMORANDUM: December 9, 1918.

A Board is appointed to make a study of the experience gained by the Artillery of the A.E.F., and to submit recommendations based upon such study.

Detail for the Board.

Brigadier General Andrew Hero, Jr., United States Army.
Brigadier General John W. Kilbreth, Jr., United States Army.
Lieutenant Colonel Curtis H. Nance, Field Artillery.

* * * * * * * *

By direction of the Chief of Artillery:

EDWIN K. SMITH
Lieutenant Colonel, C. A. C.,
Secretary.

* * * * * * * *

On December 11, 1918, the Board formulated the attached letter, (Exhibit A) and had it sent to all officers who have commanded artillery brigades, artillery regiments, trains, or schools in France, for an expression of their views on the subjects indicated.

The Board has made a careful study of all replies received from Exhibit A, indicated above. Based on this, and from other information it has received, the following report is submitted:

* * * * * * * *

I. General Organization.

1. The artillery of the United States Army to consist of two branches, Field Artillery and Coast (or Heavy) Artillery. The Field Artillery to be organized in regiments, and brigades where three or more regiments are brought together. The Coast Artillery to constitute a Corps, from the personnel of which battalions, regiments and brigades should be formed for anti-aircraft guns, trench mortars, the heavy tractor-drawn guns and howitzers, and the railway artillery. There should be a Chief of Field Artillery and a Chief of Coast Artillery as now provided, whose duties are such as are now prescribed.

2. The Field Artillery will comprise normally all mobile and fairly-mobile guns and howitzers, constituting what is generally termed divisional and corps artillery. The Coast Artillery will be charged with the care, operation and tactical use ofthe anti-aircraft artillery, of trench artillery, of the heavier calibers of guns and howitzers, normally used for army artillery, and of the railway artillery; including the armament of seacoast fortifications and the mine defence of harbors. (See Annex 1.)

* * * * * * * *

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Proceedings of the Board of Officers convened by the following order:

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Detail for the Board.

Brigadier General Andrew Hero, Jr., United States Army.
Brigadier General John W. Kilbreth, Jr., United States Army.
Lieutenant Colonel Curtis H. Nance, Field Artillery.

* * * * * * * *

By direction of the Chief of Artillery:

EDWIN K. SMITH
Lieutenant Colonel, C. A. C.,
Secretary.

* * * * * * * *

On December 11, 1918, the Board formulated the attached letter, (Exhibit A) and had it sent to all officers who have commanded artillery brigades, artillery regiments, trains, or schools in France, for an expression of their views on the subjects indicated.

The Board has made a careful study of all replies received from Exhibit A, indicated above. Based on this, and from other information it has received, the following report is submitted:

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* * * * * * * *

There being no further business before it, the Board adjourned, sine die.

(sgd) ANDREW HERO, JR.
Brigadier General, U.S.A.
President.

(sgd) J. W. KILBRETH, JR.
Brigadier General, U.S.A.,
Member.

(sgd) C. H. NANCE.
Lieutenant-Colonel, F. A., U.S.A.,
Member.

Chaumont, January 29, 1919.

C. of A.
E.H.

1st Ind.

O. C. of A., G.H.Q., A.E.F., March 29th, 1919. - To the Adjutant General, A. E. F., forwarded.

I. GENERAL ORGANIZATION (PAGE 3).

1. I concur in the opinion of the Board that the Field Artillery and the Coast Artillery Corps should not be consolidated.

2. I do not concur in its views as to the division of duties between the two. We used Coast Artillery troops in the Artillery of the A. E. F., but they were engaged almost wholly in what is properly Field Artillery work. We used them because they were not at the time needed for manning our Coast Defenses and were in consequence available for other uses; they were trained and disciplined troops, an asset that in the great expansion of our Army could not be permitted to remain idle. They rendered efficient service in the A. E. F. Artillery, but it is not open to question that they would have been still more efficient had they been trained for the same number of years in Field Artillery methods and in handling the same calibers to which they were assigned in the A. E. F.

A division of the duties of the Artillery accompanying the armies in the field, along the lines recommended by the Board, would introduce an element of divided responsibility in regard to the training of the artillery, which is vitally wrong in principle. In time of war there doubtless would be a Chief of Artillery for the field forces -- there can not be two, one for the Field Artillery and one for the Coast Artillery personnel assigned to the field forces. The result would be two agencies in time of peace responsible each in part for personnel which is to be combined during time of war for work under the Chief of Artillery of the Field Forces. Such a principle cannot be defended.

It is but a few years since the Field and the Coast Artillery were separated. This separation was the result of many years' study and effort on the part of our ablest artillery officers to secure the necessary legislation, and it behooves us to inquire thoroughly into the demands of the Coast Artillery for a reversal of our policy - for the advocacy of the consolidation so far as artillery officers are concerned appears to be confined exclusively to officers of that branch.

A short resume' of the history of our artillery organization may be pertinent to the study of this question:- From March 3, 1847, until February 2, 1901, the organization of the Artillery of the United States Army was regimental, each regiment consisting of twelve batteries, two of which were armed and equipped as light artillery. Officers were detailed by roster for two-year tours of duty with the light batteries. With the improvement of the

arm, this arrangement became unsatisfactory; there arose a need and a demand for specialization in training. As a result of many years of agitation on the part of artillery officers, and in consequence of the experience of the Spanish-American War, the Artillery in the reorganization of 1901 was organized as a Corps, but was divided into two branches - Coast and Field. Shortly afterwards the introduction into the United States Army of the modern rapid-fire field gun, and the many improvements incident thereto, caused a renewal of the agitation for a greater specialization in training and a permanent assignment of the personnel to one or the other branch of the Artillery Corps. For several years prior to 1907, artillery officers with practical unanimity urgently demanded a separation of the Corps into the two branches - Field and Coast. The reasons for desiring the separation were: that it was wholly impossible for any officer to become expert in both branchs; that it was necessary to specialize not only in one or the other branch, but within each branch; that there existed no tactical relation between the two branches; and that the efficiency of the Artillery would be greatly increased by the separation and consequent specialization of the work of the officers.

The Chief of Artillery, General Murray, advocated the separation for the following reasons:-

> "It is a sound military principle that only such arms of the service as have a fighting or tactical relation with each other should be combined for organization purposes. The Coast Artillery, organized solely for the proper handling of the two correlative elements of harbor defense - heavy guns in fixed emplacements and submarine mines in position in channels to be defended - constitutes in reality a passive defensive force which has no tactical relation whatever with the active forces of infantry, cavalry or field artillery, the three fighting elements of a mobile army. In all mobile armies there is a definite ratio between the three fighting elements whenever these are combined in organizations for tactical purposes, the size of the organization or of the mobile army determining the amount and organization of its field artillery. The Coast Artillery, constituting the defense of harbors against an enemy's fleet, not only has no tactical relation with any of the fighting elements of a mobile army, but there is no definite ratio between the two fighting elements, heavy guns and mines. The number and character of the guns and the number of mines vary with each harbor to be defended. The combination of the Coast and Field Artillery into a Corps as is now done is not only unsound as a military principle, but the frequent interchange of officers between those tactically unrelated arms is considered detrimental to the efficiency of both."

The General Staff as a whole and the Chief of Staff, after several years of study advocated legislation to accomplish the separation. As a result Congress enacted the law of January 25, 1907, creating the two branches.

This law defines these branches as follows: "The Coast Artillery is the artillery charged with the care and use of the fixed and movable elements of land and coast fortifications, including the submarine mine and torpedo defenses." Section 3, Act of January 25, 1907.

"The Field Artillery is the artillery which accompanies an army in the field, and includes light artillery, horse artillery, siege artillery, and mountain artillery." Section 4, Act of January 25, 1907.

There have been remarkable developments in motorization of artillery transportation since 1907, but it is believed that the true line of demarcation between the Field and the Coast Artillery has not been changed thereby; it is still as it was then, a question of mobility. The Field Artillery should be that which accompanies an army in the field -

without regard to caliber or the size of the organization to which it may be assigned - it should include Divisional, Corps, and Army guns of all kinds and calibers which are mobile on the roads or across country. Railway artillery is mobile but it can not accompany an Army in the field - it is a special arm which will undoubtedly be needed in our Coast Defenses. The Coast Artillery should, therefore, provide its personnel; and doubtless on the rare occasions in our service where it might be needed elsewhere it could readily be provided by the Coast Artillery in such quantity as may be necessary.

3. I recommend, therefore, that the present law governing the organization of the Artillery of the United States Army into Field and Coast Artillery and prescribing the duties of these branches be not changed.

Should there be a relatively greater increase of the Field Artillery than of the Coast Artillery Corps, there should be provision made for freely transferring suitable officers who so desire it from the Coast to the Field Artillery with a view to equalization of promotion in the two branches.

Besides this step toward the equalization of promotion the question of a single list for promotion to include all combatant officers of the Army should be considered before legislation is enacted for the reorganization of the Army. If promotion were placed upon this basis, most of the partisan advocacy of or opposition to reorganization plans would disappear, and they would be based in much greater degree upon their real merits.

* * * * * * * *

ERNEST HINDS
Major General,
Chief of Artillery, A. E. F.

RECOMMENDATIONS OF ARTILLERY OFFICERS

American Expeditionary Forces

on the

FUTURE RELATION

of the

FIELD ARTILLERY

and

THE COAST ARTILLERY CORPS.

General Officers

Favor Consolidation

(1) As the result of the war we regard the Artillery from a new standpoint. It is not unreasonable to believe that few if any guns, of any calibre, will be hereafter mounted on any but mobile carriages. Our existing installments of Sea Coast Mortars are as a rule well placed for future contingencies and can be used as heretofore up to their limiting ranges, but future improved weapons, mortars or guns will, I believe, be made mobile.

(2) A wide range of calibres, from the 37 mm. to the 14-inch or larger, has been employed in active field operations. The training of artillerymen in their use, from 3-inch up, begins with principles of gunnery commo to all calibres, and officers and men competent to handle any one of them can soon be made competent to handle any other. It is my belief that there is now no more reason for the present division of artillery in our way - Coast and Field - than a further subdivision based on calibres, or means of traction, or localities where used.

The ideal organization would be an arm that includes al guns, except the smallest, which are necessarily infantry weapons.

(3) The principal and indeed the only objection to this worth serious consideration is the effect on the existing personnel of the Regular Army in making the reorganization.

The war has brought the Artillery and Infantry in close contact; each realizes his dependence on the other and the best of feeling and some affection have grown up where the guns have helped the muskets to go forward and have kept them there. This is so even with the unwieldly ones of large calibre, where they would be employed. Likewise when all calibres could work for a common end there has been a common inteest and liking in the artillery itself.

Numerous officers heretofore trained in other work have undertaken the command of artillery of all kinds, and

Oppose Consolidation

It is not believed in the interest of the military establishment to combine the fied and coast artillery.

The thorough development of light artillery service to its maximum efficiency is the natural problem for our Field Artillery.

The thorough development of heavy artillery for coast or land warfare is the natural problem for our Coast Artillery.

And the two artillery services we now have will have plenty to do in working out their separate problems as now organized, and in my opinion, better net results will ensue from this course.

A. CRONKHITE,
Major General,
6th Corps Artillery.

Unless this be done for the purpose of having a "Single List" for promotion, in which case it should include all the officers of the line and staff except the Medical Department, and Chaplains, the Philippine Scouts, the Dental Corps and Veterinarians, it is believed the consolidation would be a step backward. For years the separation of the Field and Coast Artillery was advocated; the reasons are given in the annual reports of the Secretary of War and of the Chief of Artillery for years prior to 1907 - it is unnecessary to report them here. They were good and they apply today, just as forcibly, in my opinion, as they did years ago. Why tear down the structure it took us so many years to build. There are just as great similarities and as great differences to be found in the two arms as there were before they were separated. It is believed that our Coast Artillery is the best in the world today, but our experiences in this war have not shown that Coast Artillery training has fitted them particularly well in general for Field Artillery duty. Even if for pur-

succeeded in it. The field artillery regiments and brigades have been successfully commanded by Coast Artillerymen.

(4) As the result of an extended experience I am convinced that all the friction between the various arms heretofore has been due to inequality of promotion and that if this can disappear there will go with it practically all objections to any rearrangement of duties in the Artillery as well as any proper increase in numerical strength of any arm whatever over any other. And until this can be done there will be such hostility on the part of so many affected that the best of proposed measures will be doomed to serious modifications or failure.

(5) I believe that no only should the existing organizations of Field and Coast Artillery be consolidated and all the officers placed on a single list arranged according to length of commissioned service but that this single list should include every line officer in the service. There is no insurmountable objection to this. Officers can be commissioned and assigned to the arm for which they are best fitted and retained therein. When promoted they can remain in their arm, detached from that in which the vacancy occurs until a vacancy occurs that will keep them in the former.

(6) It is true that there will be discontent among those who have already had promotion over others of longer commissioned service, but, in the first place, more will be benefitted than hurt, and in the second we are building for the future; present irregularities will disappear and eventually a system obtained where absolute equity will prevail and discontent disappear.

No one should be demoted, if the single list comes in; present rank being retained and officers carried as supernumerary members until again promoted.

(7) I, therefore, recommend that in any Army Reorganization the Artillery be made one arm and that a single list be adopted for all line officers.

C. J. Bailey,
Major General, 81st Division.

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poses of obtaining equality of promotion a "Single List" should be adopted, it should not mean a consolidation of the two branches. Our officers should still be assigned to one or the other and remain with the branch to which they are assigned except for short periods during which they might be attached to the other in order to get a general idea of the capabilities and the limitations of that branch. Officers must specialize even within the arms as now organized. We can not make jacks-of-all-trades of them. For these reasons we need specialists to supervise, direct and develop each arm - Chiefs of Infantry, Field Artillery, Cavalry, Coast Artillery, Air Service, etc., - call them Inspectors if you will - their duties should be the same no matter what may be their designations.

ERNEST HINDS
Major General,
Chief of Artillery, A. E. F.

The relations between the Coast Artillery Corps and the Field Artillery should continue as they have been in the past. They were shown to be best for peace conditions and they have admirably adapted themselves to war conditions. There should be a Chief of Field Artillery in the War Department as at present constituted as well as a Chief of Coast Artillery. Their functions cannot be successfully combined under one head and our efficiency will suffer greatly if the two arms are united.

C. P. SUMMERALL
Major General, 5th Corps.

I believe the Coast Artillery Corps and the Field Artillery should be made into one body, instead of two, since I can see no clear line of demarcation between them and believe that very much of the success which we have had in the present war is due to the fact that the higher officers of each have, at one time or another, been trained in both. What form this reuniting is to take I am not prepared to state but believe it could be made satisfactorily. Of course the question of promotions has always been difficult in a thing of this kind, but some sacrifices will undoubtedly be necessary in order that the needs of the service might be met to best advantage.

W. R. SMITH,
Major General, 36th Division.

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It is believed that the uses of the various calibers and mounts of artillery, as well as the methods employed, will blend so gradually together that it will be difficult, if not impossible, to differentiate betwwen the two branches. The two should be combined in one.

IRA A. HAYNES,
Brigadier General, 64th F. A. Brigade.

For some years it has been evident to many Coast Artillery officers that a large proportion of the armament of coast defenses should be movile, and also that owing to the development of mechanical motive power there was no limit to the caliber of the guns that could be made mobile. It was also considered that owing to their knowledge of civil, mechanical, steam and electrical engineering, and also to their knowledge of interior and exterior ballistics and of all methods of fire control, the personnel of the Coast Artillery Corps were fully competent to man the mobile armament when mechanical means of transport were used.

It is believed that efficient service has been performed by Coast Artillery personnel with tractor drawn heavy field guns in operations in France.

The most difficult problem of the Coast Artilleryman is due to the fact that his

In certain of their phases the Coast Artillery and the Field Artillery services approach each other. In other phases they are at exactly opposite ends of the same line.

There is ample work for the Field Artillery service in developing to its ultimate efficiency light artillery <u>in all its phases</u>.

There is likewise ample work for the Coast Artillery in developing the service of long-range guns, both fixed and movable, <u>in all their phases</u>.

The long range movable guns are very appropriately the secondary guns for coast defense, to be used in supplementing the high-power fixed guns at all of our important harbors and in providing the defense of the less important harbors which do not warrant the installation of the high-power fixed guns.

It is believed that the best interests of the service will be subserved by having these two branches work at their problems with <u>proper liaison</u>, rather than as one service.

There is no reason why officers developed in the two services may not be used in war without conflict or

target moves in varying directions and at varying speeds. A Coast Artilleryman must also have a thorough knowledge of naval construction, naval tactics, strength of armour and penetrating power of projectiles. When engaged, however, against field forces his target is in general stationary and consists of either personnel or materiel, the resisting power of which is easily learned and consequently his problem is more simple.

His training gives him all the knowledge of a Field Artilleryman except that which is required for the proper care and handling of animals. There is no logical reason for Coast Artillerymen not doing good work in the field when mechanical motive power is used.

As the necessity arose of making coast artillery armament mobile an increase was being made in the calibers of the guns assigned to the Field Artillery, until there was an overlapping of the calibers assigned to each branch of the service. Moreover, many of the methods of fire control and fire direction developed in this war by the field atillery of the different armies are similar to the methods practiced by the U. S. Coast Artillery for the past fifteen years. In other words the line of demarcation between the two branches was based principally upon the want of knowledge of the care and handling of animals on the one hand and the want of knowledge of mechanical, steam and electrical engineering on the other.

There will always be one set of officers better adapted, owing to their scientific attainments and dislike of horses, to the service of the immobile coast artillery guns, submarine mine fields, power plants, search lights, etc. Another set of officers who from their liking for horses, desire for a more out-of-door life and their dislike or inability to solve problems of mechanical, steam or electrical engineering, will prefer service with horse drawn guns; and lastly, a third set of officers who are able to render efficient service with either what was formerly termed Field Artillery or the Coast Artillery.

Again, as soon as the command of the sea is secured in any future war, a personnel as highly trained and as highly disciplined as Coast Artillery Corps will not be retained in its full strength in sea coast defenses. Its overlapping of function and without crimination and recrimination.

R. P. DAVIS
Brigadier General, 151st Brigade.

The functions of the Field Artillery and the Coast Artillery have little in common, though they were more nearly on common ground in the trench warfare than is likely to occur again. It might be appropriate, however, for the Coast Artillery to have some training in heavy field guns, such as the G. P. F. and those of larger calibre.

E. B. BABBITT,
Brigadier General, 4th Brigade.

The Field Artillery is a part of the mobile army.

The Coast Artillery Corps is a part of the immobile army and it is believed that their relations should remain as they have been. In time of war, armies do become immobilized, sieges are conducted and all the warlike resources of governments are used. It is believed that light siege guns can accompany corps troops and should be a part of the mobile army, but there seems no more reason that the Field Artillery and the Coast Artillery Corps should now be combined than that the Marines and the U. S. Infantry should be combined. A rotation of service by officers, as alluded to in "i" would seem to be a proper solution.

T. N. HORN
Brigadier General, 7th Brigade.

I believe that the future relations of the Coast Artillery Corps and the Field Artillery should be as at present - those of separate arms.

During the war it has been demonstrated that the Coast Artillery officer, while in many cases thoroughly capable of handling the heavier types of artillery, is not well qualified for the duties of light artillery commander. This would include the command of Divisional Artillery, Corps

officers and enlisted men will be required for field duty as in this war. They should, therefore, be so organized and trained that they can go into the field without dislocation, that is, their training should include the methods of the field artillery arm.

The employment of coast artillery troops with the mobile arm as in this war was foreseen a number of years ago by many coast artillery officers. It was also foreseen that if so employed Coast Artillery personnel would act as assistants to the other arm, that is, in a subordinate capacity, notwithstanding the comparative records of officers of the two arms from the time they became 4th Classmen at the Academy, or from the time they became 2d Lieutenants.

The more the subject is studied the more difficult, it is believed, will be the establishment of a distinct line of separation between the two branches of artillery.

It is submitted that some form of amalgamation is inevitable.

H. D. TODD, JR.
Brigadier General, 58th Brigade

Artillery and mobile types of army artillery.

It is also a fact, within our own experience, that neither the Coast Artillery nor the Field Artillery, and more especially the latter, made any advance towards a high state of efficiency until after the separation of 1907.

If we are to profit by our own experience the two arms must remain separate.

D. E. AULTMAN
Brigadier General, Army Artillery, 2d Army.

Complete divorce. The Coast Artillery Corps and the Field Artillery were separate in 1907 for good and sufficient reasons. These reasons will be found in the numerous reports of the Chief of Artillery prior to the year of separation. They still hold good. The general training at sea coast fortifications totally unfits the coast artilleryman for duty in the field. He lacks mobility and knowledge of transport; he lacks adaptability to the rough and changing conditions of the field.

A. J. BOWLEY
Brigadier General, 6th Corps Artillery

I think nothing will be gain by com bining the coast and the field artillery services into one corps, but I do believe in a Chief of Artillery with two bureaus under him, one for Coast Artillery and one for Field Artillery. In this way the whole range of artillery matters will be covered with much benefit to the Government and increased efficiency for the two artillery branches.

R. E. CALLAN
Brigadier General, 33d Brigade.

The Field Artillery and the Coast Artillery (per se) have nothing in common. They are both called artillery and they both shoot cannon, but from this point on their paths are absolutely divergent. The Field Artillery has everything in common with Infantry and Cavalry, nothing in common with the Coast Artillery. This

naturally follows from the duties assigned by law to each of these arms.

Their methods of shooting are diametrically opposed and training and skilfulness in one method unfits the individual for training and skilfulness in the others.

Long service with guns on fixed mounts in concrete emplacements under strictly defensive conditions units a man for aggressive action under field conditions and creates a physical and mental condition that shortly becomes chronic. A good coast artilleryman cannot be a good field artilleryman, and vice versa. This was appreciated long before the separation of the arms in 1907. Every artillery officer of length of service before that date was either a coast or a field artilleryman despite the unison of the arms. If temporarily assigned out of his pew he was discontented and inefficient.

The functions of the two branches have not changed since. They hae nothing in common except the red facings of their uniforms. No change in their relations recommended.

H. G. BISHOP
Brigadier General, 3d Field Artillery Brigade

They should be separate organizations. They require separate training. If it is deemed wise to have a corps of artillerymen trained in the use of the heavier calibres which go into the field, then they should be organized and trained as such in time of peace and their functions and uses studied.

H. W. BUTNER
Brigadier General, 1st Field Artillery Brigade

The Coast Artillery, organized and trained for the purpose of the defense of our harbors, has no tactical relationship whatever to the Field Artillery. There should be no future relation between them, but the entire artillery should be organized not upon a question of calibers or mobility but upon a question of duties. The Field Artillery is the artillery which accompanies an army into the field. The fact that the Coast Artillery and officers

and men who could be spared from harbor : d
cates no relation between the Field Artil-
lery and the Coast Artillery any more than
there is a relation between the Field
Artillery and the Cavalry, or with the
civil population of the United States
which furnished most of the Field Artillery
used in France. The fact that the harbor
defense artillery could be used as field
artillery under certain circumstances does
not permit of their being considered
available as a part of the mobile army.
In our wars heretofore, for one reason or
another, we have been able to use our
harbor defense troops to field artillery
and infantry. While they may always be
considered as possibilities for duty with
field armies, they should not be included
so as to replace in any way a full quota
of mobile troops, about which there is no
doubt as to their ability to go anywhere.

The Artillery should be divided into
two branches, separate and distinct, based
upon their entirely different duties - one
should be the harbor defense artillery,
whose duty is to guard our harbors; the
the Field Artillery, whose duty it is to
accompany our armies into the field. The
defense of our coasts cannot be turned over
to one branch. It must be the duty of the
mobile army. In the reorganization along
those lines, transfers should be permitted
from the Coast Artillery to the Field
Artillery, and vice versa, up to a certain
time, when further transfers will cease.
At this time, efforts should be made as
far as possible to make an equality of
promotions throughout, although it is
doubtful whether any scheme can be devised
by which 25 per se of the officers
effected will be satisfied.

A. McINTYRE
Brigadier General, 154th Brigade

Colonels

Future Relation of the Coast Artillery Corps and the Field Artillery:-

1. Believe that past and present relations between the Coast Artillery Corps and the Field Artillery have produced only unfortunate results. In my opinion, the services

• Complete separation of Field and Coast as at present. The Coast Artillery will always be of great value as Army Artillery and Corps Artillery, if the latter is considered necessary.

should be combined and all officers trained in field work.

2. Organizations manned by personnel from the Field Artillery but armed and serving as heavy artillery should have the benefit of the advanced grades and additional pay statuses that the Coast Artillery Corps enjoy.

A. S. CONKLIN
Colonel, 303d Field Artillery

There should be but one artillery service as there was previous to 1907. The principles governing the shooting are the same, those governing mobility are, of course, different, but all artillery officers should serve in both branches of light and heavy. There will never be a war in which an expansion of personnel will not be tremendous, previous service with all classes of artillery will produce a larger body of artillerymen on which to base expansion.

F. W. STOPFORD
Colonel, 80th Field Artillery

I believe that the Coast Artillery Corps and the Field Artillery should be combined in one arm. This war has shown that there is practically no difference in artillery, and the line of demarcation coming between smaller calibres and the higher calibres is very hard to fix. With field artillery becoming more and more motorized, there is no difference between it and the heavier motorized artillery, except in its weight, and on good roads one can move as freely as the other. In fact, the calibres now grade one within the other. I do not believe that it is a good idea to detach officers from one arm to serve with the other, and I recommend that this practice be discontinued for reasons that I would not care to state here. In case the Coast Artillery Corps and the Field Artillery are not recombined and made one army I think that the line of demarcation between the two services should be made perfectly clear and distinct. I think that all field artillery should be divisional artillery and that Coast Artillery officers should not be assigned to command the heavy regiments in the division. The Coast Artillery should command the Corps, Army and Railway Artillery, and should be an entirely

R. H. McMASTER
Colonel, 21st Field Artillery

I think they had best be separated entirely and have it made possible to detach them for service with Navy or Marines when needed.

R. H. DUNLAP
Colonel, 17th Field Artillery

The future relation of the Coast Artillery Corps and the Field Artillery should be the same as that immediately before the war. There seems to be little enough in common with the Coast Defense and Field Artillery. While Coast Artillery may be properly assigned to Corps and Army Artillery of the heaviest calibers, it would seem far better that it does not find any place in the Divisional Artillery. To have an officer serve efficiently in both the Coast Artillery Corps and the Field Artillery is not usually possible, as the professions are so broad and specialty in one or the other would produce, probably, a very mediocre officer for general value; whereas, at present, there is opportunity to become an officer of general value for particular service in either of the two services. Further, it is hardly conceivable that the type of officer who would do best in a mining casement would also excel in mobile combat.

CLARENCE DEENS
Colonel, 57th Brigade.

As this is a day of specialization, it is believed that each arm should remain separated, as each is a highly specialized arm. It is believed that all Coast Artillery officers could very well be used in the Field Artillery again, in case of sudden expansion to a war footing, and that their present training is such as to allow amply grounds for absorbing the purely technical needs of artillery. The tactical use of artillery would, of course, require considerable time to assimilate, as also the habit of automaticlly conducting open warfare problems, but they should learn this latter nearly as quickly as the personnel could be trained.

separate and distinct proposition. In combining the two arms when they are separated as they are now, it is bound to engender bitterness and jealousy, due to the question of promotions, which, in my opinion, is the foundation of many troubles in the Army.

C. D. WINN
Colonel, 306th Field Artillery

The Field Artillery and Coast Artillery should be combined. Field Artillery methods today and in the future are closely allied to Coast Artillery practice, and neither is so intricate that progressive officers cannot learn both. Officers can be detailed in either arm, as was done before the separation, depending on their preference or necessity. In any case, Coast Artillery officers can keep up on field artillery practice so as to be ready for the field at any time.

W. P. PLATT
Colonel, 302nd Field Artillery

I recommend consolidation of all artillery.

Attention is invited to page 12, Cont. pamphlet 990, entitled "Artillery Firing". This book emphasizes the need of all artillery being one arm. Artillery uses at one time principles of snap firing and at another fire with all possible theoretical corrections.

There can be no question that our Coast Artillery Corps has run wholly to position firing - such training as we have had the last ten years has developed defensive feelings - for war we must have offensive training. This one point of view accounts for many excellent C. A. C. officers who have not "made good" in this war.

The Coast Artillery Corps officer and the Field Artillery officer have much in common and must develop along lines at least kindred and crossing.

There should be one Chief of Artillery, under him may come light and heavy field and fixed artillery, but exchange for qualified officers must be allowed. Our old permanent

F. C. DOYLE
Colonel, 305th Field Artillery

Have neither seen nor heard anything during this war to cause me to think that there should be any change in the relations of the Field Artillery and the Coast Artillery Corps.

TILMAN CAMPBELL
Colonel, 329th Field Artillery

It is believed that the Coast Artillery and the Field Artillery should be separate and distinct. The Field Artillery should comprise all 75 regiments and 155 short. The past experience of an artillery corps, embracing both the field and coast artillery as now organized, is sufficient argument against a resumption of the former organization.

W. H. DODDS, JR.,
Colonel, 6th Field Artillery

The Coast Artillery Corps and the Field Artillery are distinctive branches of the service and should not be combined.

A. L. COX,
Colonel, 113th Field Artillery

While not prepared to recommend a consolidation of the Coast Artillery Corps and the Field Artillery. I do recommend very strongly a closer cooperation between the two branches. Both services have derived great benefit from the close association brought about by the recent system of detail of artillery officers to the Field Artillery. National Army, and the combining of the two systems of firing.

In the event the two services are not consolidated it is thought that the detail of officers from one branch to the other for limited periods, to study the methods, experiments and improvements of both would prove beneficial. Try "to get together" to eliminate friction and petty jealousies A system providing for equal promotion would go far towards bringing this about.

fixed guns must go - no more be built. Tractor and railroad guns can take their place. All officers must be qualified to concentrate guns of all calibers at threatened point and fire effectively by any means at hand.

One List for all Army Officers.

The curse of the service in times past has been the jealousy of one branch of the service for another. The basis of the jealousy has been promotion (and its consequent pay increase).

I have profited by C. A. C. promotion, but am willing to lose now if by such sacrifice we can effect before Congress Military Organization and plans for the "real good of the service."

I recommend:

A single list for all officers (Engineers, Doctors, etc., included).

An elimination of incompetent officers - and a strict one, this to include incompatible officers as well as incompetent.

I oppose promotion by selection (altho I have profitted thereby), because so far our systems of promotion by selection have been very often, tho not always, promotion by personal acquaintance.

The Reserve Officers of this war command the efficient Regular Officers for their magnificient work, but damn the incompetents and the system which lets them live.

P. H. WORCESTER
Colonel, 146th Field Artillery

The Coast Artillery Corps and the Field Artillery are fundamentally one service. Under modern conditions of warfare the Coast Artillery is only one application of Field Artillery methods. When Heavy Artillery reaches the present development of making important corrections for the earth's rotation all Coast Artillery claims of technical mystery appear absurd.

D. McKELL
Colonel, 12th Field Artillery

The Coast Artillery Corps to handle only tractorized units 6-inch or above. The Field Artillery to handle all units horsed or tractorized below 6".

G. L. WERTENBAKER
Colonel, 345th Field Artillery

The future relation of the Coast Artillery Corps and the Field Artillery should remain as it is at present, separate and distinct branches of the service. All divisional artillery, all the corps artillery and all the army artillery of 6-inch caliber and under should pertain to the Field Artillery. All Army Artillery of above 6-inch caliber should pertain to the Coast Artillery Corps. Those larger calibers would be useful in our coast defenses and the Coast Artillery has needed heavy railway guns and heavy tractor drawn howitzers and mortars for a long time. This would economize in materiel since the materiel could be used at any threatened point. The mobile army in the future as in the past should consist of infantry, cavalry and field artillery.

J. T. KENNEDY
Lieutenant Colonel, 5th Field Artillery

A consolidation of the Coast Artillery Corps and the Field Artillery seems advisable. All artillery of whatever calibre should be made mobile. - (a) to effect concealment (b) to permit of the occupation of alternative positions (c) to increase its sphere of activity.

J. F. WALKER
Colonel, 314th Field Artillery

S U M M A R Y

Favor Consolidation	Oppose Cnsolidation
General Officers	
1. Major General C. J. Bailey (Brigadier General) formerly C.A.C.	1. Major General A. Cronkhite (Brigadier General) formerly C.A.C.
2. Major General W. R. Smith (Colonel, C.A.C.)	2. Major General Ernest Hinds (Colonel, Field Artillery)
	3. Major General C. P. Summerall (Brigadier General) formerly F. A.
3. Brigadier General Ira A. Haynes (Colonel, C.A.C.)	4. Brigadier General R. P. Davis (Colonel, C.A.C.)
4. Brigadier General H. D. Todd, Jr. (Colonel, C.A.C.)	5. Bigadier General E. B. Babbitt (Brigadier General) formerly Ordnance Department
	6. Brigadier General T. N. Horn (Colonel, Field Artillery)
	7. Brigadier General D. E. Aultman (Colonel, Field Artillery)
	8. Brigadier General A. J. Bowley (Colonel, Field Artillery)
	9. Brigadier General R. E. Callan (Lieutenant Colonel, C.A.C.)
	10. Brigadier General H. G. Bishop (Colonel, Field Artillery)
	11. Brigadier General H. W. Butner (Lieutenant Colonel, Field Artillery)
	12. Brigadier General A. McIntyre (Major, Field Artillery)
Colonels	
5. Colonel A. S. Conklin (Lieutenant Colonel, C.A.C.)	13. Colonel R. H. McMaster (Field Artillery)
6. Colonel F. W. Stopford Infantry (Major, C.A.C.)	14. Colonel R. H. Dunlap (U.S. Marine Corps)
7. Colonel C. D. Winn Field Artillery (Captain, C.A.C.)	15. Colonel Clarence Deems (Major, Field Artillery)
8. Colonel W. P. Platt Field Artillery (Captain, C.A.C.)	16. Colonel F. C. Doyle (Major, Field Artillery)

9. Colonel P. H. Worcester Field Artillery (Captain, C.A.C.)	17. Colonel T. Campbell (Major, Field Artillery)
10. Colonel D. McKell Field Artillery (Captain, C.A.C.)	18. Colonel W. H. Dodds, Jr. (Major, Field Artillery)
11. Colonel J. F. Walker Field Artillery (Captain, C.A.C.)	19. Colonel A. L. Cox (National Guard)
	20. Colonel G. L. Wertenbaker Field Artillery (Captain, C.A.C.)
	21. Lieutenant Colonel J. T. Kennedy (Captain, Field Artillery)

NOTE: It will be seen from the above that of seven General Officers of Coast Artillery whose views have been obtained, four are in favor of consolidation and three are opposed to it. Of eight Colonels of Coast Artillery whose views are gien, seven are in favor and one opposed to it. All the Regular Field Artillery officers are opposed; Colonel R. H. Dunlap, U. S. Marine Corps, who commanded a Field Artillery Regiment in the 2nd Field Artillery Brigade, and Colonel A. L. Cox, National Guard, Field Artillery, are opposed to it.

Of the four Brigadier Generals of the Regular Army -- two from the Coast Artillery, one from the Field Artillery, and one from the Ordnance Department, three are opposed and one (Coast Artillery) only in favor.

Of the 30 regular officers named, 15 are from the Coast Artillery and 16 from the field. All of the 15 Field Artillery and 4 of the Coast Artillery oppose; 11 of the Coast Artillery favor it.

ERNEST HINDS
Major General,
Chief of Artillery, A.E.F.

ssm

(Note: The following paragraph appeared in the final proceedings of this Board as forwarded to G.H.Q., A.E.F., by General Hinds, and is here inserted by his direction.)

"Considering the 3 members of the Hero Board, Generals Hero, C.A.C., General Kilbreth, F.A., and Lieutenant Colonel Nance, F.A., we have the views of 33 Regular Officers, 16 Coast and 17 Field. All of the 17 Field and 5 of the Coast oppose consolidation, total 22. Of the Coast Artillery officers 11 favor it. Thus taking equal numbers of the two branches, one-third favor and two-thirds oppose.

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E X H I B I T "B"

(6 Papers)

PROCEEDINGS OF A BOARD CONVENED BY SPECIAL ORDER NO. 10,

HEADQUARTERS, 18TH ARTILLERY AREA, 11 DECEMBER 1918,

TO REVISE "EQUIPMENT MANUALS FOR SERVICE IN EUROPE"

FOR A

REGIMENT OF 155 M.M FILLOUX GUNS

3rd Ind.
Hq 18th Area, January 14, 1918 - To Commander-in-Chief, American E.F.

1. Returned. Proceedings of boards, in triplicate, inclosed herewith.

2. The boards composed of able officers with practical experience in handling equipment concerned have performed their duties in a highly creditable manner. Particular attention is called to formation of a Transport Battalion in each regiment of heavy artillery. In my judgement this step is very necessary problem of transportation as well as result in very great economy of materiel.

W. C. DAVIS,
Brigadier General, U. S. A.
Commanding.

Accompanying Original Proceedings
Board of Officers, Office Chief of Artillery, A.E.F.

Proceedings of a Board of Officers convened pursuant to the following order:

HEADQUARTERS 18TH ARTILLERY AREA,

11th December, 1918.

SPECIAL ORDERS,)
No. 10.)

* * * * * *

5. Pursuant to instructions contained in letter of Adjutant General, American Expeditionary Forces, dated December 7, 1918, file no. 15893-A 213, the following board of officers is convened in the 18th Training Area to make a complete study and report on the suitability and adequacy of all personnel and materiel as provided in Equipment Manuals for Service in France and Organization Tables for 155 m/m G.P.F. Regiments, Army Artillery. (Individual equipment of the soldier will not be icluded in the deliberations of this Board).

Detail for the Board:

Colonel M. A. Cross, C.A.C., 57th Artillery, C.A.C.
Lieutenant Colonel T. A. Terry, C.A.C., 58th Artillery, C.A.C.
Captain F. E. Braile, F.A., 57th Artillery, C.A.C.
Captain Dulaney Logan, C.A.C., 60th Artillery, C.A.C.
Captain J. W. Doolittle, O.D., Hq. 31st Artillery Brigade, C.A.C.
Captain J. M. Harris, C.A.C., 55th Artillery, C.A.C.
Captain J. H. Wilson, C.A.C., Hq. 31st Artillery Brigade, C.A.C.
1st Lieutenant T. D. Johnson, C.A.C., Hq. 31st Artillery Brigade, C.A.C.

It is proposed to revise Equipment Manuals for Service in France and Organization Tables based on experience gained in operations at the front. The Board should make its deliberations most thoroughly so as to cover entirely questions of personnel and materiel. When any changes are recommended full reasons should be given therefore, so that the officers undertaking final revision may have before them full information and reasons for recommendations and recommended changes.

Prior to the initial sitting the President of the above-named Board will report to the Commanding General, 18th Training Area for further instructions.

Proceedings of this Board shall be submitted in quadruplicate.

By Command of Brigadier General Davis:

R. D. BROWN,
Major, C. A. C.
Chief of Staff.

OFFICIAL:

R. S. STEWART,
Captain, C. A. C.,
Adjutant.

Doulevant, Haute-Marne, France,
16th December, 1918.

The Board met at 10:00 A.M.

Present - All members.

The Board then proceeded to make a complete study on the suitability and adequacy of all personnel and materiel as provided in Equipment Manuals for Service in Europe and Organization Tables for Regiment of 155 mm. Filloux Guns, Motorized Army Artillery, and finds that:

I. (a) The motor transportation and the personnel connected with it were not organized in such a way as to secure the best use of them nor to maintain them in the best possible conditions. This was principally due to the fact that the control of the materiel was scattered among the organization commanders who were not so situated as to be able to make the necessary inspections of it, nor to supervise the conduct of drivers on the road. It has been demonstrated that a battery commander with his guns to handle must usually be near his P.C. and his battery positions, and that it is not possible for him to exercise proper supervision over trucks on the road or several kilometers to the rear. This is also true of the battalion commander. The need of temporarily transferring trucks to other duty, away from their permanent assignments, was met with on numerous occasions, and when this was done the trucks were likely to be neglected, due to the fact that they were running for people who expected to use them only temporarily. The road discipline was generally poor, due to the lack of supervision.

It is the opinion of the Board that the transportation of a Regiment, except the tractors, should be so organized that the maintenance of the materiel, and the instruction and discipline of the personnel should be under one control; also, so that a certain definite part of the transportation should be organized as a unit for each battalion to accompany it in the field, with a fourth unit for regimental headquarters and a regimental reserve for general purposes. To this end it is recommended that a transport battalion be organized in each regiment, consisting of a battalion headquarters and four transport companies as shown in proposed tables of organization attached hereto.

This battalion should be commanded by a major, on the staff of the regimental commander, who would be charged with the discipline and instruction of the personnel and the maintenance of the materiel. Each transport company should be commanded by a captain who would be charged with the discipline and instruction of the personnel and the maintenance of the materiel. When a combat battalion takes the field it would be accompanied by one of the transport companies, the company commander of which would be the transportation officer of the battalion.

The number of trucks in each transport company is based on the number required to transport the accessories, baggage and approximately one day's allowance of ammunition for a battalion.

(b) The personnel allowed by the present tables was found insufficient to provide a second relief for the guns in addition to all the other details to be performed by it. It was necessary to man the guns at all times, day and night, and to do this two complete reliefs were required. The proposed organization tables attached hereto (Exhibit) show the changes to effect this.

(c) Experience has demonstrated that a battalion should be ready at all times to take the field independently. To this end the proposed table of organization attached hereto, provides a supply officer and an orienteur officer for each battalion.

(d) A great diversity of types of trucks was furnished, some types being well adapted to the work and standing up well in service and others giving much trouble in maintenance. The ammunition body was found ill adapted to service due to its limited cargo space and the lack of protection for the driver and cargo. The four-wheel steer was found difficult to handle under conditions existing at the front.

A standard type of truck would simplify the instruction of drivers and the supply of spare parts for maintenance. It is recommended that a uniform type of 3-ton truck with cargo body, four-wheel drive, and front-wheel steer be provided for both ammunition service and general cargo transport. Also that the rear wheels be provided with dual tires; that the hub caps and cargo bodies be flush with the outside of the wheels and that the radiator be protected by an effective shield; that all trucks be provided with magneto ignition and lighting consisting of a single light pivoted on the dash; with 50 gallon tanks with compartment for emergency reserve; with locker for the storage of driver's personal effects and tools; with racks for picks and shovels; and with draw-bar at the rear, and a 35-foot steel cable, towing sling.

(e) No adequate means of providing lights for the battery P.C. aiming points, and sight illumination were provided. One battery which captured a gasoline generator set of about 1½ K.W. used the same for these purposes with satisfactory results. It is recommended that a gasoline motor-generator set of about 1½ K.W. capacity be provided on light trailer for each battery. This change is shown in proposed tables annexed hereto (exhibit).

(f) With the view of securing uniformity in artillery service, it is recommended that sights and other angle measuring instruments be graduated in mils and that sights supplied all artillery be the panoramic type and of similar design.

(g) The tables of Orienteur, Fire-Control and drafting equipment have been compiled with the idea of standardizing this equipment for all types of guns of large calibre and of providing all materiel of this class actually needed at the front.

Previous tables of equipment call for special designs of fire-control instruments for different types of guns but this is not necessary if a common unit of angular measurement is adopted. Azimuth instruments should be graduated in accordance with this unit. The small transit assigned to each battery in these tables fulfills the purpose of the aiming circle of the 155 mm. equipment and of the Director of the British Howitzer equipment.

The unit of grduation for tapes and plotting scales is dependent upon the unit of measurement and scale of the maps to be generally used for Artillery purposes.

(h) It is recommended that the Signal Corps equipment be modified so as to include only the actual needs of a regiment of heavy artillery used by the American forces with the idea in mind of using equipment of American construction only.

(i) Two general types of tractors were used by 155 mm. Filloux Regiments, the four-wheel drive (Renault type) and the Holt caterpillar type. Each type possesses advantages which the other lacks. The Renault type is superior on long hauls such as when moving from one front to another. It is faster than the caterpillar type and stands travel on hard roads better.

The caterpillar tractor by its construction has greater tractive effort than the Renault type and can put a gun into a position in deep mud or sand, impossible with the other type. Regiments equipped with Renault's tractors found it necessary to have with them at least one caterpillar tractor with each battery. The 155 mm. Filloux Gun, being mounted on springs and having rubber tires, its mobility is, within reasonable bounds, only limited by the speed of the tractor drawing it. The value of this great mobility can hardly be overestimated, especially when operations are shifted suddenly from one front to another, such as the transfer of the First French Army from the Toul Sector to the vicinity of Paris in March 1918.

In order to secure the advantage of both types, it is recommended that each battery be supplied with two 10-ton caterpillar tractors similar to the Holt and six four-wheel drive tractors similar to the Renault. Four of the Renault type tractors to be used to tow the guns and the two additional used to tow specially built, rubber tired trailers with very low bodies on which the caterpillar tractors are transported. The caterpillar tractors are run onto these trailers under their own power which takes but a few moments. This method of carrying the caterpillar tractors distributed the heavy weight in crossing bridges and adds two Renault type tractors for use at gun position in emergency. Equipment similar to this has been used very successfully by the French. The above equipment would not only take advantage of the mobility of design of the 155 mm. Filloux Gun, but would greatly lengthen the life of the tractor materiel as well.

The 10-ton Holt caterpillar tractor gave good service but developed some defects as shown in exhibit attached.

The Renault tractor was satisfactory but it is believed that an American tractor, its equal or superior, can be designed.

(j) The number of typewriters authorized by the old tables is inadequate. Three typewriters should be provided for regimntal headquarters, one for each battalion headquarters, one for each battery or company office, one for the regimental supply office and one for the regimental surgeon's office. It is recommended that a standard size typewriter be supplied for all purposes, instead of "Corona" or similar model. It is believed that the amount of typewriting required of a regiment and its component organizations justifies the number of typewriters recommended.

II. With the foregoing considerations in view, the Board recommends the following changes in the Tables of Organization and Equipment Manual for a regiment of 155 mm. Filloux Guns, motorized (Series C, No. 6):

(a) HEADQUARTERS COMPANY

Table 221 (Headquarters Company) has been changed on account of the Transport Battalion. The chauffeurs, assistant chauffeurs and wagoners have been withdrawn, while some of the personnel has been slightly increased due to the requirements of this new organization. The enlisted personnel has been increased from 255 to 257, total commissioned decreased from 22 to 16, making the new total for the Company 273 as against 277 of the old table. A sergeant-major, junior grade, and a personnel sergeant have been assigned to headquarters of the Transport Battalion. It is also recommended that a personnel sergeant be given to each battalion headquarters as shown in proposed table. Radio Sergeants have been out down to one for each combat battalion, the number actually required. From the old table have been removed three sergeants as follows: the one in charge of regimental instruments; the one in charge of the wireless station; the sergeant-mechanic. There are no instruments at regimental headquarters to be cared for by the sergeant supplied. The one in charge of wireless station has been eliminated because the radio sergeants perform this duty. The sergeant-mechanic gives way to a mechanic in the 4th Company of the Transport Battalion which will handle the transportation for the Regimental Headquarters. This table also provides for eight corporals at each of the combat battalion headquarters: 3 scouts; 1 signal corporal; 2 wireless corporals as against 1 of the old table; 1 postman and 1 telephone corporal. Two wireless corporals are required so as to give the necessary relief. Experience has shown that one signal corporal will prove sufficient. The range finder operators have been eliminated as no occasion had been found for their use in this sort of artillery. The instrument corporals, as such, have also been eliminated for the reason that the corporals mentioned perform all the functions required at Battalion Headquarters. Heretofore the number of privates and privates 1st class supplied to battalion headquarters has proved insufficient for the work required of them. It is therefore proposed that the number of privates 1st class be increased from 6 to 10 with the following duties assigned to them: 1 operator battalion commanders instrument; 4 linesmen; 2 wireless operators; 1 signaller; 2 instrument

men. The 2 latter privates 1st class perform the duty required of 2 corporals under the old table. The total number of privates assigned to each combat battalion has been increased by 4 (from 18 to 20), with the following duties: 2 linesmen; 3 scouts; 3 telephone operators; 4 orderlies; 3 messengers; 4 panelmen; 1 signaller. The duties assigned to officers have been slightly modified so as to meet the needs actually existing and those that may arise. One officer (a 1st Lieutenant) has been designated as orienteur officer for each combat battalion; a practice which was generally followed in heavy artillery and which proved entirely successful. Radio and telephone duties in the battalion have been combined under one designation, that of signal, and the officer (a 2nd Lieutenant) designated as Signal Officer and charged with these duties, has been assigned to each combat battalion. As a matter of actual practice this arrangement was followed in recent experience on the front and proved highly successful; two officers being unnecessary. A regimental gas officer (a 1st Lieutenant) has also been supplied. Although the old table provided none, one officer was required by orders to perform duties pertaining to gas warfare and protection against gas.

The materiel has been changed in accordance with the proposed plans mentioned heretofore. Reel trucks and reel carts have been eliminated. None had been supplied to heavy artillery units, and as far as can be determined, none could have been used advantageously under the conditions actually encountered. Actual conditions encountered in practice are that telephone lines ordinarily follow terrain over which it would be impossible to use a horse or motor drawn reel cart or truck and even when the lines follow roads and routes which could be travelled by such vehicles, care must be exercised to see that the lines are so laid that they will not be cut by moving traffic. It thus follows that even then the cart or truck must travel no faster than the linement on foot engaged in effecting the proper installation. Therefore the carts and trucks become only a means of transport and an ordinary standard truck meets this need far better than a special reel cart or truck since wire is provided on standard spools. This together with small hand reels provides construction equipment to lay lines over all kinds of terrain.

(b) SUPPLY COMPANY.

The creation of the Transport Battalion required the necessary changes to be made in Table 222 (Supply Company). All chauffeurs, assistant chauffeurs and wagoners have been withdrawn and the total enlisted personnel has been decreased by three: from 86 to 83 and the number of officers increased from 3 to 5. One officer, (a 1st Lieutenant) should be sent to each separate combat battalion when detached to act as supply officer for that battalion, leaving the Captain and a 2nd Lieutenant to remain with Company Headquarters as Company Commander and Assistant.

A certain number of enlisted men (6) are assigned to each battalion for the purpose of handling rations and battalion supplies. This scheme was actually followed during the recent operations and was justified in all particulars. A corporal has been added to act as noncommissioned gas officer for the organization. The sergeant-mechanic has been eliminated; the mechanic of the 4th Transport Company performing the duties formerly required to be performed by him. One sergeant-major, junior grade, has been assigned to Transport Battalion Headquarters to act as supply noncommissioned officer due to the added requirements of the transport battalion. The number of motorcars was increased from one to five, allowing one for headquarters and one for each supply officer when working separately. It is recommended that one be supplied to the Ordnance Officer.

(c) REGIMENT.

It is recommended that table 223 on pages 12 and 13 of the Equipment Manual be changed as per attached copy. The strength of the battery has been changed from 224 to 201 for reasons set forth later. This change affects the strength of each battalion. Attention is invited to the fact that an additional battalion is added, i.e., a Transport Battalion. It is the purpose to have this Battalion handle all of the transportation of the regiment; requisition for all mobile equipment that does not form a requisite part of any separate

organization, and train the wagoners and chauffeurs; these to remain part of the personnel of this Transport Battalion. Necessary reasons for the existence of this organization have been stated heretofore. The total strength of the regiment has been changed from 1787 to 2538 due principally to the addition of this battalion and to increase in number and size of the gun sections.

Each gun crew and relief crew has been changed to consist of the following: one gun commander or relief gun commander; one corporal to be assistant gun commander and gun pointer; ten cannoneers (shown by experience the minimum number to maintain maximum rate of fire); one telephone operator; one tractor driver and one assistant tractor driver - total, fifteen men. The telephone operator and tractor drivers to be part of the gun crew and under the direct control of the gun commander.

Slight changes have been made further as follows: A sergeant has been placed in charge of gas defense. Conditions at the front showed this to be necessary. A sergeant is selected rather than a corporal because a person occupying this important position should be clothed with sufficient authority to command obedience.

A corporal has been placed in charge of machine guns. These guns were supplied under the old tables and a noncommissioned officer actually placed in charge and schooled in their operation and use although the table made no provision for him.

The privates 1st class shown in the old table under battery headquarters have been withdrawn for the reason that they were found unnecessary. The agent with battalion headquarters has been eliminated; in experience no use was found for such an agent.

With respect to the materiel, only such part of the motor equipment has been retained as forms a part of the firing battery. The rest has been assigned to the Transport Battalion for the use of the batteries. A water cart has been added. The necessity for its use has been demonstrated with other units. An addition is made of a lighting set so as to insure adequate light in the B. C. station and at the aiming point which will not be disturbed by blasts from the guns. This matter of lighting the B. C. station at times became quite a problem and the adoption of this set serves as a happy solution. The numbers of motor cars (changed from 3 to 2) and motorcycles (changed from 12 to 4) have been reduced to serve the actual needs of a battery. The amount called for by the old table was never supplied and would not have been necessary.

The number of artillery supply trucks has been cut down, from three to one for each battery, which will prove ample. This one contains tools and other necessary articles and will be supplemented by materials for cleaning and preserving carried on a standard 3-ton truck. This arrangement does away with extra trucks which can be used for no other purpose than that for which they are especially designed and which, as a matter of fact, will not be required with the standard truck on hand to carry these materials.

The artillery repair truck has been assigned, one to each Transport Company, for use in each battalion. Experience has shown that one per battalion is sufficient with the battalion operating as a unit.

A slight modification has been made in the equipment carried by some of the noncommissioned officers of the battery. It is recommended that all noncommissioned officers be permitted to carry pistols. This directly affects the corporals at headquarters and those of the special detail, who, by virtue of the nature of the work required of them, are rather awkwardly armed in being obliged to carry rifles.

(d) BATTERY.

Table 224 has been changed principally in that the chauffeurs, assistant chauffeurs, wagoners, (tractor drivers and assistants excepted) and motorcycle drivers have been

withdrawn and placed in the Transport Battalion and further in the elimination of the platoon as a unit and in the addition of relief sections for manning the guns. Experience on the front has demonstrated that the platoon is an elastic and not a fixed unit, and that the unit as such serves no useful purpose in Heavy Artillery. The firing battery has been divided into eight sections; four regular and four reserve, with the same number of gunners in each section. This scheme insures two reliefs for each gun which apparently was not contemplated in the old table but which became a necessity in actual fighting. The combat train which served as a reserve to a very slight extent and as an ammunition section has been replaced by a reserve of 36 men, (to be used as ammunition detail, gas guard, police duty, kitchen police duty, in manning the machine guns, to replace casualties and general duties).

III. (a) MOBILE EQUIPMENT OF A BATTERY.

It is further recommended that Table I, of Individual Mobile Equipment be amended so as to cover each item for a battery having a total enlisted strength of 201 instead of 219, and so as to eliminate the articles enumerated under "Clothing for Chauffeurs and Motorcyclists", except in so far as these articles are required by tractor drivers and their assistants.

(b) MOBILE EQUIPMENT OF A HEADQUARTERS COMPANY.

It is also recommended that Table II, of Individual Mobile Equipment of a Headquarters Company of a regiment of 155 mm. Filloux Guns be amended to meet the requirements of an enlisted strength of 257 as set forth in the proposed amended Table 221.

(c) MOBILE EQUIPMENT OF A SUPPLY COMPANY.

It is also recommended that Table III, of Individual Mobile Equipment of a Supply Company of a regiment of 155 mm. Filloux Guns be amended to meet the requirements of a total enlisted strength of 83 as set forth in the proposed amended Table 222.

(d) MOBILE EQUIPMENT OF A REGIMENT.

It is further recommended that Table V, of the Total Mobile Equipment of a regiment of 155 mm. Filloux Guns be amended to meet the requirements of the total strength of same as shown by proposed amended Table 223; it is further recommended that the following detailed changes be made; at page 29 by eliminating the words "Typewriter, Corona" and the words "Ribbon, typewriter, Corona, red and black" and inserting the following notations after the word "Typewriter":

1	2	3	4	5	6	7
Articles	Battery	HQ Company	Supply Company	Medical Department	Total Regiment	Remarks
Typewriter	1	4a	10b	1	21	(a) 3 Regimental HQ; 1 HQ Co. (b) 2 Supply Co., 4 Battalion HQ, 4 Transport Co's.

at page 30 thereof, by changing the table of "Vehicles, Ordnance Department" to read as follows:

1	2	3	4	5	6	7	8
Articles	Transport Battery	HQ Company	Supply Company	Medical Company	Total Department	Regiment	Remarks
Lighting set, trail, mobile	1					6	
Trailer, wireless			1			1	

Quartermaster Corps

1	2	3	4	5	6	7	8
Carts, water, trail, mobile				12		12	
Kitchens, rolling, trail, mobile				12		12	

at page 31 thereof, by changing the table of "Motor Transport Corps" to read as follows:

1	2	3	4	5	6	7	8
Ambulance,					3	3	
Cars, motor, 5-Passenger	2	1	9	5	1	31	
Cars, motor, staff, observation			4			4	
Cars, Reconnaissance			4			4	
Motorcycles, with sidecars	4	6	23	8	4	83	
Tractor, caterpillar, 10-ton	2					12	
Tractor, Renault type	6					36	
Trailer, 10-ton capacity	2					12	
Trucks, cargo, 3-ton		48				192	
Trucks, artillery supply	1					6	
Trucks, artillery repair		1				4	
Trucks, tank		2				8	
Trucks, wrecking		1				4	
Trucks, light delivery			5			5	

(e) SIGNAL CORPS EQUIPMENT OF A REGIMENT.

The present signal equipment scheduled for telephone systems includes material for light pole line construction which was never actually used and which is burdensome to transport. Such items as 8-pin cross arms and a large number of lance poles for example. This construction is ordinarily cared for by the Signal Corps and there is neither personnel nor other materiel provided an artillery unit to perform this kind of construction. Ordinary twisted pair insulated wire laid along fences, existing pole lines, and trees forms the lines for the

construction of artillery signal details. The number of lance poles has been reduced to that necessary, for it was never found in practice that even as many as are now proposed were actually used, but a margin is allowed for losses and unforseen conditions.

Three pair cable was used in practice in very few cases and the amount of this material, since it is very burdensome to transport has been reduced accordingly.

It is considered that the Camp Model telephone is better for posts of command than the Type 1375-B since they furnish better transmission and are more comfortable to use. The button switch in the transmitter circuit of the 1375-B set is very tiresome to operate during a long conversation and the hook switch on the Camp Model obviates its necessity.

One additional 12-line switchboard is proposed for a Regimental headquarters in order to provide sufficient terminal facilities for the number of lines actually terminating at such stations.

The outpost twist is too light for line construction and it is proposed to provide heavy twist pair instead. A small amount of outpost twist is recommended for inside station, bell and switchboard wiring.

For visual signalling it is considered that the 24 cm. projector with combination flags is ample. The 35 cm. projector is difficult to carry, requires a storage battery and is not needed.

The proposed change in radio personnel and equipment enables the Regimental Commander to be, at all times, in direct communication with Battalion Commanders. Four panelmen have been added to Regimental Headquarters and also to Battalion Headquarters. Old tables make no provision for them and if aeroplane observation is desired, their services are indispensable.

It is therefore recommended that amendment be made to Equipment Manuals for Service in Europe (Regiment of 155 mm. Filloux Guns, motorized), (Series C, No. 6) Table VII of Signal Corps equipment for a Regiment of 155 mm. Filloux Guns thereof, by cutting out the articles set forth thereunder and substituting therefor the following articles:

1	2	3	4	5	6
Articles	Battery	HQ Company	Supply Company	Total Regiment	Remarks
Axes, hand	4	6	18	48	Articles shown under Supply Company in column 4 for use in Battalion Headquarters. Divide equally among the Battalion Headquarters of the Regiment. Articles shown under the Headquarters Company in column 3 for the use of Regimental Headquarters.
Bags, tool, service, complete	1	1	3	10	
Barometer, aneroid, grad. in millimeters and inches	1			6	
Barometer, mercurial, grad. in millimeters and inches			3	3	
Bars, digging, standard		2	6	8	
Batteries, dry for flashlight	10	20	60	140	
Batteries, dry, tungsten for telephones	26	28	84	268	
Batteries, No. 6, for vibrating bells	8	12	24	84	
Bells, electric, vibrating	2	4	9	25	
Belts, linemen's tool, with ring and safety strap	2	2	6	20	
Books, message, field, form 217-A	10	10	30	100	
Cable, 3 pair, lead covered, foot		300	1200	1500	
Clips, testing	8	6	18	72	

1	2	3	4	5	6
Articles	Battery	HQ Company	Supply Company	Total Regiment	Remarks
Climbers, linemen, complete with straps and pads, pairs	2	2	6	20	
Chronometers, Marine	1	1	3	10	
Electrolyte, 5 gallon cans		1	3	4	
Envelopes, field message, form 144-A		500	1500	2000	
Flashlights, electric, hand	5	10	30	70	NOTE: Identification panels 4 x 9 yards.
Fuzes, 1-amp for 4- and 12-line switchboards	10	20	60	140	1 set black and white
Glasses, field, prism, binocular, 8-power	5	9	21	60	
Hammers, sledge	2	2	6	20	
Hammers, carpenter's, claw	2	1	3	16	
Headsets, telephone	6	6	18	60	
Headsets, radio		4		4	
Hydrometers, Baume		2	6	8	
Insulators, clamp	16	12	36	144	
Kits, inspector's, pocket	2	3	9	24	
Kits, flag, combination, standard	2	6	12	30	
Knives, electrician	8	4	12	64	
Knobs, wooden	860	600	2430	8190	
Ladders	1	2	6	14	
Lamps for flashlights, extra	5	10	30	70	
Marlin, pounds	5	5	15	50	
Megaphones	2		3	15	
Nails, wire, 200, pounds	23	23	69	230	
Panels, heavy artillery, identification, large, sets		1	3	4	
Panels, heavy artillery, signal, large, sets		1	3	4	
Pliers, side cutting, 8"	8	10	30	88	
Poles, lance		50	150	200	
Poles, bamboo, with tips fitted		3	9	12	
Projectors, 24 cm. without spare batteries	2	3	6	21	
Reel, carts, hand	2	2	6	20	
Sapinettes				1000	
Saws, hand, cross-cut	1	1	3	10	
Screws, 8 x 1½"	100	200	600	1400	
Sets, radio (a)		1	3	4	
Screwdrivers, 6"	4	4	12	40	
Screwdrivers, 3"	4	4	12	40	
Shovels, short-handled, round point	2	2	6	20	
Staples, Blake, insulated No. 5	400	660	1980	5040	
Switch, push button type	1	4	6	16	
Switchboard, telephone, 4-line monocord type	4	1	3	28	
Switchboard, telephone, 12-line monocord type		2	3	5	
Tags, cable, heavy artillery	75	100	300	850	
Tape, friction, pounds	4	3	9	36	
Tape, rubber, pounds	2	2	6	20	

1	2	3	4	5	6
Articles	Battery	HQ Company	Supply Company	Total Regiment	Remarks
Telephones, W. E. 1375-B	12	12	36	120	
Telephones, Camp model	1	2	6	14	
Terminal strips, 10 per strip	2	4	6	22	
Thermometers, weather, grad. in Centigrade and Fahrenheit	2			12	
Voltmeters, western model 280		1	3	4	
Watches, wrist, luminous dial, with wristlets	2	2	6	20	
Wave meter		1	3	4	
Wire, insulated, heavy, twisted, pair, miles	7½	9½	31½	86	
Wire, G. I. No. 12, B.W.G. 109 mils, miles				2	
Wire, light twist pair, inside wiring, miles	2	4	6	22	

(f) FIRE-CONTROL EQUIPMENT FOR A REGIMENT.

It is recommended that amendment be made to Equipment Manuals for service in Europe (Regiment of 155 mm. Filloux Guns, motorized), (Serics C, No. 6) Table VIII of Fire-Control, Drafting materials and supplies for a regiment of 155 mm. Filloux Guns, cutting out the articles set forth thereunder and substituting therefore the following articles:

1	2	3	4	5	6
Articles	Battery	Supply Company	HQ Company	Total Regiment	Remarks
Orienteur Equipment:					
Alidade, open sight	1	3		9	
Alidade, telescopic	1	3		9	
Chest, instrument	1	3		9	
Chest, rod and tripod	1	3		9	
Compass, prismatic	1	3	1	10	
Decinator, with screws, for use on plane table	1	3		9	
Engineer Field Manual	1	3	1	10	
Ephemeris		3		3	
Flashlights, with extra batteries	4	6		30	
Logarithms, table of, in degrees	1	3	1	10	
Logarithms, table of, in mils, 5 place	1	3	1	10	
Magnifying glass, with handle		3	1	4	
Orienteur Officer's Manual	1	3	1	10	
Paint, white, small cans	6	3		39	
Paint, black, small cans	6	3		39	
Planetable, topographic, with tripod and case	1	3		9	
Protractor, small, grad; in degrees	1	6	2	14	
Protractor, large, grad; in degrees	1	6	2	14	

1	2	3	4	5	6
Articles	Battery	Supply Company	HQ Company	Total Regiment	Remarks
Protractor, small, grad, in mils	1	6	2	14	
Protractor, large, grad, in mils	1	6	2	14	
Range poles	2	6		18	
Scale, boxwood	2	6	2	20	
Scale, graduated, one yard	1	3	1	10	
Square, zinc, grad, for plotting coordinates	2	6	2	20	
Stadia rod, folding		3		3	
Tally pins	6	30		66	
Tape, steel, long		3		3	
Tape, steel, short	1	3		9	
Tape, repair outfit		3		3	
Transit, small, with tripod; graduated in mils	1			6	
Transit, standard, with tripod		3		3	
Traverse tables		3		3	
Fire-Control Equipment:					
Aiming posts, circular head	8			48	
Aiming posts, diamond head	4			24	
Aiming posts, square head	8			48	
Azimuth instrument, graduated in mils	2	3		15	
Azimuth instrument, periscopic, graduated in mils	1	3		9	
Board, firing small	1			6	
Board, firing, large	1	3	1	10	
Flashlights, with extra batteries	6	6		42	
Lamps or lanterns	16	6		102	
Plotting board, range and deflection	1			6	
Protractor, parallax, in mils	1			6	
Range tables	8	24	2	74	
Stop watches	6			36	
Scissors telescope and tripod			1	1	
Drafting Material:					
Brushes, water color, 2 each No. 1 to 6 inclusive	12	36	12	120	
Bureau of standards, circular No. 47	1	3	1	10	
Celluloid, sheets, 20 x 25 inches transparent, half frosted & half clear	12	36	12	120	
Compass, beam, bar or trammel points, micrometer adjustment	1	3	1	10	
Crayons, lumber, boxes, red	1	3	1	10	
Dividers, proportional, 8½"	1	3	1	10	
Drawing instruments, set	1	3	1	10	
Envelopes, Manila, 10 x 15 inches	24	72	24	240	

1	2	3	4	5	6
Articles	Battery	Supply Company	HQ Company	Total Regiment	Remarks
Eraser, art gum	6	18	6	60	
Eraser, pencil, ruby, No. 112	3	18	3	39	
Eraser, ink, typewriter, disc.	3	9	3	30	
Eraser, sponge	3	9	3	30	
Eraser, steel	2	6	2	20	
Glue, pint cans	1	3	1	10	
Horn centers, ½ inch diameter	1	3	1	10	
Ink, drawing, black, waterproof, bottles	3	9	3	30	
Ink, drawing, blue, waterproof, bottles	1	3	1	10	
Ink, drawing, brick red, waterproof, bottles	1	3	1	10	
Ink, drawing, brown, waterproof, bottles	1	3	1	10	
Ink, fountain pen, bottles, in wood case, with filler	2	6	2	20	
Ink, watercolor, burnt sienna, full pans	2	6	2	20	
*Ink, watercolor, Chinese white, full pans	2	6	2	20	
Ink, watercolor, crimson lake, full pans	2	6	2	20	
Ink, watercolor, Hoeker's green, full pans	2	6	2	20	
Ink, watercolor, Prussian blue, full pans	2	6	2	20	
Magnifying glass, pocket	1	3	1	10	
Map tube, galvanized iron, 37 x 6"	1	3	1	10	
Pencil points, for beam compass	12	36	12	120	
Pencil points, for dividers	12	36	12	120	
Pen holders, crowquill	1	3	1	10	
Pen holders, drawing	2	6	2	20	
Pen holders, writing	2	6	2	20	
Pins, colored head, cubes, one each, black, red, blue, green, yellow, and white	6	18	6	60	
Paint boxes, japanned tin, for 12 full pans and brushes	1	3	1	10	
Paper, computation, pads, ruled, 8 x 10½ inches	6	18	6	60	
Paper, computation, pads, unruled, 4 x 6 inches	6	18	6	60	
Paper, cross section, 10 meter roll, metric graduation, 50 cm. wide, opaque	1	3	1	10	
Paper, cross section, 10 meter roll, metric graduation, transparent	1	3	1	10	
Paper, drawing, 35 inches x 10 yard roll, single mounted	1	3	1	10	

1	2	3	4	5	6
Articles	Battery	Supply Company	HQ Company	Total Regiment	Remarks
Paper, Paragon drawing, sheets double mounted, 24 x 36 inches	12	36	12	120	
Paper, drawing, sheets, thin eggshell, 24 x 36 inches	12	36	12	120	
Paper, Manila, sheets, 24 x 36 inches	12	36	12	120	
Paper, vegetable tracing, 30 inches x 10 yards roll	1	3	1	10	
Parallel rules, rolling 12 inch	1	3	1	10	
Paste, jar of library	1	3	1	10	
Pens, crowquill	2	6	2	20	
Pens, drawing, Gillott, No. 170	24	72	24	240	
Pens, drawing, Gillott, No. 290	24	72	24	240	
Pens, drawing, Gillott, No. 303	24	72	24	240	
Pens, drawing, Gillott, No. 404	24	72	24	240	
Pencils, blue	3	9	3	30	
Pencils, brown	3	9	3	30	
Pencils, green	3	9	3	30	
Pencils, red	3	9	3	30	
Pencils, drawing, Venus 6 H	12	36	12	120	
Pencils, drawing, Venus 3-4	12	36	12	120	
Pencils, drawing, Venus 9 H	12	36	12	120	
Reconnaissance sets, US Engineer Corps	1	3	1	10	
Rubber bands (box), 1 size 19 and 1 size 32	2	6	2	20	
Sandpaper pads, pencil sharpeners	1	3	1	10	
Sealing wax, stick	1	3	1	10	
Shears, 12 inches long	1	3	1	10	
Sponge cup with sponge	1	3	1	10	
Straightedge	1	3	1	10	
Tables, vertical angle, stadia, degrees and meters	2	6	2	20	
Tapes, steel map	2	2	2	20	
Tapes, steel, pocket, inches and milimeters, 72 inches long	4	12	4	40	
Thumb tacks, solid head, long point	144	432	144	1440	
Tracing lines, 36 inch x 10 yard roll	1	3	1	10	
Transit books, US Engineer Corps, standard	6	18	6	60	
Triangles, 6 inch celluloid, 30 and 60 degrees	1	3	1	10	
Triangles, 6 inch celluloid, 45 degrees	1	3	1	10	
Triangles, 12 inch, celluloid, 30 and 60 degrees	1	3	1	10	
Triangles, 12 inch, celluloid, 45 degrees	1	3	1	10	
"T" Square, 36 inch	1	3	1	10	

1	2	3	4	5	6
Articles	Battery	Supply Company	HQ Company	Total Regiment	Remarks
*Ink, watercolor, burnt amber, full pans	2	6	2	20	

No changes have been recommended in Tables IX and X. Equipment Manual for Service in Europe, Series C, No. 6, (Regiment of 155 mm. Filloux Guns, Motorized). The articles enumerated in these tables proved sufficient in number and fairly satisfactory; however, it is believed that more satisfactory articles of American manufacture could be developed and substituted in existing tables.

The board having no further business before it adjourned sine die on December 31, 1918.

(Sgd) M. A. Gross,
Colonel, C. A. C.,
President

(Sgd) T. D. Johnson,
1st Lieutenant, C. A. C.,
Recorder

APPROVED:

(Sgd) William C. Davis,
Brigadier General, U. S. A.
Commanding

HEADQUARTERS
31ST HEAVY ARTILLERY BRIGADE
(C. A. C.)

29th December, 1918.

From: James W. Doolittle, Captain, Ordnance Department,

To: The Board of Officers appointed to revise Table of Organization and Material, Coast Artilery Corps,

Subject: Changes to be made on Holt 10-ton Tractor.

1. In reference to the tractor for hauling guns I would recommend the Holt Caterpillar, 10-ton 55 H.P., with the changes as follows:

(a) A very strong fender or guard to protect the radiator.

(b) Radiator to be braced firmly on each side, doing away with brace to motor.

(c) Track shoes to be made stronger and in such a way as to be more secure to tracks.

(d) Magneto should be entirely covered and pins in impulse starter made stronger and larger.

(e) Valve springs to be made ¼-inch shorter.

(f) Pintle hook to be made larger and of the best of material.

(g) Fan belts should be either made heavier or the construction of pullies changed.

(h) Gasoline tank to be made larger.

(i) Place to be made on tractor to carry reserve oil tank for both engine and trucks.

(Sgd) JAMES W. DOOLITTLE.

Table 223 — 155 mm. Filloux Gun Regiment, Motorized (Army Artillery) — EXHIBIT "A"

Personnel from Coast Artillery Corps

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	Remarks
		Battalion				Transport Bn				Regiment				Med			
1 Units	1 Btry (a)	HQ	2 Btry	To-tal	Trans-port Co (g)	HQ (g)	4 Co's (g)	To-tal	HQ	HQ Co (b)	Sup-ply Co (c)	4 Bn	To-tal	Dept & Chap	Ord Dept	Ag-gre-gate	
2 Colonel									1				1			1	(a) See table 224.
3 Lt Col									1				1			1	(b) See table 221.
4 Major		1		1		1		1				4	4	1		5	(c) See table 222.
5 Captain	1	1	2	3	1	1	4	5	2	1	1	14	18	3	1	53	(d) Performs duty of
6 1st Lt	2	3ik	1k 4	4	2		8	8		8b	3	20	31				Regt Sgt Maj,
7 2nd Lt	2	3i	4	4	2		8	8		6b	1	20	27			27	1 Pers Sgt.
8 Chaplain & Band Ldr										1			1	1		2	(e) Performs duty of Regt Supply Sgt.
9 Total Com.	5	2	10	12	5	2	20	22	4	16	5	58	83	5	1	89	(f) Performs duty of Bn
10 Sgt Maj, sr gr (d)										2			2			2	Sgt Maj.
11 Ord Sgt															4	4	(g) See table "Transport Company"
12 Sgt Maj, jr gr (e)		1k				1k					4		4			4	(h) Furnished by Medical Department.
13 Sgt Maj, jr gr (f)		1i				1i				4			4			4	(i) From HQ Company - not totalled.
14 1st Sgt	1		2	2	1		4	4		1	1	10	12			12	
15 Sgt Lcl														1		1	(k) From Supply Company not totalled.
16 Mast Gun		1i							1i	4			4			4	
17 Elec Sgt		1i							1i	4			4			4	
18 Mess Sgt	1		2	2	1		4	4		1	1	10	12			12	
19 Radio Sgt		1i							2i	5			5			5	
20 Supply Sgt	1		2	2	1		4	4		1	1	10	12			12	
21 Sergeant	13	1i	26	26	8	1i	32	32		17b	2	110	129	3	4	136	
22 Corporal	20		40	40	15		60	60		34b	5	180	219		8	227	
23 Cooks	4		8	8	4		16	16		4	6	40	50			50	
24 Mechanics	4		8	8	2		8	8		4	5	32	41			41	
25 Wagoners	8		16	16	54		216	216				264	264			264	
26 Buglers	3	1i	6	6	2		8	8		4		26	30			30	
27 Pvt Lcl	53		106	106	55		220	220		41	10	538	589	29	12	630	
28 Private	88		176	176	74		296	296		82	48	824	954		4	958	
29 Band, all grades										49			49			49	
30 Total Enl.	196		392	392	217		868	868		257	83	2044	2384	33	32	2449	
31 AGGREGATE	201	2	402	404	222	2	888	890	4	273	88	2102	2467	38	33	2538	

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	Remarks
		Battalion				Transport Bn				Regiment				Med			
1 Units	1 Btry (a)	HQ	2 Btry	To-tal	Trans-port Co (g)	HQ (g)	4 Co's (g)	To-tal	HQ	HQ Co (b)	Sup-ply Co (c)	4 Bn	To-tal	Dept & Chap	Ord Dept	Ag-gre-gate	
32 Ambulance														3		3	
33 Car, 5-Pass	2	1i	4	4	1	1i	4	4		9	4	16	29	1	1	31	
34 Car, Motor, staff, obs		1i							1i	4			4			4	
35 Car, recon-naissance		1i							1i	4			4			4	
36 Cart, water, trail mobile	1k		2k	2k	1k		4k	4k		1k	12	10k	12			12	
37 Kitchen, roll-ing, trail mobile	1k		2k	2k	1k		4k	4k		1k	12	10k	12			12	
38 Lighting set, trail mobile	1		2	2								6	6			6	
39 Motorcycle, side-car	4	3i	8	8	6	2i	24	24		23	8	48	79	4h		83	
40 Tractor, caterpillar 10-ton	2		4	4								12	12			12	
41 Tractor, Renault type	6		12	12								36	36			36	
42 Truck, cargo 3-ton					48		192	192				192	192			192	
43 Truck, Arty Supply	1		2	2								6	6			6	
44 Truck, Arty Repair					1		4	4				4	4			4	
45 Trailer, 10-ton, capacity	2		4	4								12	12			12	
46 Truck, tank					2		8	8				8	8			8	
47 Truck, wrecking					1		4	4				4	4			4	
48 Truck, light Dely, 1-ton		1i				1i			1i	5						5	

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	Remarks
		Battalion				Transport Bn				Regiment							
1 Units	1 Btry (a)	HQ	2 Btry	To-tal	Trans-port Co (g)	HQ (g)	4 Co's (g)	To-tal	HQ	HQ Co (b)	Sup-ply Co (c)	4 Bn	To-tal	Med Dept & Chap	Ord Dept	Ag-gre-gate	
49 Trailer, Wireless									1i	1			1			1	
50 Guns	4		8	8								24	24			24	
51 Pistols	48	2	96	98	57	2	228	230	4	150	30	524	708		33	741	
52 Rifles	153		306	306	165		660	660		123	58	1578	1759			1759	
53 Gun, anti-aircraft, machine	2		4	4								12	12			12	

Table 224 (Revised) — Battery of 155mm. G. P. G. Guns, motorized. (Army Artillery) — EXHIBIT "B"

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
		Special Detail			Firing Battery				Relief Section					
1 Units	Btry HQ	Fire Control	Signal	Messengers & Scouts	1st Section	2nd Section	3rd Section	4th Section	5th Section	6th Section	7th Section	8th Section	Reserve Section (See note)	Total Btry
2 Captain	1													1
3 1st Lieutenant	2													2
4 2nd Lieutenant	2													2
5 Total Commissioned	5													5
6 1st Sergeant	1													1
7 Mess Sergeant	1													1
8 Supply Sergeant	1													1
9 Sergeant	1k2	1e	1	1	m1	m1	m1	m1	1	1	1	1	n1	13
10 Corporals	f1	2	2	1	1	1	1	1	1	1	1	1	6 1a	20
11 Cooks	4													4
12 Mechanics					1r	1r	1r	1r						4
13 Wagoners					hlr	hlr	hlr	hlr	hlr	hlr	hlr	hlr		8
14 Buglers	3													3
15 Privates 1cl		2r	d4r	2r	1j5rlo	1j5rlo	1j5rlo	1j5rlo	1j5rlo	1j5rlo	1j5rlo	1j5rlo	5r	53
16 Privates	3r		c5r		7r	7r	7r	7r	7r	7r	7r	7r	24r	88
17 Total Enlisted	16	b5	12	3	16	16	16	16	15	15	15	15	36	196
18 AGGREGATE	21	5	12	3	16	16	16	16	15	15	15	15	36	201
19 Car, motor, 5-Pass	2													2
20 Cart, water, trail, mobile	1s													
21 Kitchen, rolling, trail	1s													1
22 Lighting set, trail, mobile	1													4
23 Motorcycle, side-cars	4													4
24 Tractor, caterpillar, 10-ton									1	1				2
25 Tractor, 4-wheel drive, Renault type					1	1	1	1			1	1		6
26 Trailer, 10-ton capacity											1	1		2

Table 224 (Revised) Battery of 155mm. G. P. G. Guns, motorized. (Army Artillery) EXHIBIT

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
		Firing Battery												
		Special Detail							Relief Section					
1 Units	Btry HQ	Fire Control	Signal	Messengers & Scouts	1st Section	2nd Section	3rd Section	4th Section	5th Section	6th Section	7th Section	8th Section	Reserve Section (See note)	Total Btry
27 Truck, Artillery Supply	1													1
28 Guns					1	1	1	1						4
29 Pistols	18	3	3	1	2	2	2	2	2	2	2	2	7	48
30 Rifles	3	2	9	2	14	14	14	14	13	13	13	13	29	153
31 Guns, antiaircraft, machine	2													2

REMARKS:

(a) In charge of machine gun,
(b) Orienteur and observation detail,
(c) 3 Telephone operators; 1 signaller; 1 lineman,
(d) 1 Signaller; 3 linemen,
(e) Perform duties of chief mechanic.
(f) Battery clerk,
(h) Tractor drivers,
(j) Assistant tractor driver,
(k) In charge of gas defense,
(m) Gun commander,
(n) In charge of ammunition,
(o) Gun telephone operator,
(r) Armed with rifle; all others with pistol,
(s) From Supply Company; not totalled.

NOTE: Reserve sections; ammunition detail, gas guard, machine gun sections, military police duty, kitchen police duty, etc.

Transport Company Table

155 mm. Gun & 8-inch, 9.2 Mark I or II Howitzer Regiments, Motorized (Army Artillery)

EXHIBIT "C"

1	2	3	4	5	6	7	8	9	10	11
1 Units	Company HQ	1st Section	2nd Section	3rd Section	4th Section	5th Section	6th Section (Ammo Servers)	7th Section: Motor Car & Motorcycle Drivers - Detached	Aggregate	Remarks
2 Captain	1								1	(a) 1 Mechanical officer; 1 convoy officer.
3 1st Lieutenant	2a								2	
4 2nd Lieutenant	2								2	
5 Total Commissioned	5								5	(b) Expert mechanics
6 1st Sergeant	1								1	(c) Chiefs of Section
7 Mess Sergeant	1								1	(d) In charge of gasoline and oil
8 Supply Sergeant	1								1	
9 Sergeant	2b	1c	1c	1c	1c	1c	1d		8	(e) Company Clerk.
10 Corporal	1e3 2f	2g	2g	2g	2g	2g	2g		15	(f) Assistant expert mechanics.
11 Cooks	4								4	
12 Mechanics	2r								2	(g) Squad leaders: 1 1 mounted on motorcycle
13 Wagoners	2pr	10kr	10kr	10kr	10kr	8kr	2tr	2hr	54	
14 Buglers	2								2	
15 Private 1cl	1j	7mr	7mr	7mr	7mr	7mr		19o	55	(h) Drivers for battery artillery supply truck.
16 Privates	4r	3m5r	3m5r	3m5r	3m5r	3m5r	45r		74	
17 Total Enlisted	23	25	25	25	25	23	50	21	217	
18 AGGREGATE	28	25	25	25	25	23	50	21	222	(j) Company commander's chauffeur.
19 Car, motor, 5-passenger	1								1	(k) Driver's cargo truck.
20 Cart, water, trail, mobile	1s									(m) Assistant driver, cargo trucks.
21 Kitchen, rolling, trail, mobile	1s									(o) 5 Drivers, motor car, 5-passenger; 1 driver, motor car, staff observation; 1 driver, motor car, reconnaissance; 1 driver, truck, light
22 Motorcycles, side-car		1	1	1	1	1	1		6	
23 Truck, cargo, 3-ton		10	10	10	10	8			48	
24 Truck, tank							2		2	
25 Truck, wrecking	1								1	
26 Truck, repair, artillery	1								1	

1	2	3	4	5	6	7	8	9	10	11
1 Units	Company HQ	1st Section	2nd Section	3rd Section	4th Section	5th Section	6th Section (Ammo Servers)	7th Section: Motor Car & Motorcycle Drivers - Detached	Aggregate	Remarks
27 Pistols	20	3	3	3	3	3	3	19	57	delivery, 1-ton;
28 Rifles	8	22	22	22	22	22	47	2	165	11 drivers, motorcycles with side-cars.

(p) 1 driver, truck, wrecking; 1 driver, truck, repair, artillery
(s) From Supply Company - not totalled.
(t) 2 drivers, trucks, tank.

Table 221 Headquarters Company (Army Artillery)
155 mm. Gun & 8-inch, 9.2 Mark I or II Howitzer Regiments, Motorized (Army Artillery)
(Personnel from C. A. C.)
Maximum and Minimum Strength

Confidential Series

EXHIBIT "D"

1 Units	2 Regimental Section & Company HQ	3 Band Section	4 1st Battalion	5 2nd Battalion	6 3rd Battalion	7 Transport Battalion	8 Total	9 Remarks
2 Captain	1						1	(a) 1 Gas officer; 1 munition officer; 1 telephone officer; 1 intelligence officer; 1 radio officer.
3 1st Lieutenant	5a		1o	1o	1o		8	
4 2nd Lieutenant			2k	2k	2k		6	
5 Total Commissioned	6	1	3	3	3		16	
6 Sergeant Major, Sr Gr	2						2	(b) 1 in charge regimental scouts; 1 in charge regimental signal detail; 1 in charge postal service; 2 personnel sergeants.
7 Sergeant Major, Jr Gr			1	1	1	1	4	
8 1st Sergeant	1						1	
9 Master Gunner	1		1	1	1		4	
10 Electrical Sergeant	1		1	1	1		4	
11 Mess Sergeant	1						1	(c) 1 agent regimental headquarters, 1 scout; 1 personnel.
12 Radio Sergeant	2		1	1	1		5	
13 Supply Sergeant	1						1	(d) 1 signal corporal; 2 instrument corporals; 3 scouts; 2 wireless operators; 1 company clerk; 1 telephone.
14 Sergeants	2h7b		3c	3c	3c	1n	17	
15 Corporals	10d		8e	8e	8e		34	
16 Cooks	4						4	
17 Mechanics	1		1	1	1		4	(e) 3 scouts; 1 signal corporal; 2 wireless corporals; 1 postman; 1 telephone corporal.
18 Buglers	1p		1q	1q	1q		4	
19 Privates, 1cl	11f		10g	10g	10g		41	
20 Privates	22i		20j	20j	20j		82	(f) 1 regimental commander's instrument; 1 signaller; 4 linemen; 2 wireless operators.
21 Band (all grades)		49					49	
22 Total Enlisted	65	49	47	47	47	2	257	
23 AGGREGATE	71	50	50	50	50	2	273	(g) 1 operator battalion commander's instrument; 4 linemen; 2 wireless operators; 1 signaller; 2 instrument privates 1cl.
24 Car, Motor, 5-Passenger Q.M.C.	5		1	1	1	1	9	
25 Car, Motor, Staff Observation, O. D.	1		1	1	1		4	
26 Car, Reconnaissance	1		1	1	1		4	(h) Performs duties of color sergeant.
27 Motorcycle & Side-Car	12		3	3	3	2	23	
28 Kitchen, rolling, trail, mobile	1s							(i) Includes 1 wiremen; 3 telephone operators; 4 orderlies; 3 messengers; 4 panelmen; 1 signaller; 2 linemen; 3 scouts.
29 Trailer, wireless, S.C.	1m						1	
30 Trucks, light delivery, 1-ton	1		1	1	1	1	5	

1	2	3	4	5	6	7	8	9
1 Units	Regimental Section & Company HQ	Band Section	1st Battalion	2nd Battalion	3rd Battalion	Transport Battalion	Total	Remarks
31 Pistols	38	50	20	20	20	2	150	(j) 2 linemen; 3 scouts; 3 telephone operators; 4 orderlies; 3 messengers; 4 panelmen; 1 signaller.
32 Rifles	33		30	30	30		123	

(k) 1 signal officer; 1 liaison officer.
(l) Includes additional pistols for all officers in regimental headquarters.
(m) See note with Tables for Telephone, Visual Signalling and Radio Equipment.
(n) Personnel sergeant.
(o) Orienteur officer.
(p) Bugler, lcl.
(q) Bugler corporal.

Table 222 — Supply Company — EXHIBIT "E"

155 mm. Gun & 8-inch, 9.2 Mark I or II Howitzer Regiments, Motorized (Army Artillery)
Confidential Series C. Personnel from C.A.C. Maximum and Minimum Strength.

1	2	3	4	5	6	7	8	9	
1 Units	Company HQ	Regiment Section	1st Battalion Section	2nd Battalion Section	3rd Battalion Section	Total Company	Ordnance Department Attached	Total	Remarks
2 Captain	1					1		1	(a) Performs duties of Regiment Supply Sergeant.
3 1st Lieutenant			1	1	1	3	1	4	
4 2nd Lieutenant	1					1		1	
5 Total Commissioned	2		1	1	1	5	1	6	(b) 1 accompanies each battalion when detached.
6 Ordnance Sergeant							4	4	
7 Sergeant Major (a) Jr Gr		1	1(b)	1(b)	1(b)	4		4	
8 1st Sergeant	1					1		1	(c) Includes one company clerk and one gas corporal.
9 Mess Sergeant	1					1		1	
10 Supply Sergeant	1					1		1	
11 Sergeant	2					2	4	6	(d) For Regiment, a battalion officer's mess.
12 Corporal	5c					5	8	13	
13 Cook	2	1d	1d	1d	1d	6		6	
14 Mechanic	1r	1er	1er	1er	1er	5		5	(e) Cobbler.
15 Private, 1cl	10					10	12	22	(f) 1 Rolling Kitchen, motor trail, for transport company attached.
16 Private	26	1d	71d	71d	71d	48	4	52	
17 Total Enlisted	49	4	10	10	10	83	32	115	
18 AGGREGATE	51	4	11	11	11	88	33	121	
19 Car, Motor, 5-Passenger Q.M.C.	1		1	1	1	4	1	5	(g) 1 for transport company attached with rifles.
20 Kitchen, rolling, trail, mobile	1	2f	3f	3f	3f	3f	12	12	
21 Motorcycle w/side-car	5		1	1	1	8		8	
22 Cart, water, trail	1	2g	3g	3g	3g	12		12	
23 Pistol	14	2	3	3	3	25	33	58	
24 Rifle	37	2	8	8	8	63		63	

NOTE: Ordnance detachment to man 4 artillery repair trucks, each truck to have 1 ordnance sergeant, 1 sergeant, expert machinist; 2 corporals, machinist, 1 private 1st 1cl, acetylene weler; 1 private 1cl, electricial; 1 private 1cl, blacksmith; 1 private, machinist's helper.

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1 November 1981

CONFIDENTIAL

Not to be Taken Into the Front Line Trenches

EQUIPMENT MANUALS

FOR SERVICE IN EUROPE

Series C-No.6

REGIMENT OF 155 MM. FILLOUX GUNS

(Motorized Army Artillery)

(Personnel from Coast Artillery Corps)

GENERAL HEADQUARTERS

AMERICAN EXPEDITIONARY FORCES

General Staff: First Section

September, 1918

EXHIBIT B-1

TABLE OF CONTENTS

Page

Table 221 . . . .

Table 222 . . . .

Table 223 . . . .

Table 224 . . . .

Table I - Sets of Individual Mobile Equipment of a Battery . . . .

Table III - Sets of Individual Mobile Equipment for Headquarter's Company of a Regiment.

Table IV - Sets of Individual Mobile Equipment of Medical Department Personnel Attached to a Regiment . . . .

Table V - Total Mobile Equipment of a Regiment . . . .

Table VI - Special Quartermaster, Engineer and Chemical Warfare Service Property for Regiments . . . .

Table VII - Signal Corps Equipment for a Regiment . . . .

Table VIII - Fire Control, Drafting Equipment and Supplies for a Regiment . . . .

Table IX - Composition of Artillery Material for a Regiment . . . .

Table X - Anti-aircraft Machine Gun and Equipment of a Regiment . . . .

General Notes . . . .

Corrections in Tables of Organization . . . .

Table 36 . . . .

Table 37 . . . .

Table 38 . . . .

Table 39 . . . .

GENERAL HEADQUARTERS
AMERICAN EXPEDITIONARY FRCES
Office of the Chief of Staff

September, 1918

1. Hereafter all property in the hands of combatant troops in service in Europe will be divided into classes as follows:

2. Mobile equipment is the equipment prescribed for use in troop movements, temporary billets, and open warfare. It is limited to the vehicles and articles of equipment prescribed in Tables of Organization, the equipment and clothing worn on the person, and the articles carried in pack and transported in field.

3. The mobile equipment will be carried in all classes of service.

4. Special equipment shown in Table 6, herein, is the equipment which, in addition to the mobile equipment, is prescribed for use at the front.

5. The special equipment prescribed is designed to meet the necessities growing out of actual conditions as exist on the Western front.

6. The tables given herein cover all property in the hands of combatant troops and include Quartermaster, Ordnance, Medical, Chemical Warfare Service, Engineer and Signal property. This equipment manual modifies for European service the allowance specified as equipment A, B, and C, described in Par. 319, Compilation of Orders, War Department 1881-1915, and all equipment in excess of the allowances specified in this manual will be turned in at once to the Salvage Service, S. O. S.

7. This manual modifies existing tables of allowance and equipment only in so far as is considered necessary to meet conditions of service in Europe. Due to the fact that different types of equipment are being issued to our troops and that other changes are to take place in the future, the names of articles and figures given herein will not be strictly applicable in all cases. Where such differences arise the provisions of the manual will be considered to apply in so far as practicable in the corresponding article of other types.

8. The manual is intended as a guide for organization commanders in determining amounts of equipments and supplies to be kept on hand, and it is authority to supply officers for issues in accordance with its provisions. IT IS NOT INTENDED TO REGULATE OR LIMIT IN ANY WAY CALLS FOR SUPPLIES NECESSARY TO THE EFFICIENT CONDUCT OF OPERATIONS, NOR TO INTERFERE WITH THE DISTRIBUTION OF SUCH SUPPLIES AS ARE DICTATED BY THESE CONSIDERATIONS.

9. Mistakes in this manual should be brought promptly to the attention of General Headquarters, A. E. F., G-1.

BY COMMAND OF GENERAL PERSHING:

JAMES W. McANDREW,
Chief of Staff.

(CONFIDENTIAL.)

WAR DEPARTMENT,
Washington, July 29, 1918.

CIRCULAR

THE FOLLOWING CHANGES ARE MADE IN TABLES OF ORGANIZATION, SERIES C AND D.

TABLE 221

(1) Lines 3 and 4, column 3, consolidate and insert 1.

(2) Lines 3 and 4, column 7, consolidate and change to read 21.

(3) Line 5, column 3, insert 1.

(4) Line 5, column 7, change 21 to 22.

(5) Line 22, column 3, change 28 to 49.

(6) Line 22, column 7, change 28 to 49.

(7) Line 23, column 3, change 28 to 49.

(8) Line 23, column 7, change 234 to 255.

(9) Line 24, column 3, change 28 to 50.

(10) Line 24, column 7, change 255 to 277.

(11) Line 36, column 3, change 28 to 50.

(12) Line 36, column 7, change 200 to 222.

(13) Column 8, under remarks, change (u) to read:

1 band leader; 1 assistant band leader; 1 sergeant bugler; 4 band sergeants; 6 band corporals; 6 musicians, 1st class; 10 musicians 2nd class; 20 musicians, 3rd class.

TABLE 223.

(1) Line 8, column 1, change to read Chaplain and Band Leader.

(2) Line 8, column 7, insert 1.

(3) Line 8, column 10, insert 1.

(4) Line 8, column 13, change 1 to 2.

(5) Line 9, column 7, change 21 to 22.

(6) Line 9, column 10, change 64 to 65.

(7) Line 9, column 13, change 70 to 71.

(8) Line 29, column 7, change 28 to 49.

(9) Line 29, column 10, change 28 to 49.

(10) Line 29, column 13, change 28 to 49.

(11) Line 30, column 7, change 234 to 255.

(12) Line 30, column 10, change 1634 to 1655.

(13) Line 30, column 13, change 1695 to 1716.

(14) Line 31, column 7, change 255 to 277.

(15) Line 31, column 10, change 1698 to 1720.

(16) Line 31, column 13, change 1765 to 1787.

(17) Line 51, column 7, change 200 to 222.

(18) Line 51, column 10, change 570 to 592.

(19) Line 51, column 13, change 599 to 621.

(20) Column 14, under remarks, change (y) to read:

1 band leader, 1 assistant band leader; 1 sergeant bugler; 4 band sergeants; 6 band corporals; 6 musicians, 1st class; 10 musicians, 2nd class; 20 musicians, 3rd class.

(320.2, A. G. O.)

BY ORDER OF THE SECRETARY OF WAR:

PEYTON C. MARCH.
General, Chief of Staff

OFFICIAL:
H. P. McCAIN,
The Adjutant General.

SEE TABLE 221 (REVISED) ATTACHED

TABLE 221 - HEADQUARTERS COMPANY (ARMY ARTILLERY)
6-inch Gun and 8-inch, 9.2-inch Mark I or II, 240 mm., Model 1918, Howitzer
Regiments, Motorized
(Personnel from Coast Artillery Corps)
MAXIMUM AND MINIMUM STRENGTH

CONFIDENTIAL.
SERIES C.

Corrected to July 29, 1918

1	2	3	4	5	6	7	8
1 Units	Regimental Section & Company HQ	Band Section	1st Battalion	2nd Battalion	3rd Battalion	Total	Remarks
2 Captain	1	..	..	..	..	1	(a) One reconnaissance officer, one telephone officer, one radio officer, four aeroplane observers, four balloon observers, ten 1st Lieutenants, attached to Regimental Headquarters.
3 1st Lieutenant	..	(1	..	..	..	(21	
4 2nd Lieutenant	11a	(	3t	3t	3t	(	
5 Total Commissioned	12	1	3	3	3	22	
6 Sergeant Major, Sr Gr	2h	..	..	..	..	2	(b) One in charge regimental scouts, one in charge regimental signal detail, one in charge regimental instruments, one in charge postal service, one in charge wireless station, two personnel sergeants.
7 Sergeant Major, Jr Gr	..	..	1	1	1	3	
8 1st Sergeant	1	..	..	..	..	1	
9 Master Gunner	1	..	1	1	1	4	
10 Electrician Sergeant	1	..	1	1	1	4	
11 Mess Sergeant	1	..	..	..	..	1	
12 Radio Sergeant	2	..	2	2	2	8	
13 Supply Sergeant	1	..	..	..	..	1	(c) Chaufeurs.
14 Sergeant	1x2s 10b	..	2g	2g	2g	16	(d) One rangefinder operator, one signal corporal, two instrument corporals, three scouts, one wireless operator, one company clerk.
15 Corporal	10d	..	10i	10i	10i	40	
16 Cook	4	..	..	..	..	4	
17 Mechanic	..	..	1r	1r	1r	3	
18 Wagoners (Y)	c4r	..	c1r	c1r	c1r	4	(h) One performs duties of regimental sergeant major, Field Artillery, one personnel sergeant.
19 Buglers	1	..	1	1	1	4	
20 Privates, 1st Class	er2215c	..	r6Lc	r6Lc	r6Lc	40	(e) Includes one in charge regimental commander's instrument, one telephone operator, two wireless operators.
21 Privates	4k20f2r	..	1kr16m	1kr16m	1kr16m	68	
22 Band (all grades) (U)	..	49	..	..	..	49	(f) One wire man, four telephone operators, four orderlies, three messengers, three scouts.
23 Total Enlisted	80	49	42	42	42	255	
24 Aggregate	92	50	45	45	45	277	(g) One agent regimental headquarters, one scout.
25 Cars, Motor, 5-passenger (Q. M. C.)	5	..	..	..	..	5	
26 Cars, Motor, Staff Observation (O. D.)	1	..	1	1	1	4	
27 Carts, Reel, Regimental and Battalion (O. D.)	1	..	1	1	1	4	

1	2	3	4	5	6	7	8
1 Units	Regimental Section & Company HQ	Band Section	1st Battalion	2nd Battalion	3rd Battalion	Total	Remarks
28 Kitchen, Rolling, Trail (Q. M. C.)	s1	..	..	..	..	..	(i) One rangefinder operator, two instrument corporals, three scouts, two signal corporals, one wireless corporal, one postman.
29 Motorcycles with Side Cars (Q. M. C.)	24	..	..	..	..	24	
30 Tractors, Artillery, 2½-ton (O. D.)	1	..	1	1	1	4w	(k) Assistant chauffeurs.
31 Trucks, 3-ton (O. D.)	11s2	..	..	..	..	9n	(L) One operator battalion commander's instrument, one telephone operator, two wireless operators, one signaller.
32 Trucks, Ammunition (O. D.) (o)	9	..	..	..	..	9n	(m) One wire man, three scouts, four telephone operators, four orderlies, three messengers
33 Truck, Artillery, Supply (O. D.)	1	..	..	..	..	1	(n) Four transportation cannoneers, one for ordnance personnel attached to supply company.
34 Truck, Telephone, Switchboard, 2-ton (O. D.)	1	..	..	..	..	1	(o) Six-inch gun regiments only.
35 Truck, Wireless (O. D.)	1	..	..	..	..	1	(r) Armed with rifle; all others with pistols.
36 Pistols	64	50	36	36	36	222	(u) One band leader, one assistant band leader, one sergeant bugler, four band sergeants, six band corporals, six musicians 1st class, ten musicians 2nd class, twenty musicians 3rd class.
37 Rifles	28	..	9	9	9	55	(t) Three 2d Lieutenants attached, one liaison officer, one telephone officer, one radio officer.
							(s) From Supply Company; not totalled.
							(w) Two reel carts.
							(x) Performs duties of chief mechanic,

Note. For tractors, 10 to 20-ton, 1 wagoner, as chauffeur and 1 private, 1st class, and 1 private as assistant chauffeur. For ammunition, supply, wireless, telephone and tank trucks, 1 wagoner as chauffeur and 1 private as assistant chauffeur and necessary number of privates. For reel and fire control trucks, 1 private, 1st class, as chauffeur and 1 private as assistant chauffeur. For 3-ton light, repair and personnel trucks, reconnaissance cars, and motor cars, 1 private, 1st class, as chauffeur. For tractors, 2½-ton, 1 wagoner as chauffeur, 1 private as assistant chauffeur. For tractors, 5-ton, 1 wagoner as chauffeur and 1 private, 1st class, as assistant chauffeur.

Field Artillery.
(Y) Par. V. G. O. 150, W. D., 1917.
(z) Perform duties of color sergeant, Field Artillery.

SEE TABLE 222 (REVISED) ATTACHED

TABLE 222 - SUPPLY COMPANY
6-inch Gun and 8-inch, 9.2-inch Mark I or II, 240 mm., Model 1918, Howitzer Regiments, Motorized (Army Artillery)
(Personnel from Coast Artillery Corps)
MAXIMUM AND MINIMUM STRENGTH

CONFIDENTIAL.
SERIES C.

Corrected to March 14, 1918

1	2	3	4	5	6	7	8	9	10
1 Units	Company HQ	Regimental Section	1st Battalion Section	2nd Battalion Section	3rd Battalion Section	Total Company	Ordnance Department Attached	Aggregate	Remarks
2 Captain	1					1			(a) One accompanies each battalion when detached.
3 1st Lieutenant	1					1	1	3	(b) For regimental and battalion officers' messes.
4 2nd Lieutenant	1					1	..	1	(c) Chauffeur.
5 Total Commissioned	3	..	..	..	..	3	1	4	(d) Includes one company clerk.
6 Ordnance Sergeant	..	..	..	..	..	..	4	4	(e) Cobbler.
7 Sgt Maj, Jr Gr (i)	..	..	a1t	a1t	a1t	3	..	3	(f) 25 in 6-inch gun regiments, 6 in supply company, 3 in each battery, 1 in headquarters company.
8 1st Sergeant	1t	..	..	..	..	1	..	1	(i) Performs duties of regimental supply sergeant.
9 Mess Sergeant	1t	..	..	..	..	1	..	1	(k) Assistant chauffeur.
10 Supply Sergeant	1t	..	..	..	..	1	..	1	(r) Armed with rifle; all others armed with pistols.
11 Sergeant	1x31t	..	..	..	..	3	3	6	(s) Only 3 in 6-inch gun regiments, 1 for each battalion.
12 Corporal	r5d1t	..	..	..	..	5	6	11	(t) Motorcyclist.
13 Cooks	2	1b	1b	1b	1b	6	..	6	(w) Manned by Ordnance Department personnel.
14 Mechanics	r1	..	r13	r1e	r1e	4	..	4	(x) Performs duties of
15 Wagoners (y)	r2c	..	..	..	..	2	..	2	
16 Privates, 1st Class	r144c	r2c	r4c	r4c	r4c	28	7	35	
17 Private	r282k	r1b	r1b	r1b	r1b	32	8	40	
18 Total Enlisted	58	4	8	8	8	86	28	114	
19 Aggregate	61	4	8	8	8	89	29	118	
20 Car, Motor, 5-pass. Q.M.C.	1	..	..	..	..	1	..	8	
21 Kitchens, Rolling, Trail (Q.M.C.)	1	1	2	2	2	8	..	8	
22 Motorcycles with Side Cars (Q.M.C.)	5	..	1	1	1	8	..	8	

1	2	3	4	5	6	7	8	9	10
1 Units	Company HQ	Regimental Section	1st Battalion Section	2nd Battalion Section	3rd Battalion Section	Total Company	Ordnance Department Attached	Aggregate	Remarks
23 Trucks, 3-ton (O.D.), Ration and Baggage (o) (Q.M.C.)	2	2	4	4	4	16	..	16	chief mechanic, Field Artillery (y) Par. V. G. O., No. 150, W. D. (z) One of these manned by company personnel; other by ordnance personnel. NOTE: For tractors 2½-ton, 1 wagoner as chauffeur, 1 private as assistant chauffeur. For 3-ton light, repair and personnel trucks, reconnaissance cars and
24 Trucks, Artillery Repair (O.D.)	1ws	..	2ws	2ws	2ws	7s	..	7	
25 Trucks, Artillery Supply (O.D.)	2zf	..	2w	2w	2w	8f	..	8	
26 Trucks, Repair, Light (O.D.)	1	..	..	..	..	1	..	1	
27 Truck, Tank (O.D.)	1	..	..	..	..	1	..	1	
28 Pistols	11	1	2	2	2	18	29	47	
29 Rifles	50	3	6	6	6	71	..	71	

motor cars, 1 private first class as chauffeur. For tractors, 5-ton, 1 wagoner as chauffer, and 1 private first class as assistant chauffeur. For tractors, 10- or 20-ton, 1 wagoner as chauffeur, 1 private first class and 1 private as assistant chauffeurs. For ammunition, supply, wireless, telephone and tank trucks, 1 wagoner as chauffeur, 1 private as assistant chauffeur, and necessary number of privates. For reel and fire control trucks, 1 private first class as chauffeur and 1 private as assistant chauffeur.

(o) Trucks, ration and baggage (Q.M.C.) for 6-inch gun regiments only; other regiments have trucks, 3-ton (O.D.)

SEE TABLE 221 (REVISED) ATTACHED

TABLE 221 - HEADQUARTERS COMPANY (ARMY ARTILLERY)
6-inch Gun and 8-inch, 9.2-inch Mark I or II, 240 mm., Model 1918, Howitzer
Regiments, Motorized

CONFIDENTIAL. (Personnel from Coast Artillery Corps) Corrected to July 29, 1918
SERIES C. MAXIMUM AND MINIMUM STRENGTH

1	2	3	4	5	6	7	8	9	
1 Units	Company HQ	Regiment Section	1st Battalion Section	2nd Battalion Section	3rd Battalion Section	Total Company	Ordnance Department Attached	Total	Remarks
2 Captain	1					1		1	(a) Performs duties of Regiment Supply Sergeant.
3 1st Lieutenant			1	1	1	3	1	4	
4 2nd Lieutenant	1					1		1	
5 Total Commissioned	2		1	1	1	5	1	6	(b) 1 accompanies each battalion when detached.
6 Ordnance Sergeant							4	4	
7 Sergeant Major (a) Jr Gr		1	1(b)	1(b)	1(b)	4		4	
8 1st Sergeant	1					1		1	(c) Includes one company clerk and one gas corporal.
9 Mess Sergeant	1					1		1	
10 Supply Sergeant	1					1		1	
11 Sergeant	2					2	4	6	(d) For Regiment, a battalion officer's mess.
12 Corporal	5c					5	8	13	
13 Cook	2	1d	1d	1d	1d	6		6	
14 Mechanic	1r	1er	1er	1er	1er	5		5	(e) Cobbler.
15 Private, 1cl	10					10	12	22	(f) 1 Rolling Kitchen, motor trail, for transport company attached.
16 Private	26	1d	7 1d	7 1d	7 1d	48	4	52	
17 Total Enlisted	49	4	10	10	10	83	32	115	
18 AGGREGATE	51	4	11	11	11	88	33	121	
19 Car, Motor, 5-Passenger Q.M.C.	1		1	1	1	4	1	5	(g) 1 for transport company attached with rifles.
20 Kitchen, rolling, trail, mobile	1	2f	3f	3f	3f	3f	12	12	
21 Motorcycle w/side-car	5		1	1	1	8		8	
22 Cart, water, trail	1	2g	3g	3g	3g	12		12	
23 Pistol	14	2	3	3	3	25	33	58	
24 Rifle	37	2	8	8	8	63		63	

NOTE: Ordnance detachment to man 4 artillery repair trucks, each truck to have 1 ordnance sergeant, 1 sergeant, expert machinist; 2 corporals, machinist, 1 private 1st 1cl, acetylene weler; 1 private 1cl, electricial; 1 private 1cl, blacksmith; 1 private, machinist's helper.

(SEE TABLE 223 (REVISED) ATTACHED

TABLE 223 - 6-INCH GUN REGIMENT, MOTORIZED (ARMY ARTILLERY)
(Personnel from Coast Artillery Corps) Corrected to April 12, 1918
MAXIMUM AND MINIMUM STRENGTH

CONFIDENTIAL.
SERIES C.

1	2	3	4	5	6	7	8	9	10	11	12	13
		Battalion			Regiment					Medical		
1 Units	1 Battery (a)	HQ	2 Batteries	Total	HQ	HQ Company (b)	Supply Company (f)	3 Battalions	Total	Department and Chaplains	Ordnance Dept (g)	Aggregate
2 Colonel	..	..	..	..	1	..	..	..	1	..	..	1
3 Lieutenant Colonel	..	..	..	..	1	..	..	..	1	..	..	1
4 Major	..	1	..	1	..	..	..	3	3	1	..	4
5 Captain	1	1	2	3	2A	1	1	9				
6 1st Lieutenant	2	..	4	4	..	11	1	12	37	3	1	41
7 2nd Lieutenant	2	i3	4	4	..	9	1	12	22	..	..	22
8 Chaplain	..	..	..	..	..	..	..	..	..	1	..	1
9 Total Commissioned	5	2	10	12	4	21	3	36	64	5	1	70
10 Sgt Maj, Sr Gr (p)	..	..	..	..	..	2	..	..	2	..	..	2
11 Ordnance Sergeant	..	..	..	..	..	..	..	..	..	..	4	4
12 Sgt Maj, Jr Gr (o)	..	k1	..	..	..	..	3	..	3	..	..	3
13 Sgt Maj, Jr Gr (q)	..	i1	..	..	..	3	..	..	3	..	..	3
14 1st Sergeant	1	..	2	2	..	1	1	6	8	..	..	8
15 Sergeant, 1st Class	..	..	..	..	..	..	..	..	..	1	..	1
16 Master Gunner	..	i1	..	..	i1	4	..	..	4	..	..	4
17 Electrician Sergeant	..	i1	..	..	i1	4	..	..	4	..	..	4
18 Mess Sergeant	1	..	2	2	..	1	1	6	8	..	..	8
19 Radio Sergeant	..	i2	..	..	i2	8	..	..	8	..	..	8
20 Supply Sergeant	1	..	2	2	..	1	1	6	8	..	..	8
21 Sergeant	12	..	24	24	..	16	3	72	91	3	3	97
22 Corporal	24	..	48	48	..	40	5	144	189	..	6	195
23 Cook	4	..	8	8	..	4	6	24	34	..	..	34
24 Mechanic	4	..	8	8	..	3	4	24	31	..	..	31
25 Wagoner (z)	19	i1c	38	38	..	7	2	114	123	..	..	123
26 Bugler	3	..	6	6	..	4	..	18	22	..	..	22
27 Private, 1st Class	49	i1c	98	98	..	40	28	294	362)	29	7)	1112
28 Private	101	i1d	202	202	..	68	32	606	706)		8)	
29 Band (all grades)(y)	..	..	..	..	..	28	..	..	28	..	..	28
30 Total Enlisted	219	..	438	438	..	234	86	1314	1634	33	28	1695
31 Aggregate	224	2	448	450	4	255	89	1350	1698	38	29	1765

1	2	3	4	5	6	7	8	9	10	11	12	13
		Battalion			Regiment					Medical		
1 Units	1 Battery (a)	HQ	2 Batteries	Total	HQ	HQ Company (b)	Supply Company (f)	3 Battalions	Total	Department and Chaplains	Ordnance Dept (g)	Aggregate
32 Ambulances (M. D.)	..	..	..	..	..	..	..	..	..	3	..	3
33 Car, Motor, 5-Passenger (Q.M.C.)	2	..	4	4	..	5	1	12	18	1	..	19
34 Car, Motor, Staff Observation (O.D.)	..	il	..	..	il	4	..	i3	4	..	..	4
35 Car, Reconnaissance (O.D.)	1	..	..	2	2	..	..	6	6	..	..	6
36 Cart, Reel, Regimental and Battalion (O.D.)	..	il	..	..	il	4	..	i3	4	..	..	4w
37 Kitchen, Rolling, Trail (Q.M.C.)	k1	..	k2	..	..	k1	8	k6	8	..	..	8
38 Motorcycle with Side Car (Q.M.C.)	12	..	24	24	..	24	8	72	104	4m	..	108
39 Tractor, Artillery, 2½-ton (O.D.)	..	il	..	..	il	4	..	i3	4	..	..	4
40 Tractor, Artillery, 10-ton (O.D.)	4	..	8	8	..	..	..	24	24	..	..	24
41 Truck, Ration and Baggage, 3-ton (Q.M.C.)	k2	..	k4	..	..	k3	16	k12	16	..	..	16
42 Truck, Ammunition (O.D.)	20[8v]	..	40[16v]	40	..	9v	..	120	129	2v	..	131
43 Truck, Artillery, Repair (O.D.)	..	k1	..	..	..	..	3	k3	3	..	..	3
44 Truck, Artillery Supply (O.D.)	3[2n]	k1	6[4n]	6	..	1	6	18	25	..	..	25
45 Truck, Repair, Light (O.D.)	..	..	..	..	..	..	1	..	1	..	..	1
46 Truck, Reel and Fire Control (O.D.)	1	..	2	2	..	..	..	6	6	..	..	6
47 Truck, Tank (O.D.)	1	..	2	2	..	..	1	6	7	..	..	7
48 Truck, Telephone, Switchboard, 2-ton (O.D.)	..	..	..	..	il	1	..	..	1	..	..	1
49 Truck, Wireless (O.D.)	..	..	..	..	..	1	..	..	1	..	..	1

1	2	3	4	5	6	7	8	9	10	11	12	13
		Battalion			Regiment					Medical		
1 Units	1 Battery (a)	HQ	2 Batteries	Total	HQ	HQ Company (b)	Supply Company (f)	3 Battalions	Total	Department and Chaplains	Ordnance Dept (g)	Aggregate
50 Gun, 6-inch	4	..	8	8	..	..	..	24	24	..	..	24
51 Pistol	57	2	114	116	4	200	18	348	570	..	29	599
52 Rifle	167	..	334	334	..	55	71	1002	1128	..	..	1128
53 Gun, Anti-Aircraft, Machine		2	..	4	4	..	..	..	12	..	..	12

(a) See Table 224. (b) See Table 221. (c) Chauffeurs. (d) Assistant chauffeurs. (f) See Table 222.
(g) See Table 222. (i) From Headquarters Company; not totaled. (k) From Supply Company; not totaled.
(m) Furnished by Medical Department. (n) Tool trucks. (o) Performs duties of Regimental Supply Sergeant.
(p) One performs duties of Regimental Sergeant Major, Field Artillery; one personnel sergeant. (q) Performs duties of Battalion Sergeant Major, Field Artillery. (v) For transportation. (w) Pulled by 2½-ton tractor. (y) one band leader, one assistant band leader, one 1st sergeant, two band sergeants, 4 band corporals, two musicians, 1st class, four musicians 2nd class, and 13 musicians 3rd class. (z) Par. V. G. O. No. 150, War Dept, 1917.

Note.--For tractors, 2½-ton, 1 wagoner as chauffeur, 1 private as assistant chauffeur. For tractors, 5-ton, 1 wagoner as chauffeur, 1 private 1st class as assistant chauffuer. For tractors, 10 or 20-ton, 1 wagoner as chauffeur, and 1 private 1st class and 1 private as assistant chauffeurs. For ammunition, and motor cars, 1 private 1st class as chauffeur. Supply, wireless, telephone and tank trucks, 1 wagoner as chauffeur, and 1 private as assistant chauffeur, and necessary number of privates. For reel and fire control trucks 1 private 1st class as chauffeur and 1 private as assistant chauffeur. For 3-ton, light repair and personnel trucks, reconnaissance cars.

(A) One adjutant, one personnel officer.

(See Table 224)

TABLE 224--BATTERY OF 6-GUNS, MOTORIZED (ARMY ARTILLERY)
(Personnel from Coast Artillery Corps)
MAXIMUM AND MINIMUM STRENGTH

SERIES C
CONFIDENTIAL

Corrected to April 12, 1918

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
		ONE BATTERY - FOUR GUNS												
		Special Detail			Firing Battery						Combat Train			
					1st Platoon		2nd Platoon		3rd Platoon		4th Platoon			
1 Unit	HQ	Instrument Detail	Signal Detail	Scouts	1st Section	2nd Section	3rd Section	4th Section	5th Section	6th Section	7th Section	8th Section	9th Section	Total One Battery
2 Captain	1	..	..	..	..	..	..	..	..	..	..	..	..	1
3 1st Lieutenants	1	..	..	..	1	..	..	..	..	..	..	..	..	2
4 2nd Lieutenants	..	..	..	..	..	..	1	..	..	1	..	..	..	2
5 Total Commissioned	2	..	..	..	1	..	1	..	..	1	..	..	..	5
6 1st Sergeant	1	..	..	..	..	..	..	..	..	..	..	..	..	1
7 Mess Sergeant	1	..	..	..	..	..	..	..	..	..	..	..	..	1
8 Supply Sergeant	..	..	..	..	..	..	..	..	..	..	..	..	1	1
9 Sergeants	..	1	1	..	21z	1	1	1	1	1	1	1	1z	12
10 Corporals	aj2	1d2	i2	x2r	2	2	2	2	2	2	2	2	..	24
11 Cooks	4	..	..	..	..	..	..	..	..	..	..	..	..	4
12 Mechanics	..	..	..	..	1r	..	1r	..	..	1r	..	..	1r	4
13 Wagoners (Y)	..	..	..	..	c3r	c2r	c3r	c2r	c2r	c2r	c2r	c2r	c1r	19
14 Buglers	1	..	..	..	1	..	..	..	..	1	..	..	..	3
15 Privates, 1st Class	b2r1c	e21c	f31c	x2r	r1c61k	r51k	r51k	r51k	5r	2c4r	2c4r	2c4r	r2c	49
16 Privates	..	1r	g61kr	..	3k14r	2k13r	3k14r	2k13r	2k13r	2k8r	2k8r	2k8r	1k3r	101
17 Total Enlisted	11	6	12	4	29	23	26	23	23	19	17	17	9	219
18 Aggregate	13	6	12	4	30	23	27	23	23	20	17	17	9	224

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
		ONE BATTERY - FOUR GUNS												
		Special Detail			Firing Battery						Combat Train			
					1st Platoon		2nd Platoon		3rd Platoon		4th Platoon			
1 Unit	HQ	Instrument Detail	Signal Detail	Scouts	1st Section	2nd Section	3rd Section	4th Section	5th Section	6th Section	7th Section	8th Section	9th Section	Total One Battery
19 Car, Motor, 5-passenger, (Q.M.C.)	1	..	..	..	1	..	..	..	..	..	..	..	..	2
20 Car, Reconnaissance (O.D.)	..	1	..	..	..	..	..	..	..	..	..	..	..	1
21 Kitchen, Rolling Trail (Q.M.C.)	1s	..	..	..	..	..	..	..	..	..	..	..	..	..
22 Motorcycles with Side Cars (Q.M.C.)	1	1	1	2	1	..	1	..	1	..	1	1	2	12
23 Tractor, Artillery, 10-ton (O.D.)	..	..	..	..	1	1	1	1	..	..	..	..	..	4
24 Truck, Ration & Baggage, 3-ton (Q.M.C.)	2s	..	..	..	..	..	..	..	..	..	..	..	.	..
25 Truck, Ammunition (O.D.)	..	..	..	..	1	1	1	1	2	42v	42v	42v	2v	208v
26 Truck, Artillery Supply (O.D.)	..	..	..	..	1s	..	1n	..	..	..	..	..	1	1w3
27 Truck, Reel & Fire Control (O.D.)	..	..	1	..	..	..	..	..	..	..	..	..	..	1
28 Truck, Tank (O.D.)	..	..	..	..	..	..	..	..	..	..	..	..	1	1
29 Guns, 6-inch	..	..	..	..	1	1	1	1	..	..	..	..	..	4
30 Pistols	9	5	11	..	6	3	4	3	3	5	3	3	2	57
31 Rifles	4	1	1	4	24	20	23	20	20	15	14	14	7	167
32 Gun, Anti-Aircraft, Machine	..	..	..	..	..	..	..	..	..	1	..	1	..	2

REMARKS

(a) Agent with Battalion Headquarters.
(b) One agent with Supply Company.
(c) Chauffeur.
(d) Range finder.
(e) Fire control instruments.
(f) Telephone operators.
(g) Three telephone operators, one signaller, one lineman.
(i) One in charge of reel and fire control truck, one in charge of B. C. telephone station.
(j) One battery clerk.
(k) Assistant chauffeur.
(n) Tool truck.
(r) Armed with rifle; all others with pistols.
(s) From Supply Company; not included in total.
(v) For transportation of cannoneers.
(w) Cleaning and preserving materials and spare parts.
(x) One driver, Scouts' motorcycles.
(Y) Par. V. G. O. No. 150, W. D., 1917.
(z) Performs duties of chief mechanic.

NOTE.--For tractors, 10 or 20-ton, 1 wagoner as chauffeur and 1 private 1st class and 1 private as assistant chauffeur. For ammunition, supply, wireless, telephone and tank trucks, 1 wagoner as chauffeur and 1 private as assistant chauffeur, and necessary number of privates. For reel and fire control truck, 1 private 1st class as chauffeur and 1 private as assistant chauffeur. For 3-ton, light repair and personnel trucks, reconnaissance cars and motor cars, 1 private 1st class as chauffeur.

NOTE.--See proposed new table "Transport Company."

AMENDED TO CONFORM TO BATTERY TOTAL ENLISTED STRENGTH OF 196 AND 5 OFFICERS

TABLE I

SETS OF INDIVIDUAL MOBILE EQUIPMENT OF A BATTERY OF 155 m/m FILLOUX GUNS (ARMY ARTILLERY)

1	2	3	4	5
Articles Worn or carried on person	1 1st Sgt, 1 Mess Sgt, 1 Supply Sgt, 12 Sgts, 20 Cpls, 4 Cooks, 3 Buglers, 5 Pvt 1st Cl, 5 Pvts	4 Cpls, 4 Mechs, 19 Wagoners, 44 Pvt 1st Cl, 95 Pvts	Total Battery	Remarks
Armed with pistol Number in each group	52p	167r	219	(p) (r) Armed with rifle
QUARTERMASTER PROPERTY				
Belt, waist	1	1	219	
Blankets, O. D. (1)	1	1	219	(1) See Note No. 1.
Breeches, service, wool	1	1	219	
Bugle with sling (2)	..	..	3	(2) Carried by buglers only
Cap, overseas	1	1	219	
Coat, fatigue	1	1	219	
Coat, service, wool	1	1	219	
Chevrons and sleeve insignia (3)	..	..	..	(3) See Note No. 2.
Drawers, pair	2	2	438	
Dubbin 4 oz can (4)	1	1	224	(4) Includes Officers.
Gloves, heavy leather, prs.	1	1	219	
Gloves, wool, O.D., prs.	1	1	219	
Hat, fatigue	1	1	219	
Laces, shoe, extra, prs.	2	2	438	
Ornament, bronze	2	2	438	
Ornament, bronze, letters	1	1	219	
Overcoat (1)	1	1	219	
Pin, shelter tent (4)	5	5	1145	
Pole, shelter tent (4)	1	1	229	
Puttees, spiral, wool, prs	1	1	219	
Rations, reserve (4)	2	2	448	
Shirts, wool, O. D.	2	2	438	
Shoes, prs.	2	2	438	
Slickers	1	1	219	
Socks, wool, prs.	4	4	876	
Tag, Identification	2	2	438	
Tape, Identification Tag, yds.	1	1	219	
Tent, shelter half (4)	1	1	229	
Toilet kit (5)	1	1	219	(5) See Note No. 5.
Trousers, fatigue	1	1	219	
Undershirt	2	2	438	
Whistle and chain (6)	..	..	13	(6) Carried by 1st Sgts and Sgts

1	2	3	4	5
Articles Worn or carried on person	1 1st Sgt, 1 Mess Sgt, 1 Supply Sgt, 12 Sgts, 20 Cpls, 4 Cooks, 3 Buglers, 5 Pvt 1st Cl, 5 Pvts	4 Cpls, 4 Mechs, 19 Wagoners, 44 Pvt 1st Cl, 95 Pvts	Total Battery	Remarks
Armed with pistol Number in each group	52p	167r	219	(p) (r) Armed with rifle
ORDNANCE PROPERTY				
Bayonet	..	1	167	
Bayonet scabbard	..	1	167	
Breech cover	..	1	167	
Breech stick	..	1	167	
Brush and thong (7)	..	1	167	(7) If any rifles are provided w/spare part containers, this number will be reduced accordingly.
Can, condiment	1	1	219	
Can, meat	1	1	219	
Canteen	1	1	219	
Canteen cover, dismounted	..	1	218	
Cartridges, ball, cal. 30	..	100	16700	
Cartridges, pistol, cal. .45 (4)	35	..	1995	
Cartridge belt, cal. 30, dismounted	..	1	167	
Cup	1	1	219	
Fork	1	1	219	
Front, sight cover	..	1	167	
Gun sling	..	1	167	
Haversack	1	1	219	
Helmet, steel (4)	1	1	224	
Knife	1	1	219	
Magazine, pistol, extra (4)	4	..	228	
Magazine, pocket, web, double (4)	2	..	114	
Oiler and thong case (7)	..	1	167	
Pack carrier	1	1	219	
Pistol belt (4)	1	..	57	
Pistol, cal. .45 (4)	1	..	57	
Pistol holster (4)	1	..	57	
Pouch, 1st aid packet	1	1	219	
Rifle, U. S. cal. .30	..	1	167	
Rifle, scabbard	..	1	167	
Spoon	1	1	219	
MEDICAL PROPERTY				
Foot powder or grease box (4)	1	1	224	
Packet, 1st aid (4)	1	1	224	
CHEMICAL WARFARE SERVICE PROPERTY				
Respirator, British, S. B. or equal (4)	1	1	224	

ARTICLES OF MOBILE EQUIPMENT DISTRIBUTED WITHIN A BATTERY OF 155 M/M FILLOUX GUNS

1	2	3
QUARTERMASTER PROPERTY		Distributed as directed by Organization Commander.
Brassards: (8)		
Blue (Agents and signalmen)	..	(S) See G. O. No. 59 H.
Green (Guides and scouts)	..	A. E. F., 1917.
Red (Orderlies and messengers)	..	
Housewife	27	
CLOTHING FOR CHAUFFEURS AND MOTORCYCLISTS		
Boots, hip, rubber, prs.	69	
Coat, oilskin	69	
Gauntlets, winter, prs. (9)	69	(9) For winter use.
Gloves, heavy leather, prs. (9)	69	
Goggles, mica or compound	69	
Helmet, wool or toque (9)	69	
Mackinaw or jerkin (9)	69	
Overshoes, arctic, prs. (9)	69	
Socks, extra heavy, prs.	138	
Trousers, oilskin (10)	12	(10) For motorcyclists only.
ORDNANCE PROPERTY		
Cleaning rod, barracks	21	
Screwdriver (rifle)	21	

AMENDED TO CONFORM TO COMPANY HAVING TOTAL ENLISTED STRENGTH OF 250 AND 16 OFFICERS.

TABLE II.

SETS OF INDIVIDUAL MOBILE EQUIPMENT FOR A HEADQUARTERS COMPANY OF A REGIMENT OF 155 M/M FILLOUX GUNS (ARMY ARTILLERY)

1	2	3	4	5
Articles	1 Sgts Maj, Sr Gr; 3 Sgts Maj, Jr Gr; 1 1st Sgt; 4 Mast Gnrs; 4 Elec Sgts; 1 Mess Sgt; 8 Radio Sgts; 1 Sup Sgt; 16 Sgts; 40 Cpls; 4 Cks; 4 Buglers; 63 Pvts; 49 Bandmen	3 Mechanics, 7 Wagoners, 40 Pvt 1st Cl, 5 Pvts	Total Company	Remarks
Number in each group	200p	55r	255	(p) Armed with pistol (r) Armed with rifle
Belt, waist	1	1	255	
Blanket, O. D. (1)	1	1	255	(1) See Note 1.
Breeches, service, wool	1	1	255	
Bugle, with sling (2)	..	..	4	(4) Carried by Buglers only
Cap, overseas	1	1	255	
Coat, fatigue	1	1	255	
Coat, service, wool	1	1	255	
Chevrons and sleeve insignia (3)	..	..	..	(3) See Note No. 2.
Drawers, prs.	2	2	510	
Dubbin, 4 oz. can (4)	1	1	287	(4) Includes officers.
Gloves, heavy leather, prs.	1	1	255	
Hat, fatigue	1	1	255	
Laces, shoe, prs.	2	2	510	
Ornaments, bronze	2	2	510	
Ornaments, bronze, letters	1	1	255	
Overcoat (1)	1	1	255	
Pin, shelter tent (4)	5	5	1595	
Pole, shelter tent (4)	1	1	319	
Puttees, spiral, wool, prs.	1	1	255	
Rations, reserve	2	2	574	
Shirt, O. D., wool	2	2	510	
Shoes	2	2	510	
Slickers	1	1	255	
Socks, wool, prs.	4	4	1020	
Tag, identification	2	2	510	
Tape for identification tags, yds.	1	1	255	
Tent, shelter half (4)	1	1	319	
Toilet kit (5)	1	1	255	(5) See Note No. 5.
Trousers, fatigue	1	1	255	
Undershirt	2	2	510	
Whistle and chain (6)	..	..	17	(6) Whistle and chain will be carried by the 1st Sgt and Sgt.

1	2	3	4	5
Articles	1 Sgt Maj, Sr Gr; 3 Sgts Maj, Jr Gr; 1 1st Sgt; 4 Mast Gnrs; 4 Elec Sgts; 1 Mess Sgt; 8 Radio Sgts; 1 Sup Sgt; 16 3 Mechanics, Sgts; 40 Cpls; 4 Cks; 7 Wagoners, 4 Buglers; 63 Pvts; 49 Bandmen	40 Pvt 1st Cl, 5 Pvts	Total Company	Remarks
Number in each group	200p	55r	255	(p) Armed with pistol (r) Armed with rifle
ORDNANCE PROPERTY				
Bayonet	..	1	55	
Bayonet scabbard	..	1	55	
Breech cover	..	1	55	
Breech stick	..	1	55	
Brush and thong (7)	..	1	55	(7) If any rifles are provided with spare part containers this number will be reduced accordingly.
Can, condiment	1	1	255	
Can, meat	1	1	255	
Canteen	1	1	255	
Canteen cover, dismounted	1	1	255	
Cartridges, ball, cal .30	..	100	5500	
Cartridges, cal .45 (4)	35	..	8120	
Cartridge belt, cal .30 dismounted	..	1	55	
Cup	1	1	255	
Fork	1	1	255	
Front sight cover	..	1	55	
Gun sling	..	1	55	
Haversack	1	1	255	
Helmet, steel (4)	1	1	287	
Knife	1	1	255	
Magazine, pistol, extra (4)	4	..	928	
Magazine, pocket, web double (4)	2	..	464	
Oiler and thong case (7)	..	1	55	
Pack carrier	1	1	255	
Pistol belt (4)	1	..	232	
Pistol, cal .45 (4)	1	..	232	
Pistol holster (4)	1	..	232	
Pouch for 1st aid packet	1	1	255	
Rifle, U. S. cal .30	..	1	55	
Rifle scabbard	..	1	55	
Spoon	1	1	255	
MEDICAL PROPERTY				
Foot powder, or grease box (4)	1	1	287	
Packet, 1st aid (4)	1	1	287	

1	2	3
QUARTERMASTER PROPERTY		HOW DISTRIBUTED As directed by Organization Commander.
Brassards: (8)		
Blue (Agents and signalmen)	..	(8) See G. O. No. 59 H.
Green (Guides and scouts)	..	A. E. F., 1917.
Red (Orderlies and messengers)	..	
Housewife	32	
CLOTHING FOR CHAUFFEURS AND MOTORCYCLISTS		
Boots, hip, rubber, prs.	74	
Coat, oilskin	74	
Gauntlets, winter, prs. (9)	74	(9) For winter use.
Gloves, heavy leather, prs. (9)	74	
Goggles, mica or compound	74	
Helmet, wool or toque (9)	74	
Mackinaw or jerkin (9)	74	
Overshoes, arctic, prs. (9)	74	
Socks, extra heavy, prs.	148	
Trousers, oilskin (10)	24	(10) For motorcyclists only.
ORDNANCE PROPERTY		
Cleaning rod, barracks	7	
Screwdriver (rifle)	7	

AMENDED TO CONFORM TO COMPANY HAVING TOTAL ENLISTED STRENGTH OF 83 AND 5 OFFICERS

TABLE III
SETS OF INDIVIDUAL MOBILE EQUIPMENT FOR A SUPPLY COMPANY OF A REGIMENT
155 M/M FILLOUX GUNS (ARMY ARTILLERY)

1	2	3	4	5	6
Articles	3 Sgts Maj Gr, 1 1st Sgt; 1 Mess Sgt 1 Sup Sgt	5 Cpl 4 Mech 2 Wagoners 28 Pvts, 1st Cl	4 Rd Sgt 3 Sgts 6 Cpls 7 Pvts, 1st Cl		Remarks
Worn or carried on person	3 Sgts 6 Cooks	32 Pvts	8 Pvts Ord Attch	Total Company	
Number in each group	15p	71r	28p	114	(p) Armed with pistol (r) Armed with rifle
QUARTERMASTER PROPERTY					
Belt, waist	1	1	1	114	
Blankets, O. D. (1)	1	1	1	114	(1) See Note No. 1.
Breeches, service, wool	1	1	1	114	
Cap, overseas	1	1	1	114	
Chevrons and sleeve insignia (2)	..	..	..	..	(2) See Note No. 2.
Coat, fatigue	1	1	1	114	
Coat, service, wool	1	1	1	114	
Drawers, pair	2	2	2	228	
Dubbin 4 oz can (3)	1	1	1	118	(3) Includes Officers.
Gloves, heavy leather, prs. (1)	1	1	1	114	
Gloves, wool, O.D., prs. (1)	1	1	1	114	
Hat, fatigue	1	1	1	114	
Laces, shoe, extra, prs.	2	2	2	228	
Ornament, bronze	2	2	2	228	
Ornament, bronze, ltrs	1	1	1	114	
Overcoat (1)	1	1	1	114	
Pin, shelter tent (3)	5	5	5	610	
Pole, shelter tent (3)	1	1	1	122	
Puttees, spiral, wool, prs	1	1	1	114	
Rations, reserve (3)	2	2	2	236	
Shirts, O. D.	2	2	2	228	
Shoes, prs.	2	2	2	228	
Slickers	1	1	1	114	
Socks, wool, prs.	4	4	4	456	
Tag, identification	2	2	2	228	
Tape, identification tag, yds.	1	1	1	114	
Tent, shelter half (3)	1	1	1	122	
Toilet kit (4)	1	1	1	114	(4) See Note No. 5.
Trousers, fatigue	1	1	1	114	
Undershirt	2	2	2	228	
Whistle and chain (5)	..	..	..	3	(5) Carried by 1st Sgt and Sgts

1	2	3	4	5	6
Articles	3 Sgts Maj Gr, 1 1st Sgt; 1 Mess Sgt 1 Sup Sgt	5 Cpl 4 Mech 2 Wagoners 28 Pvts, 1st Cl	4 Rd Sgt 3 Sgts 6 Cpls 7 Pvts, 1st Cl		Remarks
Worn or carried on person	3 Sgts 6 Cooks	32 Pvts	8 Pvts Ord Attch	Total Company	
Number in each group	15p	71r	28p	114	(p) Armed with pistol (r) Armed with rifle
ORDNANCE PROPERTY					
Bayonet	..	1	..	71	
Bayonet scabbard	..	1	..	71	
Breech cover	..	1	..	71	
Breech stick	..	1	..	71	
Brush and thong (6)	..	1	..	71	(6) If any rifles are provided w/spare part containers, this number will be reduced accordingly.
Can, condiment	1	1	1	114	
Can, meat	1	1	1	114	
Canteen	1	1	1	114	
Canteen cover, dismounted	1	1	1	114	
Cartridges, ball, cal. 30	..	100	..	7100	
Cartridges, pistol, cal. .45 (4)	35	..	35	1645	
Cartridge belt, cal. 30, dismounted	..	1	..	71	
Cup	1	1	1	114	
Fork	1	1	1	114	
Front, sight cover	..	1	..	71	
Gun sling	..	1	..	71	
Haversack	1	1	1	114	
Helmet, steel (3)	1	1	1	118	
Knife	1	1	1	114	
Magazine, pistol, extra (3)	4	..	4	188	
Magazine, pocket, web, double (3)	2	..	2	94	
Oiler and thong case (6)	..	1	..	71	
Pack carrier	1	1	1	114	
Pistol belt	1	..	1	47	
Pistol, cal. .45	1	..	1	47	
Pistol holster	1	..	1	47	
Pouch, 1st aid packet	1	1	1	114	
Rifle, U. S. cal. .30	..	1	..	71	
Rifle, scabbard	..	1	..	71	
Spoon	1	1	1	114	
MEDICAL PROPERTY					
Foot powder or grease box (3)	1	1	1	118	
Packet, 1st aid (3)	1	1	1	118	

CHEMICAL WARFARE SERVICE PROPERTY

Respirator, British, S. B. or equal (3)	1	1	1	118

TABLE III (Continued)

ARTICLES OF A SUPPLY COMPANY OF A REGIMENT OF 155 M/M FILLOUX GUNS, DISTRIBUTED WITHIN THE ORGANIZATION

1	2	3
		HOW DISTRIBUTED
QUARTERMASTER PROPERTY		
Brassards: (7)		As directed by the Organization Commander.
Blue: Agents and signalmen	..	
Green: Guides and scouts	..	(7) See G. O. No. 59, H. A. R. F., 1917.
Red: Orderlies and messengers	..	
Housewife	14	
CLOTHING FOR CHAUFFEURS AND MOTORCYCLISTS		
Boots, hip, rubber, pairs	46	
Coat, oilskin	46	
Gauntlets, winter, pairs (8)	46	(8) For winter use.
Goggles, mica or compound	46	
Helmets, wool or toque (8)	46	
Mackinaw or jerkin (8)	46	
Overshoes, article pairs (8)	46	
Socks, wool, extra heavy, pairs (8)	92	
Trousers, oilskin (9)	8	(9) For motorcyclists only.
ORDNANCE PROPERTY		
Cleaning rod, barrack	9	
Screwdriver, (rifle)	9	

NO CHANGE

TABLE IV
SETS OF INDIVIDUAL MOBILE EQUIPMENT OF MEDICAL DEPARTMENT PERSONNEL
ATTACHED TO A REGIMENT OF 155 M/M FILLOUX GUNS, ARMY ARTILLERY

1	2	3	4
ARTICLES Worn or carried on the person	1 Sgt, 1st Cl; 3 Sgts; 29 Pvts, 1st Cl; & Pvts	Total Detachment	Remarks
Number in each group	33	33	
Belt, waist	1	33	
Blanket, O. D. (1)	1	33	(1) See Note No. 1
Breeches, service, wool	1	33	
Caps, overseas	1	33	
Chevrons and sleeve insignia (2)	..	..	(2) See Note No. 2
Coat, service, wool	1	33	
Drawers	2	66	
Dubbin, 4 oz can (3)	1	38	(3) Includes officers
Gloves, heavy leather, pairs	1	33	
Gloves, wool, O. D., pairs (1)	1	33	
Laces, shoe extra, pairs	2	66	
Ornaments, bronze	2	66	
Ornaments, bronze, letters	1	33	
Overcoat (1)	1	33	
Pins, shelter tent (3)	5	215	
Pole, shelter tent (3)	1	43	
Puttees, spiral, wool, pairs	1	33	
Rations, reserve (3)	2	76	
Shirt, O. D.	2	66	
Shoes, pairs	2	66	
Socks, wool, pairs	4	132	
Tags, identification	2	66	
Tape, identification tag, yds.	1	33	
Tent, shelter half (3)	1	43	
Toilet kit (4)	1	33	(4) See Note No. 5
Undershirt	2	66	
ORDNANCE PROPERTY			
Can, condiment	1	33	
Can, meat	1	33	
Canteen	1	33	
Canteen cover, dismounted	1	33	
Cup	1	33	
Fork	1	33	
Hand axe and carrier	1	33	
Haversack	1	33	
Helmet, steel (3)	1	38	
Knife	1	33	
Pack carrier	1	33	
Pouch for 1st aid packet	1	33	
Spoon	1	32	

1	2	3	4
ARTICLES Worn or carried on the person	1 Sgt, 1st Cl; 3 Sgts; 29 Pvts, 1st Cl; & Pvts	Total Detachment	Remarks
Number in each group	33	33	
MEDICAL PROPERTY			
Belt, web with pouch for diagnosis tags & instruments, w/contents, complete (3)	1	37	
Brassards, Red Cross (3)	1	38	
Diagnosis tags, book of (3)	1	37	
Foot powder or grease box (3)	1	38	
Packet, first aid (3)	1	38	
CHEMICAL WARFARE SERVICE PROPERTY			
Respirator, British, S. B. or equal (3)	1	38	

ARTICLES DISTRIBUTED WITHIN THE DETACHMENT OF MEDICAL PERSONNEL ATTACHED TO A REGIMENT OF 155 M/M FILLOUX GUNS

1	2	3
		HOW DISTRIBUTED
QUARTERMASTER PROPERTY		
Housewife	4	As directed by the detachment commander.
CLOTHING FOR CHAUFFEURS AND MOTORCYCLISTS		
Boots, hip, rubber, pairs	10	
Coat, oilskin	10	
Gauntlets, winter, pairs (5)	10	(5) For winter use.
Gloves, heavy leather, pairs	10	
Goggles, mica or compound	10	
Helmet, wool or toque (5)	10	
Mackinaw or jerkin (5)	10	
Overshoes, artic, pairs (5)	10	
Socks, extra heavy, pairs (5)	20	
Trousers, oilskin (6)	4	(6) For motorcyclists only.

TABLE V (Continued)

TOTAL MOBILE EQUIPMENT OF A REGIMENT OF 155 MM FILLOUX GUNS (ARMY ARTILLERY)

1	2	3	4	5	6	7
Range, field, No. 1 or 2, complete (5)	..	..	..	..	..	(5) Usually none will
Rations, field	448	574	236	76	3574	be issued; may be
Rations, reserve	672	861	354	114	5361	issued to detachments
~~Ribbons, typewriter, Corona, red & black~~	~~..~~	~~9~~	~~..~~	~~..~~	~~9~~	and organizations
Shirt, O. D.	438	510	228	66	3432	when available and
Shoes, pairs	438	510	228	66	3432	necessary. See Notes
Slicker	219	255	114	33	1716	9 and 16.
Sling, color	..	2	..	..	2	
Socks, wool, pairs	876	1020	456	132	6864	(6) 3 for each Bn
Spade	4	12	6	3	45	Headquarters.
Colors, C.A.C. regimental, w/case, staff, cord & tassels, silk	..	1	..	..	1	
Colors, national, service, w/case, staff, cord & tassels	..	1	..	..	1	
Colors, national, silk, w/case, staff, cord and tassels	..	1	..	..	1	
Stretcher, shoe	1	1	1	..	8	
Tag, identification	438	510	228	66	3432	
Tape, identification tag, yards	219	255	114	33	1716	
Tent, shelter half	229	319	122	43	1858	
Toilet kit	219	255	114	33	1716	
Tools, butcher's kit (7)	..	..	1	..	1	(7) See Note No. 11.
Trousers, fatigue	219	255	114	..	1683	
Typewriter	..	5	..	..	5	(See amendment
~~Typewriter, Corona standard (8)~~	~~..~~	~~3~~	~~..~~	~~..~~	~~3~~	attached)
Undershirts	438	510	228	..	3432	(8) 1 for each Bn
Whistle and chain	13	17	3	..	98	Headquarters.
CLOTHING FOR CHAUFFEURS AND MOTORCYCLISTS						
Boots, hip, rubber, pairs	69	74	46	10	544	
Coat, oilskin	69	74	46	10	544	
Gauntlets, winter, pairs	69	74	46	10	544	
Gloves, heavy leather, pairs	69	74	46	10	544	
Goggles, mica or compound	69	74	46	10	544	
Helmet, wool or toque	69	74	46	10	544	
Mackinaw or jerkin	69	74	46	10	544	
Overshoes, arctic, pairs	69	74	46	10	544	
Socks, extra heavy, pairs	138	148	92	20	1088	
Trousers, oilskin	12	24	8	4	108	
Note. For issue of expendable quartermaster supplies see A.R., F.S.R., and current general orders, G.O.Q., A.E.F.						
ORDNANCE PROPERTY						
Bayonet	167	55	71	..	1128	
Bayonet scabbard	167	55	71	..	1128	
Breech cover	167	55	71	..	1128	
Breech stick	167	55	71	..	1128	

1	2	3	4	5	6	7
Brush and thong	167	55	71	..	1128	
Can, condiment	219	255	114	33	1716	
Canteen	219	255	114	33	1716	
Canteen cover, dismounted	219	255	114	33	1716	
Cartridge, ball, cal. 30	16700	5500	7100	..	112800	
Cartridge, pistol, cal. 45	1995	8120	1645	..	21735	
Cartridge belt, cal. 30 dismounted	167	55	71	..	1128	
Cleaning rod, barrack	21	7	9	..	142	
Cup	219	255	114	33	1716	
Fork	219	255	114	33	1716	
Front sight cover	167	55	71	..	1128	
Gun sling	167	55	71	..	1128	
Hand axe and carriers	..	..	..	33	33	
Haversack	219	255	114	33	1716	
Helmet, steel	224	287	118	38	1786	
Knife	219	255	114	33	1716	
Magazine, pistol, extra	228	928	188	..	2484	
Magazine, pocket, web, double	114	464	94	..	1212	
Marking outfit, M. 1910, stamping metal	1	1	1	..	8	
Oiler and thong case	167	55	71	..	1128	
Pack carrier	218	255	114	33	1716	
Pistol belt	57	232	47	..	621	
Pistol, cal .45	57	232	47	..	621	
Pistol bolster	57	232	47	..	621	
Pistol cleaning kit	1	1	1	..	3	
Pouch, 1st aid packet	219	255	114	33	1716	
Rifle, US cal .30	167	55	71	..	1128	
Rifle scabbard	167	55	71	..	1128	
Screwdriver (rifle)	21	7	9	..	142	
Spoon	219	255	114	33	1716	
MEDICAL PROPERTY						
Belt, web, w/pouch for diagnosis tags & instrument & contents, complete (9)	..	..	..	37	37	(9) For contents see Par 866 & 867, Manual Medical Dept, 1916.
Brassards, Red Cross	..	..	..	38	38	
Combat equipment (10)	..	..	..	..	3	
Diagnosis tags, book of	..	..	..	37	37	(10) 1 for each Bn.
Foot powder or grease box	224	287	118	38	1787	See Par 886 and 867,
Litters	5	5	2	..	37	Manual Medical Dept.
Packet, first aid	224	287	118	38	1787	1916.
CHEMICAL WARFARE SERVICE PROPERTY						
Respirator, British, S. B., or equal	224	287	118	38	1787	
VEHICLES ORDNANCE DEPARTMENT						
~~Cart,-reel,-Regtl-&-Bn~~	~~..~~	~~..~~	~~4~~	~~..~~	~~4~~	(See amendment attached)
QUARTERMASTER CORPS						
Kitchen, rolling trail (11)	..	..	8	..	8	(11) See Note No. 12.

1	2	3	4	5	6	7
MOTOR TRANSPORT CORPS						
Ambulance	..	..	..	3	3	
Cars, motor, 5 passenger	2	5	1	1	19	
Cars, motor, staff observation	..	4	..	..	4	
Cars, reconnaissance	1	..	..	..	6	
Motorcycles with side cars	12	24	8	4	108	
Tractor, 2½ tons	..	4	..	..	4	
Tractor, artillery, 10-ton	4	..	..	..	24	
Trucks, ration and baggage, 3-ton	..	..	16	..	16	
Trucks, ammunition	20	9	..	2	130	
Trucks, artillery, repair	..	..	3	..	3	
Trucks, artillery, supply	3	1	6	..	25	
Trucks, repair, light	..	..	1	..	1	
Trucks, reel & fire control	1	..	..	..	6	
Truck, tank	1	..	1	..	7	
Trucks, telephone, switchboard, 2-ton	..	1	..	..	1	
Trucks, wireless	..	1	..	..	1	

TABLE VI

SPECIAL QUARTERMASTER, ENGINEER AND CHEMICAL WARFARE SERVICE PROPERTY FOR REGIMENTS OF 155 M/M FILLOUX GUNS (ARMY ARTILLERY)

(FOR USE WHEN IN THE LINE, TO BE DRAWN UPON ARRIVAL IN THE SECTOR.)

1	2	3	4	5	6	7
ARTICLES	Bat-tery	HQ Co	Sup Co	Med Dept	Tot Regt	REMARKS
QUARTERMASTER PROPERTY						
Alcohol, solidified, cans	50	50	25	15	390	(1) One for each man
Cans, marmite	10	10	..	2	72	on duty in emplace-
Jerkins (1)	..	..	..	..	..	ment.
Overshoes, arctic, pr (1) (2)	..	..	..	..	..	(2) Rubber boots may
Rations, reserve (3)	..	..	..	..	..	be issued in addition
Stoves, trench (6)	..	..	..	..	..	where conditions make them more desirable.
ENTINEER PROPERTY						The number issued not to exceed 50% of the
Auger, earth (4)	..	..	..	..	..	strength of organiza-
Pick and helve (4)	20	5	..	3	128	tion.
Saw, cross-cut two handled, 6 ft	2	1	..	..	13	(3) 4 days reserve to
Shovels, short-handled	10	5	..	3	68	be held in reserve.
Spades	10	5	..	3	68	G. O. 38, H. A. E. F.
Suction pump (5)	..	..	..	..	..	1917.
CHEMICAL WARFARE SERVICE PROPERTY						(4) 1 to be kept in each dugout in case of cave-in.
Bellsar triangles	4	4	..	1	29	(5) As necessary.
Chloride of lime, kegs	4	4	..	1	29	(6) Issued as
Cloth, blanket, yards	20	20	..	3	143	required.
Fire tins	3	3	..	1	22	(7) 5% reserve, G.O.
Gloves, oilskin, pr. (6)	..	..	..	..	..	53, H.A.E.F., 1917.
Glycerine, quarters	2	2	..	1	15	
Horns, klaxon	1	3	..	..	9	
Respirator, British, S. B. or equal (7)	..	..	..	..	..	
Suits, oilskin (6)	..	..	..	..	..	
Trench fans	5	5	..	1	36	

(SEE AMENDMENT ATTACHED)

TABLE VII

SIGNAL CORPS EQUIPMENT FOR A REGIMENT OF 155 M/M FILLOUX GUNS (ARMY ARTILLERY)

1	2	3	4	5	6
ARTICLES	Bat-tery	HQ Co	Sup Co	Tot Regt	REMARKS
(b) Axes, hand	8	3	12	63	Articles shown under Supply
(b) Bags, tools, service, complete	1	1	3	10	
(a) Barometer, aneroid, graduated in millimeters and inches	1	..	..	6	
(a) Barometer, mercurial, graduated in millimeters and inches	..	..	3	3	
(b) Bars, digging, standard	2	2	6	20	
(b) Batteries, dry, tungsten, Type A	9	8	25	86	
(b) Batteries, dry, tungsten, No. 703	24	24	72	240	
(a) Bells, electric, vibrating	4	6	12	42	
(b) (b) Belts, linemen's tool, with ring and safety strap	1	1	3	10	
(b) Binding posts	15	10	30	130	
(b) Blocks, 2 sheave (W. E. No. 760330)	1	2	3	11	
(b) Blocks, message, field, form 217-A	10	10	30	100	
(a) Cable, 3 pair, lead covered, ft	..	1700	5100	6800	
(a) Charging set	..	1	..	1	
(b) Clips, testing	8	6	18	72	
(b) Climbers, linemen, complete with straps and pads, pairs	1	2	3	11	
(a) Cross-arms, light wood, 8 pins	..	500	..	500	
(a) Electrolyte (10 litre carboys)	..	1	3	4	
(b) Envelopes, field message, form 144 A	..	500	1500	2000	
(b) Flashlights, electric, hand	5	5	15	50	
(a) Fuzes, 1 amp, for 4 & 12-line switchboards	40	40	120	400	
(a) Glasses, field, prism, binocular, 8-power, French	5	9	21	60	
(b) Grips, buffalo, No. 2	1	1	3	10	
(b) Hammers, sledge	2	2	6	20	
(b) Hammers, carpenter's claw	2	1	3	16	
(a) Headsets, telephone	6	6	18	60	
(a) Hydrometers, Baume	..	2	6	8	
(b) Insulators, clamp	16	12	36	144	
(b) Insulators, w/ lag screws, Repp. type	123	77	231	1046	
(b) Kits, inspector's, pocket	2	3	9	24	
(b) Kits, flag, combination, standard	2	6	12	30	
(b) Knives, electrician	8	4	12	64	
(a) Knobs, French type	860	600	2430	8190	
(a) Ladders	1	2	6	14	
(b) Lamps for flashlights	4	4	12	49	
(b) Marlin, pounds	5	5	15	50	
(b) Megaphones	2	1	3	16	
(b) Nails, wire, 20d, pound	23	23	69	230	
(a) Panels, heavy artillery, identification, large sets	..	1	3	4	
(a) Panels, heavy artillery, rectangular, large, sets	..	1	3	4	

1	2	3	4	5	6
ARTICLES	Bat-tery	HQ Co	Sup Co	Tot Regt	REMARKS
(b) Pliers, side cutting, 8"	8	10	30	88	
(b) Poles, lance (1)	100	100	300	1000	
(a) Poles, bamboo with tips fitted	..	3	9	12	
(a) Projectors, 24 cm. without spare batteries	..	3	6	9	
(a) Projectors, 35 cm	..	1	3	4	
(a) Reels, barrow	2	2	6	20	
(a) Sapinettes (1)	..	..	..	1000	
(a) Saws, hand, cross-cut	1	1	3	10	
(a) Screws, lag, 38x4"	..	..	..	1200	
(a) Sets, radio type, E-10	..	1	3	4	
(b) Screwdrivers, 6"	4	4	12	40	
(b) Screwdrivers, 3"	4	4	12	40	
(b) Shovels, long-handled, round-point	2	2	6	20	
(b) Shovels, spoon	1	1	3	10	
(b) Staples, Blake insulated No. 5	400	660	1980	5040	
(a) Switchboard, telephone 4-line monocord type	4	1	3	28	
(a) Switchboard, telephone, 12-line monocord type	..	1	3	4	
(a) Tags, cable, heavy artillery	75	100	300	850	
(b) Tape, friction, lbs	4	3	9	36	
(b) Tape, rubber, lbs	2	2	6	20	
(b) Telephones, W. E. 1375 B	12	12	36	120	
(a) Thermometers, weather, graduated in Centigrade and Fahrenheit	2	..	..	12	
(a) Voltmeters, Western Model, 280	..	1	3	4	
(b) Watches, wrist, luminous dial, with wristlets	2	2	6	20	
(a) Wave meter, type No. 2, French	..	1	3	4	
(b) Wire, outpost, twisted pair, miles	7½	9½	31½	86	
(b) Wire, G.I. No. 12 B.W.G. 109 mils, miles	..	..	..	2	

TABLE VIII

FIRE CONTROL, DRAFTING EQUIPMENT AND SUPPLIES FOR A REGIMENT OF 155 M/M GUNS (ARMY ARTILLERY)

1	2	3	4	5	6
ARTICLES	Bat-tery	HQ Co	Sup Co	Tot Regt	REMARKS
ORDNANCE PROPERTY FIRE CONTROL EQUIPMENT					
Alidade, slope rule, with case	1	3	1	10	The items shown in column 3 under Headquarters Company for use of each battalion.
Alidade, telescopic, with case	..	3	1	4	
Board, firing, 70 x 70 cm. with cover	1	..	..	6	
Board, firing, 70 x 108 cm. with cover	1	3	3	12	
Chest, instrument	1	3	1	10	
Circle, aiming, complete with tripod, lighting device and case, graduated in decigrades	1	3	1	10	
Circle, sighting, complete with field glass support and tripod, graduated in decigrades	2	..	..	12	
Compass, luminous, with 8 cm. celluloid protractor, graduated in degrees	1	..	..	6	
Compass, Peigne	1	3	1	10	
Declinator, small, with screws	1	..	..	6	
Declinator, large, with screws	..	3	1	4	
Goniometer, periscopic, in decigrades, with tripod and case	1	3	1	10	
Key, padlock	1	3	1	10	
Logarithms, table of, in decigrades and degrees, 5 place	1	3	1	10	
Magnifying glass, with handle, 3 in	..	3	1	4	
Padlock	1	3	1	10	
Plane table, topographic, 50 x 60 cm. with tripod and cover	1	3	1	10	
Protractor, 22 cm. celluloid, graduated in degrees, semicircular, with case	1	3	1	10	
Protractor, 22 cm. celluloid, graduated in decigrades, semicircular, with case	1	3	1	10	
Protractor, parralax, in decigrades	2	6	2	20	
Protractor, 33 cm. zinc, graduated in decigrades, semicircular	1	3	1	10	
Scale, graduated steel 1 meter long	1	3	1	10	
Sitogoniometer, with case, in mils	1	3	1	10	
Square, graduated zinc 1/20000	1	3	1	4	
Stadia rod, two meter, folding	..	3	1	4	
Tape, steel, 100 meter	..	3	1	4	
Telescope, observation, complete, w/case & tripod, graduated in decigrades	1	3	1	10	
Telescope, scissors, complete w/case & tripod, graduated in decigrades	1	3	1	10	
Theodolite, Jobin, graduated in decigrades	..	3	1	4	
Time Interval Recorder	..	3	1	4	
Wire, 20 meter, steel	1	6	2	14	

1	2	3	4	5	6
ARTICLES	Bat-tery	HQ Co	Sup Co	Tot Regt	REMARKS
DRAFTING MATERIEL					
Brushes, water color, 2 each No. 1 to 6, inclusive	12	36	12	120	
Bureau of standards, circular No. 47	1	3	1	10	
Celluloid, sheets, 20 x 25 inches, transparent, half frosted & half clear	12	36	12	120	
Compass, beam, bar or trammel points, micrometer adjustment	1	3	1	10	
Crayons, lumber, boxes, red	1	3	1	10	
Dividers, proportional, 8½ inch	1	3	1	10	
Drawing instruments, set	1	3	1	10	
Engineer field manual	1	3	1	10	
Envelopes, Manila, 10" x 15"	24	72	24	240	
Ephemeris (current year) French if possible	1	3	1	10	
Eraser, art gum	6	18	6	60	
Eraser, ink, typewriter, disc	3	9	3	30	
Eraser, pencil, ruby, No. 112	3	18	3	39	
Eraser, sponge	3	9	3	30	
Eraser, steel	2	6	2	20	
Glue, pint cans	1	3	1	10	
Horn centers ½" diameter	1	3	1	10	
Ink, drawing, black, waterproof, bottles	3	9	3	30	
Ink, drawing, blue, waterproof, bottles	1	3	1	10	
Ink, drawing, brick red, waterproof, bottles	1	3	1	10	
Ink, drawing, brown, waterproof, bottles	1	3	1	10	
Ink, fountain pen, bottles, in wood case, with filler	2	6	2	20	
Ink, water color, burnt sienna, full pans	2	6	2	20	
Ink, water color, burnt amber, full pans	2	6	2	20	
Ink, water color, Chinese white, full pans	2	6	2	20	
Ink, water color, crimson lake, full pans	2	6	2	20	
Ink, water color, Hoeker's green, full pans	2	6	2	20	
Ink, water color, Prussian blue, full pans	2	6	2	20	
Magnifying glass, pocket	1	3	1	10	
Map tube, galvanized iron, 37" x 6"	1	3	1	10	
Orienteur, Officer's Manual (in English)	2	6	2	20	
Pencil points, for beam compass	12	36	12	120	
Pencil points, for dividers	12	36	12	120	
Pen holders, crow quill	1	3	1	10	
Pen holders, drawing	2	6	2	20	
Pen holders, writing	2	6	2	20	
Pins, colored, head, cubes, one each, black, red, blue, green, yellow and white	6	18	6	60	
Paint boxes, japanned tin, for 12 full pans and brushes	1	3	1	10	
Paper, computation, pads, ruled, 8" x 10½"	6	18	6	60	
Paper, computation, pads, unruled 4" x 6"	6	18	6	60	

1	2	3	4	5	6
ARTICLES	Bat-tery	HQ Co	Sup Co	Tot Regt	REMARKS
Paper, cross section, 10 meter roll, metric graduation, 50" wide, opaque	1	3	1	10	
Paper, cross section, 10 meter roll, metric graduation, transparent	1	3	1	10	
Paper, drawing, 35" x 10 yd roll, single mounted	1	3	1	10	
Paper, paragon drawing, sheets, double mounted, 24" x 36"	12	36	12	120	
Paper, drawing, sheets, thin eggshell, 14" x 36"	12	36	12	120	
Paper, Manila, sheets, 24" x 36"	12	36	12	120	
Paper, vegetable tracing, 30" x 10 yd roll	1	3	1	10	
Parallel rules, rolling, 12"	1	3	1	10	
Paste, jar of library	1	3	1	10	
Pen, crow quill	2	6	2	20	
Pen, drawing, Gillott, No. 170	24	72	24	240	
Pen, drawing, Gillott, No. 290	24	72	24	240	
Pen, drawing, Gillott, No. 303	24	72	24	240	
Pen, drawing, Gillott, No. 404	24	72	24	240	
Pencil, blue	3	9	3	30	
Pencil, brown	3	9	3	30	
Pencil, green	3	9	3	30	
Pencil, red	3	9	3	30	
Pencil, drawing, Venus 6H	12	36	12	120	
Pencil, drawing, Venus 3-4	12	36	12	120	
Pencil, drawing, Venus 9H	12	36	12	120	
Reconnaissance sets, US Engineer Corps	1	3	1	10	
Rubber bands (box), 1 size 19 and 1 size 32	2	6	2	20	
Sandpaper pads, pencil sharpeners	1	3	1	10	
Scale, boxwood map, 30 cm. long, metric graduation 1/20000 and 1/50000	4	12	4	40	
Scale, boxwood map, 50 cm. long, metric graduation 1/5000 and 1/10000	4	12	4	40	
Sealing wax, stick	1	3	1	10	
Shears, 12 inches long	1	3	1	10	
Sponge cup with sponge	1	3	1	10	
Tables, vertical angle, stadia, degrees and meters	2	6	2	20	
Tapes, steep map, scale 1/20000, reading to 25000 meters	2	6	2	20	
Tapes, steel, pocket inches and millimeters, 72 inches long	4	12	4	40	
Thumb tacks, solid head, long point	144	432	144	1440	
Tracing linen, 36" x 10 yd roll	1	3	1	10	
Transit books, US Engineer Corps, standard	6	18	6	60	
Triangles, 6" celluloid, 30 & 60 degrees	1	3	1	10	
Triangles, 6" celluloid, 45 degrees	1	3	1	10	
Triangles, 12" celluloid, 30 & 60 degrees	1	3	1	10	
Triangles, 12" celluloid, 45 degrees	1	3	1	10	
"T" Square, 36 inch	1	3	1	10	

NO CHANGES RECOMMENDED

TABLE IX

COMPOSITION OF ARTILLERY MATERIAL FOR A REGIMENT OF 155 M/M FILLOUX GUNS (ARMY ARTILLERY)

1	2	3	4	5	6
ARTICLES	Bat-tery	HQ Co	Sup Co	Tot Regt	REMARKS
PART I. ARTILLERY VEHICLES					
155 M/M Filloux gun with limder and drawbar for motor traction	4	..	..	24	
PART II. ARTICLES FOR THE SERVICE OF THE PIECE					
(a) Tools, equipment and accessories for the service of the piece					
Caterpillar band segment, Mark A (a)	192	..	..	1152	(a) Forming four complete
Caterpillar land shoe (a)	192	..	..	1152	caterpillar bands per piece.
Caterpillar band segment pin (a)	192	..	..	1152	
Caterpillar band suspension	4	..	..	24	
Sled	5	..	..	30	
Large spade	8	..	..	48	
Lifting bar	4	..	..	24	
Jack, 10- or 15-ton (1)	10	..	..	60	(1) American jacks.
Travelling bar	4	..	..	24	
Pivot pin complete (b)	4	..	..	24	(b) On the piece.
Wooden maneuvering lever	8	..	..	48	
Handspike	8	..	..	48	
Muzzle cover (b)	4	..	..	24	
Breech cover (b)	4	..	..	24	
Covers for recoil & counterrecoil cylinder pistol rod, ends (b)	4	..	..	24	
Sight support cover (b)	4	..	..	24	
Cleaning sponge	4	..	..	24	
Sponge cover	4	..	..	48	
Greasing sponge	4	..	..	24	
Short rammer	4	..	..	24	
Sponge with 5-foot handle	4	..	..	24	
Unloading rammer, with extension	4	..	..	24	
Loading tray	4	..	..	24	
Mirror stake	8	..	..	48	
Mirror rule	4	..	..	24	
Rule brackets, R.H. and L.H. complete	4	..	..	24	
Fuze-setter, model 1917, w/accessories and chest, for 24/31 fuze	4	..	..	24	
Fuze-setter, American ammunition	4	..	..	24	
Wooden tubs	4	..	..	24	
Watering buckets	4	..	..	24	
Canvas fire bucket	10	..	..	60	
Cooling pump for the piece	4	..	..	24	
Block, 9x9x19"	24	..	..	144	
Half block, 9x4x19"	24	..	..	144	
Timber, 4x8x130"	32	..	..	192	
Timber, 4x8x65"	16	..	..	96	

TABLE IX (Continued)

1	2	3	4	5	6
Timber, 9x9x130"	4	..	..	24	
Wheel wedge	16	..	..	96	
Wedge handle	16	..	..	96	
Iron-shod round stake, 60 in	16	..	..	96	
Square wooden stake, 3½ in	24	..	..	144	
Wooden maul, iron bound	8	..	..	48	
Sledge hammer (about 5 lbs)	8	..	..	48	
Single crowbar	12	..	..	72	
Roller, 8" diam, 6' long	8	..	..	48	
Square shovel	8	..	..	48	
Round shovel	12	..	..	72	
Pick	12	..	..	72	
1 3/4" (40 mm) rope, 650' long (c)	2	..	..	12	(c) ½ on reel trailer.
Reel trailer for 650' rope	1	..	..	6	
Double block, 10-ton capacity, w/iron sheaves, for 1½" rope	4	..	..	24	
1½" (33 mm) rope, 165' long w/eyes	4	..	..	24	
Snatch block, 1 3/4" (40 mm) 6-ton capacity	16	..	..	96	
S-hooks, 10-ton	12	..	..	72	
Rope, 1 3/4" (40 mm) w/eye at each end, 65' long	4	..	..	24	
Rope, 1 3/4" (40 mm) w/eye at each end, 35' long	4	..	..	24	
80' rope, 1¼" diameter	8	..	..	48	
50' rope, 1" diameter	8	..	..	48	
Lashing rope, 33', ½" diameter	32	..	..	192	
Lashing rope, 16', 6½" diameter	32	..	..	192	
Wheel mat	48	..	..	288	
Wheelbarrow	4	..	..	24	
Sponge, w/5' handle	2	..	..	12	
(b) Articles contained in the sight chest					
Sight chest	4	..	..	24	
Padlock	4	..	..	24	
Padlock key	4	..	..	24	
Sight, with goniometer	4	..	..	24	
Case for sight	4	..	..	24	
Quadrant, Model 1888	4	..	..	24	
Quadrant case, Model 1888	4	..	..	24	
Lantern for night laying	8	..	..	48	
Mirror support, with mirror	4	..	..	24	
Mirror	4	..	..	24	
Plumb bob, with line	4	..	..	24	
(c) Articles contained in the section armament chest					
Armament chest	4	..	..	24	
Padlock	8	..	..	48	
Padlock key	8	..	..	48	
Pawl lever	8	..	..	48	
Loading tray	4	..	..	24	

TABLE IX (Continued

1	2	3	4	5	6
Charge carrier	8	..	..	48	
Gunner's pouch	8	..	..	48	
Gunner's blouses	8	..	..	48	
Gunner's gloves	16	..	..	96	
Cotton batting, sack (¼ lb)	4	..	..	24	
Chalk pouch	4	..	..	24	
Primer holder, assembled	8	..	..	48	
Double winch for recoil & counterrecoil pistol rod nuts with bars	4	..	..	24	
Counterpoise spring adjusting pin	4	..	..	24	
Lanyard extension rope, 40 ft long	4	..	..	24	
Gun books	8	..	..	48	
Set of firing tables	4	..	..	24	
Safety lock housing	1	..	..	6	
Operating finger	1	..	..	6	
Operating finger spring	2	..	..	12	
Spring socket	1	..	..	6	
(d) Articles contained in the section tool and spare part chest					
Tool and spare part chest	4	..	..	24	
Padlock	8	..	..	48	
Padlock key	8	..	..	48	
1 gallon can	12	..	..	72	
Valvoline oil, medium (gal)	5	..	..	30	
Recoil mechanism oil, special (gal.)	5	..	..	30	
Kerosene (gal.)	5	..	..	30	
Grease can	4	..	..	24	
Heavy grease (lbs)	25	..	..	150	
Tallow (piece of 1 lb)	4	..	..	48	
Greasing brush, small	8	..	..	48	
Greasing, large, brush	8	..	..	48	
Oil can	4	..	..	24	
Waste (lbs)	20	..	..	120	
Sponge (weight ½ lb)	4	..	..	24	
Oil cup	6	..	..	36	
Rotherham-coventry oil cup	1	..	..	6	
Set of 14 split pins	4	..	..	24	
Brass scraper	4	..	..	24	
Drift, 1/8"	4	..	..	24	
Carpenter's mallet	4	..	..	24	
Medium size adjustable end wrench	4	..	..	24	
Large adjustable end wrench	4	..	..	24	
Copper hammer	8	..	..	48	
Scraper, steel	4	..	..	24	
6" flat-nose pliers	4	..	..	24	
Brass drift	4	..	..	24	
10" screwdriver	4	..	..	24	
Steel wire, approx .04" diam coil of ½ lb	4	..	..	24	
Triangular file	4	..	..	24	
File handle	4	..	..	24	
Breech thread file	4	..	..	24	
Hand hammer, 2 lb	4	..	..	24	
1 meter brass folding rule	4	..	..	24	

TABLE IX (Continued

1	2	3	4	5	6
Lanyard, with handle	4	..	..	24	
Metal pan	4	..	..	24	
Double-ended wrench for hub cap and wheel lock nut	4	..	..	24	
Spindle nut key, assembled, with spring and rivet	4	..	..	24	
Complete obturator spindle	4	..	..	24	
Complete plastic obturator	4	..	..	24	
Breech rack drift	4	..	..	24	
Burlap bag, sulphated	12	..	..	72	
Canvas fire bucket	8	..	..	48	
Lashing rope, 33' long, ½" diameter	8	..	..	48	
(e) Articles contained in the caterpillar band chest					
Caterpillar band chest	4	..	..	24	
Padlock	4	..	..	24	
Padlock key	4	..	..	24	
Cross peen hammer	8	..	..	48	
Drift, 1/8"	4	..	..	24	
Cotter-pin pliers	4	..	..	24	
Side cutting pliers	4	..	..	24	
Segment pin, with pin	16	..	..	96	
Caterpillar hand crowbar	8	..	..	48	
Iron wire, about .16" diameter (lbs)	16	..	..	96	
PART III. ARTICLES FOR THE SERVICE OF THE BATTERY					
(a) Spare equipment and accessories					
Travelling bar	1	..	..	6	
Rope, 1" diameter, 50' long	4	..	..	24	
Lashing ropes, ½" diameter, 16'6" long	8	..	..	48	
Lashing ropes, ½" diameter, 33' long	16	..	..	96	
Manoeuvering level, wooden	8	..	..	48	
Handspike	4	..	..	24	
Wheel wedge	8	..	..	48	
Wedge handle	8	..	..	48	
Cleaning sponges	1	..	..	6	
Sponge cover	2	..	..	12	
Greasing sponge	1	..	..	6	
Unloading rammer, with extension	1	..	..	6	
Short rammer	2	..	..	12	
Mirror stake	2	..	..	12	
Mirror rule	1	..	..	6	
Wooden maul	4	..	..	24	
Caterpillar, band segment, Mark A	12	..	..	72	
Caterpillar, band segment, Mark B	4	..	..	24	
Caterpillar, band shoe	12	..	..	72	
Wheel, w/rubber tires, brake drum & hub cap	½	..	..	3	
Complete limber spring	1	..	..	6	
Tarpulin	2	..	..	12	

TABLE IX (Continued

1	2	3	4	5	6
(b) Articles contained in the sight spare part chest					
Sight spare part chest	1	..	..	6	
Padlock	1	..	..	6	
Padlock key	1	..	..	6	
Sight, with goniometer	1	..	..	6	
Sight case	1	..	..	6	
Mirror support	1	..	..	6	
Mirror	4	..	..	24	
Firing tables, set of	4	..	..	24	
(c) Articles contained in the battery mechanics' tool chest					
Battery mechanics' tool chest	2	..	..	12	
Padlock	2	..	..	12	
Padlock key	2	..	..	12	
Screwdriver for rack guide bushing	2	..	..	12	
Breech rack drift	2	..	..	12	
Pawl lever	2	..	..	12	
Spanner wrench for dissembling the obturator spindle	4	..	..	24	
Hammer rack spindle drift	2	..	..	12	
Counterpoise spacing clip	4	..	..	24	
Counterpoise spring adjusting pin	2	..	..	12	
Double wrench, 77/54 mm	4	..	..	24	
Double wrench, 40/26 mm	4	..	..	24	
Double wrench, 20/17 mm	4	..	..	24	
10" screwdriver	4	..	..	24	
(b) Articles contained in the recoil mechanism chest					
Recoil mechanism chest	2	..	..	12	
Padlock	4	..	..	24	
Padlock key	4	..	..	24	
Portable pump	2	..	..	12	
Funnel with strainer	2	..	..	12	
Oil extractor (75 m/m gun, Model 1897)	2	..	..	12	
Screw filler (75 mm gun, Model 1897)	2	..	..	12	
Graduated rule	2	..	..	12	
Special screw driver blade	2	..	..	12	
21 and 35 m/m wrench	2	..	..	12	
(e) Articles contained in the chest of spare assemblies.					
Spare assembly chest	1	..	..	6	
Padlock	1	..	..	6	
Padlock key	1	..	..	6	
Complete breech block	1	..	..	6	
Counterpoise, complete	1	..	..	6	
Complete obturator	2	..	..	12	
Complete obturator spindle nut	2	..	..	12	
Complete primer holder	4	..	..	24	

TABLE IX (Continued

1	2	3	4	5	6
Shackle adjusting device, assembled	2	..	..	12	
Gun axle spring eye pin, assembled	2	..	..	12	
(f) Articles contained in the separate spare part chest					
Separate spare part chest	1	..	..	6	
Padlock	2	..	..	12	
Padlock key	2	..	..	12	
Firing pin bushing	12	..	..	72	
Firing pin	12	..	..	72	
Firing pin spring	12	..	..	72	
Hammer support	2	..	..	12	
Hammer rack	1	..	..	6	
Rack washer	1	..	..	6	
Rack guide bushing	1	..	..	6	
Rack spindle	1	..	..	6	
Rack spring	2	..	..	12	
Hammer	1	..	..	12	
Hammer catch	2	..	..	12	
Hammer catch spring	2	..	..	12	
Lanyard eye-bolt	1	..	..	6	
Eye-bolt washer	1	..	..	6	
Eye-bolt pin	2	..	..	12	
Lanyard, with handle	6	..	..	36	
Hinge pin, collar	1	..	..	6	
Lock collar	1	..	..	6	
Pin (spherical head)	2	..	..	12	
Breech rack lock	1	..	..	6	
Breech rack lock spring	1	..	..	6	
Spindle plug washer	4	..	..	24	
Spindle plug	4	..	..	24	
Vent bushing	4	..	..	24	
Spring plate bolt	4	..	..	24	
Top spring plate	1	..	..	6	
Hub cap	1	..	..	6	
Hub cab gasket	1	..	..	6	
Adjusting bolt nut	4	..	..	24	
Forward transom bolts and nuts	2	..	..	12	
Rear transom bolts with nuts	2	..	..	12	
Rear transom bolts (C.S. heads) & nuts	1	..	..	6	
Spring eye pin	2	..	..	12	
Operating finger spring	1	..	..	6	
Brake lever, with handle and latch	1	..	..	6	
Longitudinal cable	2	..	..	12	
Traverse cable	1	..	..	6	
Thimble	6	..	..	36	
Cable clamp, complete	4	..	..	24	
Cable connecting pin	2	..	..	12	
Washer	2	..	..	12	
Cable connection, complete	2	..	..	12	
Rear cable guide, complete	2	..	..	12	
Front cable guide, with screws	2	..	..	12	
Common nut for 16 m/m bolt	2	..	..	12	
Common nut for 10 m/m bolt	4	..	..	24	

TABLE IX (Continued

1	2	3	4	5	6
Caste nut for 16 m/m bolt	6	..	..	36	
Castle nut for 24 m/m bolt	20	..	..	120	
Castle nut for 40 m/m bolt	4	..	..	24	
3 m/m split pin	6	..	..	36	
3.5 m/m split pin	30	..	..	180	
5 m/m split pin	5	..	..	30	
6 m/m split pin	5	..	..	30	
8 m/m split pin	5	..	..	30	
10 m/m lock washer (Grower)	4	..	..	24	
14 m/m lock washer (Grower)	2	..	..	12	
16 m/m lock washer (Grower)	6	..	..	36	
24 m/m lock washer (Grower)	4	..	..	24	
PART IV. GENERAL TOOLS AND ACCESSORIES					
1. Artificer's tool chest					
Unpainted chest	1	..	..	6	
Brush for greasing rotating bands	8	..	..	48	
Small nippers	1	..	..	6	
Padlock	1	..	..	6	
Padlock key	1	..	..	6	
Key for powder and munition chests	6	..	..	36	
Wire, nails, assorted (pounds)	6	..	..	36	
Waste (pounds)	8	..	..	48	
Silk choke lashing (pounds)	2	..	..	12	
Cord .04 to .08" diameter (pounds)	3/4			4½	
Cold chisel, 3/4"	2	..	..	12	
Pair of small shears	2	..	..	12	
Common knife	1	..	..	6	
Screwdriver bit (for brace)	6	..	..	18	
Hand hammer, 2 pound	2	..	..	12	
Side cutting pliers	3	..	..	18	
Extra heavy brace	3	..	..	18	
Grease can of armament chest	2	..	..	12	
Wire brush for cleaning projectiles	4	..	..	24	
Wrench for 24/31 detonating fuses	2	..	..	12	
Wrench for 30/55 combination fuses	2	..	..	12	
2. Tools and stores for wood and iron workers					
Chest	2	..	6	18	
Grease, gun, 5 ounce	1	..	..	6	
Brass scraper	1	..	..	6	
Greasing brush, small	1	..	..	6	
Oil can	1	..	3	9	
Drift (a)	5	..	..	30	(a) 1 1/16" diameter
Adjustable end wrench, large	1	..	..	6	2 1/8" diameter
Adjustable end wrench, medium	1	..	3	9	2 1/8" diameter
Adjustable end wrench, small	1	..	3	9	
Copper hammer	1	..	..	6	
Large greasing brush	2	..	..	12	
Brass drift	1	..	..	6	
Screwdrivers, ¼" blade width	1	..	3	9	

TABLE IX (Continued

1	2	3	4	5	6
Screwdrivers, 1/8" blade width	1	..	..	6	
Padlock	2	..	6	18	
Padlock key	2	..	6	18	
Bench vise	1	..	..	6	
Carpenter's pencil	1	..	3	9	
File handle	10	..	12	72	
Oilstone	1	..	3	9	
Chisels, ½ to 3/4" cape	2	..	6	18	
Chisels, round nose	2	..	6	18	
Bold chisel, 5/8"	1	..	6	18	
Platter, with handle	1	..	6	6	
Fuller, 3/4" top, with handle	1	..	..	6	
Tinner's shears	1	..	3	9	
Chisel, firmer, with handle, 3/4"	2	..	6	18	
Dividers	1	..	3	9	
Squares, wooden, carpenter's	1	..	3	9	
Squares, common iron	1	..	3	9	
Handvise	1	..	3	9	
Plane iron with clamp	1	..	3	9	
Soldering iron	1	..	3	9	
Drills (for breast drill) assorted	10	..	30	90	
Hack saw blade	3	..	9	27	
Screwdriver bit for brace	4	..	3	27	
Files, assorted bastard	6	..	9	45	
Files, triangular (for saw blades)	3	..	9	27	
Files, second cut and smooth	2	..	6	18	
Files, rough, flat	2	..	3	15	
Files, rough, half-round	1	..	3	9	
File card	1	..	3	9	
Sledge	1	..	..	6	
Hammer, hand, 2-pound	1	..	..	6	
Hammer, claw	1	..	3	9	
Hammer, cross peen	1	..	3	9	
Bits for brace, counter sink	1	..	3	9	
Bits for brace, common	3	..	18	36	
Grindstone, complete	1	..	..	6	
Hacksaw frame	1	..	3	9	
Swab rod	1	..	..	6	
Fire shovel	1	..	..	6	
Side-cutting pliers	2	..	3	15	
Spokeshave	1	..	3	9	
Punches, center	2	..	6	18	
Punches, blacksmith's with handle	1	..	..	6	
Punches, blacksmith's hand	1	..	..	6	
Carpenter's plane, without bit	1	..	3	9	
Wood rasp, half round, 10"	1	..	..	6	
Fire rake	1	..	..	6	
Saw, hand	1	..	3	9	
Saw, buck coping, narrow blade	1	..	3	9	
Saw, keyhole	1	..	3	9	
Saw, small handsaw	1	..	3	9	
Saw, ripsaw	1	..	3	9	
Blacksmith's tongs, assorted	2	..	..	12	
Poker	1	..	..	6	

TABLE IX (Continued

1	2	3	4	5	6
Hot chisel, blacksmith's	1	..	..	6	
Cold chisel, blacksmith's	1	..	..	6	
Nippers, medium	1	..	3	9	
Breast drill	1	..	3	9	
Extra heavy brace	1	..	3	9	
Gimlet, large	1	..	3	9	
Gimlet, medium	2	..	3	15	
Folding meter rule, metal	1	..	3	9	
Tin funnel	2	..	3	15	
Anvil, with block	1	..	..	6	
Portable forge, with blower	1	..	..	6	
(b) Stores for wood and iron workers					
Pins, assorted	25	..	75	225	
Set of 14 split pins	2	..	..	12	
Steel washers, assorted	20	..	60	180	
Can for grease	2	..	..	12	
Forge coal (pounds)	200	..	..	1200	
Bars, steel, assorted (pounds)	10	..	30	90	
Solder (pounds)	1	..	3	9	
Round, square, flat, iron, assorted (pounds)	100	..	300	900	
Wrought iron wire, .08-.12" diameter (pounds)	10	..	30	90	
Sheet iron, .08 to .12" thick (sheets)	1	..	..	6	
Sheet of zinc, 1 m/m gauge, 1x2 m	1	..	..	6	
Carriage bolts, assorted	200	..	300	1500	
Common wood screws (metric system):					
No. 16-40, C. S. head	12	..	36	108	
No. 25 assorted, C. S. head	48	..	144	432	
No. 24 Fillister head	12	..	36	108	
No. 23, assorted, C. S. head	24	..	72	216	
No. 21-25, C. S. head	24	..	72	216	
No. 19-20, C. S. head	12	..	36	108	
No. 18-25, C. S. head	12	..	36	108	
Wire nails, assorted (pounds)	15	..	45	135	
Thongs, rawhide	50	..	..	300	
Waste (1 box) (pounds)	50	..	150	450	
Sponges	5	..	15	45	
Cord, .04-.08" diameter (pounds)	1	..	3	9	
Heavy grease (pounds)	20	..	60	180	
Special oil for recoil mechanism (gallon)	2	..	..	12	
Kerosene (gallon)	2	..	6	18	
Rosin (pounds)	½	..	1½	4½	
Salammoniac (pounds)	1	..	3	9	
2-gallon can	2	..	6	18	
3. Saddler's tools and stores					
(a) Tools					
Saddler's tool chest	1	..	..	6	
Screwdriver	1	..	..	6	

TABLE IX (Continued

1	2	3	4	5	6
Saddler's needle	25	..	..	150	
Awls, flat and round	4	..	..	24	
Pair of shears, 10"	1	..	..	6	
Knife, shoe	1	..	..	6	
Thimble	1	..	..	6	
Riveting hammer	1	..	..	6	
Stitching clamp	1	..	..	6	
Cutting nippers	1	..	..	6	
Folding meter rule, brass	1	..	..	6	
Punch, with 5 spare tubes	1	..	..	6	
Cold chisel, 5/8"	1	..	..	6	
Awl blades, spare, assorted	10	..	..	60	
Eyelet set	1	..	..	6	
Riveting set	1	..	..	6	
Round knife	1	..	..	6	
Dividers	1	..	..	6	
(b) Stores					
Saddler's nails (pounds)	1	..	..	6	
Waterproof cloth (sqare yards)	6	..	..	36	
Hemp thread No. 6 (pounds)	1	..	..	6	
Pitch, prepared (pounds)	1	..	..	6	
Chrome leather, 18-.20" thickness (pounds)	15	..	..	90	
Tublar rivets, assorted	250	..	..	1500	
Eyelets for tarpaulin	40	..	..	240	
Buckles, 1"	40	..	..	240	
Snap fasteners, assorted	30	..	..	180	
Thumbuttons for curtains, male and female	30	..	..	180	
Sacking needle	3	..	..	18	
Leather belting, 1¼ to 2" width (pounds)	5	..	..	30	
Black oilcloth, square yards	2	..	..	12	
Galvanized rings, 3/4 to 1" diameter	12	..	..	72	
Brown canvas, square yards	5	..	..	30	
Belt fasteners, 3/4 to 1"	6	..	..	36	
"I" belt fastener	6	..	..	36	
4. Tools for the construction of emplacements and shelters.					
Axe	8	..	6	54	
Square shovel	10	..	12	72	
Round shovel	30	..	30	210	
Rock pick	10	..	12	72	
Pick	30	..	30	210	
Sickle	10	..	15	75	
Tamper	5	..	3	33	
Iron-bound wooden maul	10	..	12	72	
Iron sledge	6	..	6	42	
Burlap bag, sulphated	200	..	..	1200	
Double crowbar	6	..	..	36	
Galvanized iron wire, about 12" diameter (pounds)	20	..	30	150	
Shingle nails (pounds)	50	..	..	300	
Round shovel handle	20	..	..	120	

TABLE IX (Continued

1	2	3	4	5	6
Pick handle	20	..	..	120	
Axe handle	4	..	..	24	
Chisel, firmer, 3/4"	4	..	..	24	
Adz	4	..	..	24	
Hand axe	4	..	..	24	
Carpenter's mallet	4	..	..	24	
Hand hammer, 2-pound	4	..	..	24	
Bits, for braces, assorted	8	..	..	48	
Side-cutting pliers	6	..	..	36	
Saw, hand	3	..	3	21	
Saw, cross-cut	3	..	3	21	
Saw, buck coping	1	..	..	6	
Saw, buck rip-saw	4	..	6	30	
Brace	3	..	..	18	
Common meter rule	3	..	..	18	
Ten meter steel tape	1	..	..	6	
Mason's level	1	..	..	6	
Straight edge, 10-foot	2	..	..	12	
5. Illuminating material					
Boxes for lanterns and candles	(to be collected by units)				
Folding lantern, Montjardet	20	12	48	180	
Large kerosene lantern	10	6	6	72	
Lantern wick	6	9	9	54	
Candles (lbs)	80	30	180	690	
Box of matches	10	6	24	90	
Acetylene lamp	8	6	12	66	
Small barrel of calcium carbide, 75-lb capacity	1	3	3	12	
Electric pocket lamp	20	12	..	132	
Spare burners for acetylene lamp	20	15	30	165	
Spare battery for pocket lamp	40	30	..	270	
Spare bulb for pocket lamp	10	12	..	72	
Mica sheets for folding lantern	36	27	81	324	
Holder for mica sheets	4	3	9	36	
CLEANING AND PRESERVING MATERIAL					
Borax, pound	10	..	..	60	
Brushes:					
Sash, No. 3-0	3	..	9	27	
Varnish, No. 4-0	2	..	6	18	
Varnish, No. 6-0	2	..	6	18	
Camel's hair, No. 1	4	..	3	18	
Chamois skin	4	..	3	27	
Cleaning material and small stores chest	1	..	3	9	
Crocus cloth, quires	5	..	3	33	
Emery cloth:					
No. 00, quires	5	..	3	33	
No. 0, quires	5	..	3	33	
No. 1/2, quires	5	..	3	33	
Lens, paper, reams	1	..	3	9	
Lye, powdered, pounds	25	..	..	150	

TABLE IX (Continued

1	2	3	4	5	6
Oil:					
Light slushing, 1-gallon can	2	..	..	12	
Sperm, ½-gallon cans	1	..	..	6	
Clock (1-ounce bottles)	1	..	3	9	
Lubricating or engine No. 1, 5-gal. cans	2	..	..	12	
Paint:					
Black, gallon cans	2	..	3	15	
Blue-gray, gallon cans	2	..	3	15	
Dark buff, gallon cans	2	..	3	15	
Light olive green, gallon cans	2	..	3	15	
Sandpaper:					
No. 00, quires	5	..	3	33	
No. 2, quires	5	..	3	33	
Soap:					
Castile, pound cakes	6	..	6	42	
H. & H., 0.75-pound cakes	6	..	6	42	
Vaseline, 5.5-ounce cans	1	..	3	9	
Webbing, O. D., 0.625" wide, yards	21	..	..	126	
Webbing, O.D., 1" wide, yards	32	..	..	192	

TABLE X

ANTI-AIRCRAFT MACHINE GUNS AND EQUIPMENT OF A REGIMENT OF 155 M/M GUNS (ARMY ARTILLERY)

1	2	3	4	5	6
ARTICLES	Bat-tery	HQ Co	Sup Co	Tot Regt	REMARKS
ORDNANCE PROPERTY					
Machine guns, anti-aircraft	2	..	..	12	
Spare barrels	2	..	..	12	
Tripod	2	..	..	12	
Anti-avion mounts	2	..	..	12	
Anti-avion sights	2	..	..	12	
Spare part cases, No. 1 complete (1)	1	..	..	6	(1) Note No. 13.
Spare part cases, No. 2 complete (2)	1	..	..	6	(2) Note No. 14.
Gunners pouch, complete (3)	2	..	..	12	(3) Note No. 15.
Cleaning kit, complete (4)	2	..	..	12	(4) Note No. 16.
Tables of fire) Wind charts) Temperature charts) Book form Barometer charts)	1	..	..	6	
Belt boxes	12	..	..	72	
Belt	12	..	..	72	
Strip boxes (12 strip)	12	..	..	72	
Strips (24 rounds)	144	..	..	864	
Ammunition, 8 mm. rounds	6456	..	..	38736	

GENERAL NOTES

Note 1.--When ordered by the Army or other independent commander there will be added to the normal mobile equipment, for winter use, 1 or 2 O. C. blankets, special provision to be made for their transportation, 1 pair lined gloves or 1 finger mitten.

Note 2.--Chevrons and sleeve insignia as prescribed will be issued, 3 to each individual, to be worn on the right sleeve of the overcoat, service coat, and O. D. shirt.

Note 3.--ISSUE OF CLOTHING TO OFFICERS.

G. O. No. 7, Par. 3, 4, H. A. E. F. (1918).

Officers serving in the Zone of Advance before going into the trenches will be issued all articles of the enlisted man's uniform and equipment that they may require; when the duty in the trenches is completed, officers will return the articles so issued. Fatigue clothing may be issued to an officer attending school to be returned upon completion of the course.

The wearing of enlisted men's woolen O. D. breeches or trousers, and woolen O.D. coats on occasions other than those mentioned in Paragraph 3 is prohibited.

Note 4.--ORDNANCE EQUIPMENT FOR OFFICERS. Ordnance equipment required for use by officers will be procured under the provisions of Paragraph 11, General Orders No. 41, G. H. Q. A. E. F., March 14, 1918.

Note 5.--TOILET KIT. Contents:

1 Brush, shaving	1 Cake soap, hand
1 Comb	1 Cake soap, shaving
1 Mirror	1 Toothbrush
1 Razor	1 Towel, face

No 51 6.--COBBLER OUTFIT, HAND. Contents of Cobbler's Kit:

1 Iron stand, with three lasts	1 Thread, shoe, ball
1 Hammer, shoemaker's	5 Nails, cobbler, 4/8 pound
1 Nippers, peg	5 Nails, cobbler, 5/8 pound
1 Handle, sewing awl	3 Nails, heet, 6/8 pound
6 Blades, sewing awl	100 Half soles, assorted sizes, pairs
1 Handle pegging awl	1 Patches for uppers, pound
6 Blades, pegging awl	100 Lifts, heel, pairs
1 Wrench for awl	2 Needles, shoemaker's packages (12 to pk
1 Knife, shoemaker's	10 Leather, sole, pound
1 Rasp, shoemaker's	
1 Wax, shoemaker's ball	

Note 7.--FIELD DESK, SMALL. The contents of a field desk include records, manuals, blanks and stationery. The stationery for a single desk should not exceed the following, which is prescribed as an allowance for 30 days. The allowance applies also to each field desk not furnished by the Quartermaster Corps.

	If Typewriter Is Supplied	If Typewriter Is Not Supplied
Bands, rubber, No. 18, gross	1	1
Blocks, memo or scratch note, for pencil	1	4
Books, duplicating, letter size	2	2

Envelopes, official	200	100
Erasers:		
Rubber, ink and pencil	1	2
Rubber, typewriter	1	..
Steel	1	1
Fasteners, paper, boxes	1	1
Files, office:		
General orders	1	1
Special order	1	1
Ink:		
Black, powdered, tablets, tins	1	1
Red, powdered, tablets, tins	1	1
Mucilage (or paste), bottle or tube	1	1
Paper:		
Blotting, 4 x 9½" sheets	6	6
Blotting, 12 x 9" sheets	2	2
Carbon, letter size, sheets	25	..
Letter, typewriter, quires	5	..
Pencils:		
Indelible	4	4
Lead	2	2
Colored (blue and red)	2	2
Penholders	4	4
Pens, steel	24	24
Pins, office, cone	1	1
Ribbons, typewriter, record	2	..
Ruler, office, 12 inch	1	1
Shears, office	1	1
Tape, office, spool	1	1
Twine, wrapping, ball	1	1
Wax, sealing, ounce	1	1

Note 8.--HOUSEWIFE. Contents:

1 Scissors
3 Needles, large
24 Needles, assorted sizes
20 Pins
8 Safety pins
1 Card of thread (white, black and olive drab
24 Buttons, olive drab shirt.
48 Buttons, underwear (24 undershirt, 24 drawers)

Note 9.--FIELD RANGE NO. 1, COMPLETE

1 Field range (1 body, No. 41, and boiling plate No. 42)
1 Almo attachment (2 pieces, 42a and 42b)
6 Boilers, Nos. 48, 49, 50, 51, 53 and 54)
2 Cans, G. I., large
1 Can, G. I. small
1 Cleaver, 6-inch
1 Dipper, 1-2 gallon, No. 55
1 Dipper, quart, No. 56
2 Forks, small

Components:
1 Grinder, meat
2 Knives, butcher, 8-inch
2 Pans, bake, No. 52
1 Pipe, smoke, elbow No. 47
4 Pipes, smoke, joints, No.s 43, 44, 45 and 46
4 Rests, pan, No. 57
1 Saw, meat, 15-inch blade
1 Skimmer, large
2 Spoons, large
1 Steel, butcher's, 10-inch

Note 10.--FIELD RANGE NO. 2, COMPLETE

1 Field range (1 body, No. 61 and boiling plate No. 62)
2 Boilers, Nos. 50 and 51
1 Dipper, 1-2 gallon, No. 55
2 Forks, meat, small
2 Knives, butcher, 8"
2 Pans, bake, No. 52
1 Pipe, smoke, elbow, No. 67
4 Pipe, smoke, joints, Nos. 63, 64, 65 and 66
2 Rests, pan, No. 57
1 Saw, meat, 15-inch blade
1 Skimmer, small
2 Spoons, small
1 Steel, butcher's 10-inch

Note 11.--BUTCHER'S KIT. The following articles constitute a kint of butcher's tools, prescribed as mobile equipment:

1 Cleaver
6 Hooks, meat, for racks
2 Knives, butcher
1 Saw, meat, including two extra blades
1 Steel, butcher's
1 Steelyard

Note 12.--ROLLING KITCHEN COOKING EQUIPMENT.

2 Buckets, G.I.
6 Cannisters
1 Cleaver
1 Cook's chest
6 Cook pots
2 Conveying poles
1 Dipper, 1 quart
2 Dust covers, large
2 Dust covers, small
1 Food chopper
2 Forks, large
1 Knife, bread
2 Knives, butcher's 8"
2 Knives, slicing
1 Needles
2 Oven pans and cover
1 Poker
1 Salt box
1 Saw, meat
1 Shovel
2 Skimmers
2 Spoons, large
1 Steel, butcher's, 10"
2 Table boards
2 Thermos cans
2 Tills
1 Tire pump (for trailmobile type only)
1 Wrench

(The above equipment will be furnished to kitchens not provided with utensils. Existing kitchen equipment will be changed where necessary so as to correspond as nearly as practicable to the above.)

Note 13.--SPARE PARTS CASE NO. 1 (LEATHER), HOTCHKISS MACHINE GUN

Contents

1 Breech block
1 Ejector
2 Ejector cushions (rubber)
1 Elevating link
1 Elevating connection link pin
2 Extractor spring -2 Extractor
1 Feed ratchet release pawl
1 Feed ratchet pin spring
1 Firing pin
1 Locking screw gas cylinder
1 Safety sear
1 Safety sear spring
1 Traversing clamp
1 Box zinc containing spare parts as follows:
1 Arm lock handle spring
1 Arm lock handle spring locking, belt
10 Pins assorted
1 Cotter pin
5 Rivets
1 Elevating block trunnion lock
1 Elevating block trunnion lock spring
1 Elevating block locking pin
1 Knee joint lock plunger
1 Knee joint lock spring
1 Telescopic elevating screw hook spring
1 Telescopic elevating screw hook lock

1 Traversing clamp lever
1 Traversing clamp spring
1 Barrel, cleaning rod, 2 sections
1 Gas cylinder cleaning rod, 2 sections
1 Scraper for gas cylinder
12 Cleaning brushes (barrel)
1 Copper hammer
1 Dismounting wrench
1 Screwdriver
1 Wrench teat
1 File handle
1 Gauge chamber
1 Hand extractor
1 Oil can
1 Grease box full
1 Breech block case, leather
1 Manual 1917, for 1914 H. M. G.
1 Zinc box and cover, canvas
1 Recoil spring
1 Sear
1 Sear spring
1 Sprocket, shaft ratchet spring
1 Trunnion cap lock
1 Trunnion cap lock spring
1 Trunnion cap lock spring plug screw
1 Trunnion cap wing nut
1 Trunnion cap case locking nut
1 Upper leg head joint pin
1 Upper leg head joint pin collar
1 Upper leg head joint pin collar pin

Note 14.--SPARE PARTS CASE NO. 2 (LEATHER), HOTCHKISS MACHINE GUN

Contents:

1 Ejector
2 Ejector cushions (rubber)
1 Elevating connection link pin
2 Extractors
1 Feed ratchet release awl
1 Feed ratchet pin spring
1 Locking screw
1 Piston
1 Piston return spring
1 Sear
1 Sear spring
1 Striker
1 Cleaning rod barrel, 2 section
1 Cleaning rod gas cylinder, 2 section
12 Cleaning brushes (barrel)
1 scraper for gun cylinder
1 Copper hammer
1 Screwdriver
1 Dismounting wrench
1 File and handle
1 Grease box
1 Oil can
1 Front sight cover
2 Extractor springs
1 Sprocket shaft ratchet spring
1 Hand extractor

Note 15.--GUNNERS POUCH, HOTCHKISS MACHINE GUN

Contents:

1 Extractor
1 Extractor spring
1 Striker
1 Blush, varnish
1 Defectives cartridge extractor
1 Hand extractor
1 Wrench for gun regulator
1 Oil can

Note 16.--CONTENTS OF CLEANING KITS, HOTCHKISS MACHINE GUN

1 Chain mittens, pair
1 Chain shoulder strap
1 Canvas water bucket
1 Oil can
1 Cleaning rags, package

Note.--If regiment is manned by personnel from Field Artillery, adjust individual mobile equipment to conform to strength as shown in Tables of Organization, Series "A", No. 36, 37, 38 and 39. For convenience of all concerned, these Tables of Organizations, with corrections, are included in this manual.

CORRECTIONS IN

TABLES OF ORGANIZATION
SERIES A, JANUARY 14, 1918

(Edition corrected to June 26, 1918)

August 20, 1918

The tables as printed in this volume include War Department changes up to and including June 26, 1918. In order to correct the tables up to and including War Department changes July 15th and to correct certain typographic errors the following changes should be made.

All tables of organization printed in Equipment Manuals for Service in Europe should be similarly corrected.

TABLE 38

Line	Column	Correct Figure	Line	Column	Correct Figure
38	6	6	42	1	Carts, reel &
38	7	10			fire control
38	10	10			

TABLE 39

Line	Column	Correct Figure	Line	Column	Correct Figure
21	2	0	21	16	1

Add lines 23 -- Car, staff observation.
Column 2 -- 1.
Column 16 -- 1.
26 Tractors, Ordnance, 2½ tons
Column 4 -- 1.
Column 16 -- 1.
Renumber lines from 22 down.

CORRECTIONS, SECOND SERIES, IN

TABLES OF ORGANIZATION

SERIES A, JANUARY 14, 1918
(Edition Corrected to June 26, 1918)

September 6, 1918

The tables as printed in this volume include War Department changes up to and including June 26, 1918. In order to correct the tables up to September 1 and to correct certain typographical errors, the following changes should be made.

All tables of organization printed in "Equipment Manuals for Service in Europe" should be similarly corrected.

These changes are in addition to the changes published as these headquarters August 20, 1918.

TABLE 38

Line	Column	Correct Figure	Instead of
34	6	$^{6}_{10}\circ^{12}_{23}{}^{6}_{18}{}^{q}_{q}$	$^{12}_{4}\circ^{19}_{23}{}_{q}$
34	10		

TABLE 39

Line	Column	Correct Figure	Instead of
27	1	Carts, reel & fire, etc.	Trucks, reel & fire, etc.
Note (f)	17	One in charge of reel & fire control cart	One in charge of reel & fire & fire control truck

CORRECTIONS, THIRD SERIES, IN

TABLES OF ORGANIZATION

SERIES A, JANUARY 14, 1918
(Edition Corrected to June 26, 1918)

September 12, 1918

The tables are printed in this volume include War Department changes up to and including June 26, 1918. In order to correct the tables up to and including War Department changes July 25th and to incorporate certain changes authorized by cable from the U. S. the following changes should be made.

All tables of organization printed in "Equipment Manuals for Service in Europe" should be similarly corrected.

These changes are in addition to those published at these headquarters dated August 20, 1918, and September 6, 1918.

TABLE 36

Change line 34 to read "Rifles, automatic."

Line	Column	Correct Figure	Instead of
33	2	87	57
33	4	40	32
33	5	40	32
33	6	40	32
33	7	257	203
34	2	8	30
34	4	0	8
34	5	0	8
34	6	0	8
34	7	8	54

TABLE 37

Change line 29 to read "Rifles, automatic."

Line	Column	Correct Figure	Instead of
28	2	28	12
28	3	21	2
28	4	21	2
28	5	21	2
28	6	91	18
28	8	115	42
29	2	8	16
29	3	0	17
29	4	0	19
29	5	0	19
29	6	8	73
29	8	8	73

TABLE 38

Change line 29 to read "Rifles, automatic."

Line	Column	Correct Figure	Instead of
49	4	257	203
49	5	91	18
49	6	1362	318
49	7	1720	549
49	10	1744	573
50	4	8	54
50	5	8	73
50	6	48	1044
50	7	64	1171
50	10	64	1171

TABLE 39

Change line 33 to read "Rifles, automatic."

Line	Column	Correct Figure	Instead of
32	2	7	4
32	3	7	5
32	4	13	11
32	5	4	0
32	6	30	6
32	7	23	3
32	8	27	4
32	9	23	3
32	10	23	3
32	11	20	5
32	12	17	3
32	13	17	3
32	14	10	2
32	15	6	1
32	16	227	53
33	2	8	3
33	3	0	2
33	4	0	2
33	5	0	4
33	6	0	24
33	7	0	20
33	8	0	23
33	9	0	20
33	10	0	20
33	11	0	15
13	12	0	14
13	13	0	14
13	14	0	8
13	15	0	3
13	16	8	174

TABLE 37--SUPPLY COMPANY, 6-INCH GUN REGIMENT
(Heavy Field Artillery Regiment, Motorized)
MAXIMUM STRENGTH

1	2	3	4	5	6	7	8	9
1 Units	Regimental Section	1st Bn Section	2nd Bn Section	3rd Bn Section	Total	Ord Dept Attch	Aggregate	Remarks
2 Captains	1	..	..	..	1	1	2	
3 1st Lieutenants	21t	..	..	..	2	..	2	
4 2nd Lieutenant	1t	..	..	..	1	..	1	
5 Total commissioned	4	..	..	..	4	1	5	
6 Regimental supply sergeant	..	1t	1t	1t	3	..	3	
7 Ordnance sergeant	..	..	..	..	..	4	4	
8 1st sergeant	1t	..	..	..	1	..	1	
9 Mess sergeant	1t	..	..	..	1	..	1	
10 Sergeant	21t	..	..	..	2	3	5	
11 Corporal	r1	r1	r1	r1	4	6	10	
12 Chief mechanic	1	..	..	..	1	..	1	
13 Cook	21b	1b	1b	1b	6	..	6	
14 Mechanic	r1a	r1e	r1e	r1e	4	..	4	
15 Wagoner	r4d	r7d	r7d	r7d	25	..	25	
16 Private, 1st class	r31c	r3	r3	r3	12	5	17	
17 Private	rg71b	r71b	r71b	r71b	28	5	32	
18 Total enlisted	24	21	21	21	87	23	110	
19		21	21	21	91	24	115	
20 Car, motor, 5-passenger	1	..	..	..	1	..	1	
21 Kitchens, rolling, trailmobile	2	2	2	2	8	..	8	
22 Motorcycles w/side cars	5	1	1	1	8	..	8	
23 Truck, ration & baggage, 3-ton	4	4	4	4	16	..	16	
24 Truck, repair	..	1	1	1	3	..	3	
25 Truck, repair light	1	..	..	..	1	..	1	
26 Truck, supply	..	2	2	2	6f	..	6	
27 Truck, tank	..	1	1	1	3	..	3	
28 Pistol	12	2	2	2	18	24	42	
29 Rifles	16	19	19	19	73	..	73	

TABLE 38--REGIMENT OF 6-INCH GUNS
(Heavy Field Artillery, Motorized)
MAXIMUM STRENGTH

1	2	3	4	5	6	7	8	9	10
Units	Regt HQ	3 Bn HQ	HQ Company	Supply Company	6 Btrys	Total	Med Dept & Chaplain	Ordnance Attached	Aggregate
2 Colonel	1	..	..	..	..	1	..	..	1
3 Lieutenant colonel	1	..	..	..	..	1	..	..	1
4 Major	..	3	..	..	..	3	1	..	4
5 Captain	z2	3	1	1	6	13	..	1	..
6 1st Lieutenant	..	..	..	2	12	..	3	..	65
7 2nd Lieutenant	..	..	..	1	12	48	..	..	..
8 Chaplain, major, captain or 1st lieutenant							1	..	1
9 Total commissioned	4	6	22	4	30	66	5	1	72
10 Regimental sergeant major	..	..	2z	..	..	2	..	..	2
11 Ordnance sergeant	..	..	..	..	..	..	..	4	4
12 Battalion sergeant major	..	..	3	..	..	3	..	..	3
13 Regimental supply sergeant	..	..	..	3	..	3	..	..	3
14 1st Sergeant	..	..	1	1	6	8	..	..	8
15 Sergeant, 1st class	..	..	..	..	..	..	1	..	1
16 Color sergeant	..	..	2	..	..	2	..	..	2
17 Mess sergeant	..	..	1	1	6	8	..	..	8
18 Supply sergeant	..	..	1	..	6	7	..	..	7
19 Sergeant	..	..	132z	2	60	75	3	3	81
20 Corporal	..	..	39	4	144	187	..	6	193
21 Chief mechanic	..	..	1	1	12	14	..	..	14
22 Cook	..	..	4	6	24	34	..	..	34
23 mechanic	..	..	3	4	24	31	..	..	31
24 Saddler	..	..	1	..	6	7	..	..	7
25 Wagoner	..	..	7	25	126	158	..	..	158
26 Bugler	..	..	4	..	18	22	..	..	22
27 Private, 1st class	..	..	37	12	294	343	..	5	..
28 Private	..	..	67	28	606	701	29	5	1083
29 Band (all grades)	..	..	49	..	..	49	..	..	49
30 Total enlisted	..	..	235	87	1332	1654	33	23	1710
31 Aggregate	4	6	257	91	1362	1720	38	24	1782

1	2	3	4	5	6	7	8	9	10
Units	Regt HQ	3 Bn HQ	HQ Company	Supply Company	6 Btrys	Total	Med Dept & Chaplain	Ordnance Attached	Aggregate
32 Carts, reel, regimental or battalion	..	..	4	..	..	4	..	..	4
33 Ambulance, motor	..	..	..	..	..	..	3	..	3
34 Car, motor	..	..	4095q	1	12	22	1	..	402319q
35 Car, reconnaissance	..	..	..	..	6	6	..	..	6
36 Kitchen, rolling trail type	..	..	..	8	..	8	..	..	8
37 Motorcycle with side car	..	..	24	8	72	104	4	..	108
38 Tractor, 2½-ton	..	..	4	..	..	4	..	..	4
39 Tractor, 10-ton	..	..	..	..	24	24	..	..	24
40 Truck, ammunition	..	..	9v	..	12n13248v	12n14157v	2v	..	12n14359v
41 Truck, ration and baggage	..	..	..	16	..	16	..	..	16
42 Truck, reel and fire control	..	..	..	..	6	6	..	..	6
43 Truck, repair	..	..	..	3	..	3	..	..	3
44 Truck, repair, light	..	..	..	1	..	1	..	..	1
45 Truck, supply	..	..	1	6	6	13	..	..	13
46 Truck, wireless	..	..	1	..	..	1	..	..	1
47 Gun, 6-inch	..	..	..	..	24	24	..	..	24
48 Gun, machine, anti-aircraft	..	..	..	..	12	12	..	..	12
49 Pistol	4	6	203	18	318	549	..	24	573
50 Rifle	..	..	54	73	1044	1171	..	..	1171
51 Truck, tank	..	..	..	3	..	3	..	..	3
52 Truck, telephone	..	..	1	..	..	1	..	..	1

Remarks

(n) Tool trucks
(o) 7-passenger car
(v) For transportation passengers
(q) 5-passenger car
(z) Personnel detachment: 1 captain, 1 regimental sergeant major, 2 personnel sergeants

TABLE 39--BATTERY 6-INCH GUN REGIMENT
(Heavy Field Artillery, Motorized)
MAXIMUM STRENGTH

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
		Special Detail			Firing Battery									Cbt Train	
					1st Plt		2nd Plt		3rd Plt		4th Plt				
1 Units	Btry HQ	Instrument Detail	Signal Detail	Scout	1st Section	2nd Section	3rd Section	4th Section	5th Section	6th Section	7th Section	8th Section	9th Section	W/ Sup Company	Tot
2 Captain	1	..	..	..	..	..	..	..	..	..	..	..	..	..	1
3 1st Lieutenants	1	..	..	..	1	..	..	..	..	..	..	..	..	..	2
4 2nd Lieutenants	..	..	..	..	..	..	1	..	..	1	..	..	..	..	2
5 Total commissioned	2	..	..	..	.1	..	1	..	..	1	..	..	..	..	5
6 1st Sergeant	1	..	..	..	..	..	..	..	..	..	..	..	..	..	1
7 Mess sergeant	..	..	..	..	..	..	..	..	..	..	..	..	..	1	1
8 Supply sergeant	..	..	..	..	..	..	..	..	..	..	..	..	1	..	1
9 Sergeants	..	b1	1	..	1	1	1	1	1	1	1	1	..	..	10
10 Corporals	a2r	2d	2f	2r	2	2	2	2	2	2	2	2	..	..	24
11 Chief mechanics	..	..	..	..	..	..	..	..	..	..	..	..	1	..	2
12 Cooks	..	..	..	..	..	..	..	..	..	..	..	..	..	4r	4
13 Mechanics	..	..	..	..	1r	..	1r	..	..	1r	..	..	1r	..	4
14 Saddler	..	..	..	..	..	..	..	..	..	..	..	..	1r	..	1
15 Wagoners	..	r1c	r1c	..	r3c	r2c	r3c	r2c	r2c	r2c	r2c	r2c	r1c	..	21
16 Buglers	1	..	..	..	1	..	..	..	..	1	..	..	..	..	3
17 Privates, 1st class	c1r	2e	3g	2yr	1c6 1kr	r51	r51k	r51k	5r	r42c	r42c	r42c	r2c	1rz	49
18 Privates	..	k1r	16 1kr	..	r143k	r132	r143k	r132k	r132k	r82k	r82k	r82k	r31k	..	101
19 Total enlisted	5	7	13	4	29	23	26	23	23	19	17	17	10	6	222
20 Aggregate	7	7	13	4	30	23	27	23	23	20	17	17	10	6	227
21 Cars, motor, 5-passenger	1	..	..	..	1	..	..	..	..	..	..	..	..	..	2
22 Car, reconnaissance	..	1	..	..	..	..	..	..	..	..	..	..	..	..	1
23 Motorcycles w/side cars	12s	..	..	..	..	..	..	..	..	..	..	..	..	..	12s
24 Tractors, ord, 10-ton	..	..	..	..	1	1	1	1	..	..	..	..	..	..	4
25 Trucks, ammunition	..	..	..	..	21n	1	21n	1	2	42v	42v	42v	2v	..2n	228v
26 Truck, reel and fire control	..	..	1	..	..	..	..	..	..	..	..	..	..	..	1
27 Truck, supply	..	..	..	..	..	..	..	..	..	..	..	..	1	..	1
28 Guns, 6-inch	..	..	..	..	1	1	1	1	..	..	..	..	..	..	4
29 Guns, machine, anti-aircraft	..	..	..	..	..	..	..	..	..	1	..	1	..	..	2
30 Pistols	4	5	11	..	6	3	4	3	3	5	3	3	2	1	53
31 Rifles	3	2	2	4	24	20	23	20	20	15	14	14	8	5	174

REMARKS

(a) One agent with battalion headquarters, one battery clerk.
(b) In charge of instrument detail.
(c) Chauffeur.
(d) One rangefinder, one operates scissors instrument.
(e) One operates aiming circle, one operates B. C. scissors instrument.
(f) One in charge of reel and fire control truck, one in charge of B. C. telephone station.
(g) Telephone operators.
(i) Three telephone operators, one signaler, one linesman.
(k) Assistant chauffeur.
(n) Tool truck.
(r) Armed with rifle; remainder of personnel armed with pistol.
(s) To be assigned by battery commander as required.
(v) For transportation cannoneers.
(y) Drive scouts' motorcycles.
(z) Agent with supply company.

NOTE.--For tractors, one wagoner, one private 1st class, and one private as chauffeur, and assistant. For ammunition trucks, supply truck, reconnaissance car and reel and fire control truck, one wagoner and one p as chauffeur and assistant. For personnel trucks and motor cars, one private 1st class as chauffeur.

A. G. Printing Department

General Headquarters

American E. F.

EXHIBIT B-2

UNCLASSIFIED
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Para d, 3a,
1 Nov 1981

25 Aug 1982

PROCEEDINGS OF A BORAD CONVENED BY SPECIAL ORDER NO. 10, HEADQUARTERS, 18TH ARTILLERY AREA, 11 DECEMBER 1918, TO REVISE "EQUIPMENT MANUALS FOR SERVICE IN EUROPE" FOR A REGIMENT OF 8-INCH HOWITZERS

Proceedings of a board of officers convened pursuant to the following order:

HEADQUARTERS 18TH ARTILLERY AREA

11 December, 1918

SPECIAL ORDERS)
NO. 10)

* * * * * * * *

11. Pursuant to instructions contained in letter of Adjutant General, American Expeditionary Forces, dated December 7, 1918, file no. 15893-A 213, the following Board of officers is convened in the 18th Training Area to make a complete study and report on the suitability and adequacy of all personnel and materiel as provided in equipmnt manuals for service in France and organization tables for 8" howitzer regiment, Army artillery. (Individual equipment of the soldier will not be included in the deliberations of this Board.)

Detail for the Board:

Colonel M. A. Cross, C.A.C., 57th Artillery, C.A.C.
Lieutenant Colonel T. A. Terry, C.A.C., 58th Artillery, C.A.C.
Major T. H. Jones, C.A.C., 59th Artillery, C.A.C.
Captain Alfred R. Heath, C.A.C., 58th Artillery, C.A.C.
Captain J. W. Doolittle, O.D., HQ, 30th Brigade, C.A.C.
Captain J. M. Harris, C.A.C., 55th Artillery, C.A.C.
Captain J. H. Wilson, C.A.C., HQ, 31st Brigade, C.A.C.
1st Lieutenant T. D. Johnson, C.A.C., HQ, 31st Brigade, C.A.C.

It is proposed to revise equipment manuals for service in France and organization tables, based on experience gained in operations at the front. The Board should make its deliberations most thorough so as to cover entirely questions of personnel and materiel. When any changes are recommended, full reasons should be given therefor, so that the officers undertaking final revision may have before them full information and reasons for recommendations and recommended changes.

Prior to the initial sitting the president of the above-names Board will report to the Commanding General, 18th Artillery Area for further instructions.

Proceedings of this Board shall be submitted in quadruplicate.

By Command of Brigadier General Davis.

OFFICIAL:
R. S. STEWART
Captain, C.A.C.
Adjutant

R. D. BROWN
Major, C.A.C.
Chief of Staff

Doulavant, France
16 December 1918

The Board met at 10:00 A.M.

Present - All members.

The Board then proceeded to make a study in detail of the suitability and adequacy of the personnel and materiel provided in the Equipment Manuals for Service in Europe, Series C. No. 1, for a Regiment of 8-inch Howitzers (British) Marks VI and VII (Motorized).

After a careful consideration and thorough discussion of the several changes suggested in the above manual, the Board recommends that each of the following tables be revised as indicated in its respective exhibit, or in accordance with the remarks below:

Table 205	Exhibit A
Table 208	Exhibit B
Proposed Transport Company	Exhibit C
Table 221	Exhibit D
Table 222	Exhibit E
Table I	See Page 8 of this report
Table II	See Page 8 of this report
Table III	See Page 9 of this report
Table IV	No change
Table V	See Page 9 of this report
Table VI	No change
Table VII	Exhibit F
Table VIII	Exhibit G
Table IX	See Page 12 of this report
Table X	See Page 12 of this report
Table XI	No change
Appendix I	No change
Appendix II	No change
General Notes	No change

The majority of the foregoing changes recommended are contingent upon the formation of a "transport battalion", the personnel and materiel of which are shown in Exhibit "C", to be inserted in the Equipment Manuals for Service in Europe after Table 206.

The several changes in the tables in question have been explained and substantiating reasons for the same are given in connection with the service tables, in the following remarks or discussions. Owing, however, to the radical effect upon the personnel and materiel of the existing tables caused by the addition of the "transport battalion", the advisability of making the battalion of two batteries a fighting unit which may operate independently, and the changes in the transportation equipment, it is necessary to explain at first the reasons for these recommendations, before considering each individual table.

1. The Board finds that the motor transportation and the personnel necessary for its operation and maintenance could not be organized in accordance with the present manuals so as to secure their use most efficiently; nor could the equipment be maintained in the best possible condition. This was principally due to the fact that direct control of this part of the organization by the battery commander was practically impossible, as the park for this transportation equipment was so remote from his battery position, where his presence is needed continually, that he had no opportunity for the proper supervision of trucks and repair work, instruction and discipline of the personnel and convoy discipline. Furthermore, the necessity of temporarily supplying trucks for duty which took them from their permanent

assignments, obviously lessened the battery commander's control over a vital part of his organization. This has been found to be equally true in instances where the trasportation was handled through a battalion transportation and mechanical officer of the two batteries of a battalion. With a view to correcting this difficulty and relieving the battalion commander or the battery commanders as the case may be, of an unnecessary and difficult burden this board recommends that a fourth battalion be added to each regiment (to be called hereafter "transport battalion" consisting of a battalion headquarters and four companies; one for each battalion and one for regimental headquarters and a general egimental reserve. This battalion is to be so organized that the maintenance of all the transportation materiel (with the exception of the tractors) and the equipment, instruction and discipline of the necessary personnel will be under one specialized control. Furthermore, a definite part of the transportation as set forth in the following tables will be organized as a transportation unit for each battalion to accompany it when the battalion is operating as an independent unit.

This battalion is to be commanded by a major, on the staff of the regimental commander, and each transport company will be commanded by a captain. When a combat battalion takes the field, it will be accompanied by one of the companies of the transport battalion, the company commander of which would be the transportation officer of the battalion. The number of trucks in each of these companies, as shown in the following tables is that required to transport the necessary personnel, accessories, baggage and approximately one day's allowance of ammunition for a battalion.

II. Experience has demonstrated that a battalion should be ready at all times to take the field independently. With this in view the board finds that to complete the commissioned personnel required by such an independent unit the additions of an orienteur officer and a supply officer are necessary, as well as certain further increases in the enlisted personnel now allowed each battalion.

III. The predominating difficulty incurred in the matter of transportation was the lack of standardization in the type of trucks furnished. In order to enhance the proficiency of the transportation organizations through simplifying the instruction of the personnel in driving and maintaining the vehicles, it is recommended that a standard type of truck be adopted, and that this standardization be carried even to the body design. It is therefore recommended that a uniform type of 3-ton truck with a cargo body, four-wheel drive and front wheel steer be provided for both ammunition and general cargo service; that the rear wheels be provided with dual tires; that the hub caps and cargo boies be flush with the outside of the wheels and that the radiator be protected by an effective shield; that all trucks be provided with magneto ignition and lighting systems consisting of a single light pivoted on the dash; with a fifty (50) gallon tank with compartment for emergency reserve; with lockers for the storage of drivers' personal effects and tools; with racks for picks and shovels, with draw bars and with thirty (30) foot steel cable towing slings. In reference to the proposed changes in the body design and the steering system, it was found that the ammunition body was poorly adapted to the service required, due to its limited cargo space and want of protection for the driver and cargo and that the four-wheel steer was found to be difficult to manage and control under the traffic and road conditions existing on narrow and congested highways.

As stated above the further changes recommended in the equipment manuals for service in Europe are noted with the reasons therefore in the subsequent exhibits and pages.

Table 205:

The changes shown in this Table (205) are caused by the changes recommended in the various units which make up the composite regimental table. These are explained under each separate organization. As has been stated above a new battalion called the "transport battalion" has been added. It is intended that this battalion shall handle all the transportation for the regiment (with the exception of the tractors); requisition for all mobile equipment which does not form a requisite part of any separate

organization; and train the wagoners and chauffeurs (except the tractor drivers) for the entire regiment, all of whom shall constitute a part of this transport battalion regardless of their assignments within the regiment. This battalion shall be divided into four companies.

The total strength of the regiment has been increased from 1875 to 2490 due largely to the addition of this fourth battalion and also to an increase in the personnel, by providing a second relief for the gun detachments.

The board further recommends, and has drawn up the new tables accordingly, that all noncommissioned officers be armed with the pistol or revolver. This affects beneficially the corporals detailed at headquarters and those on special duty, who by reason of the nature of the work required of them are rather awkwardly armed in carrying rifles.

Table 206:

This table has been necessarily changed on account of the formation of the transport battalion, in that all the chauffeurs, assistant chauffeurs, wagoners (tractor drivers and assistant tractor rivers excepted) and motorcycle drivers have been withdrawn and placed in the transport battalion.

The division of the battery personnel as far as the platoon and combat train are concerned has been so altered as to eliminate both of these units and substitute therefore, four gun sections and four relief gun sections together with a reserve section of 36 men, who would be utilized for ammunition details, gas guards, military police duty, manning machine guns, kitchen police, replacing casualties and general duties. Experience has shown that the platoon is an elastic and not a fixed unit and that there is no reason for the existence of this unit as such. Furthermore it is absolutely essential that provision be made for a complete relief crew for each gun in order to insure proper continuity of operations.

Each gun crew and relief gun crew consists of the following: one gun commander (sergeant), one gun pointer and assistant gun commander (corporal), ten cannoneers, one telephone operator, one tractor driver (wagoner) and one assistant tractor driver, (tractor driver and assistant tractor driver not provided for in relief gun crew), making a total of fifteen (15) men. It has been found to be advisable to include the telephone operators and the tractor drivers as members of the gun crews in order that they may be under the direct and sole control of the gun commander.

A sergeant has been placed in charge of gas defense as conditions existing demanded a man of that grade for this important work.

Under the existing tables no provision was made for a noncommissioned officer who would be responsible for the operation of the machine guns. This is very necessary in order that such a man may be properly instructed in the care and operation of those arms. It is therefore recommended that a corporal be designated as the noncommissioned officer in charge of machine guns.

The privates 1st class under battery headquarters and the agent with battalion headquarters as shown in the present tables have been eliminated as experience has demonstrated that such services are not required.

In reference to the materiel; only such part of the mobile equipment has been retained in the battery tables as forms a part of the firing battery. The remainder has been assigned to the transport battalion for the use of the batteries as outlined previously. The artillery repair truck has been assigned to the transport company for use

in each combat battalion, as experience has shown that one per battalion (of two batteries) is sufficient for all repair work. The light repair truck has therefore been eliminated. The number of artillery supply trucks has been reduced from forty-five per regiment to six; one for each battery. This truck contains tools and necessary accessories, which will be supplemented by other cleaning materials, etc. carried in a standard 3-ton truck. This arrangement will eliminate extra trucks which cannot be used for any other purpose than that for which they are specially designed and which, as a matter of fact, will not be required with the standard truck to carry such materials. The number of motor cars reduced from three to two) and motorcycles (reduced from twelve to four) have been changed to the number necessary to serve the actual needs of a battery. The number called for in the present table was never supplied and would not have been necessary.

A water cart has been added as this has been found to be quite necessary.

Considerable trouble was experienced at the battery positions on account of inadequate means for illumination of the gun position, aiming points, sights and the battery commander's station. In view of the fact that a certain amount of light is necessary and that the operating efficiency of a battery is dependent to a great extent upon the reliability and continuity of this lighting, it is recommended that a gasoline motor-driven electric generator set of about 1½ to 2 kilowatts capacity be provided on a light trailer, for each battery.

Transport Company:

Reasons for the formation of the transport company have been given above.

Table 221:

Table 221 (Headquarters Company) has also been changed on account of the transport battalion. The chauffeurs, assistant chauffeurs and wagoners have been withdrawn, while in some instances the personnel has been slightly increased due to the requirements of this new organization. The enlisted personnel has been increased from 234 to 257 and the commissioned personnel decreased from 21 to 16, making the new total for the company 273 as against 155 of the old table. A sergeant-major, junior grade, and a personnel sergeant have been added for the transport battalion. It is also recommended that a personnel sergeant be allowed each battalion headquarters as shown in proposed table. Radio sergeants have been reduced to one for each combat battalion which has been found to be sufficient. From the old table three sergeants have been removed as follows: the one in charge of regimental instruments, the one in charge of the wireless station, and the sergeant-mechanic. There are no instruments at regimental headquarters to be cared for by a sergeant. The one in charge of the wireless station has been eliminated because the radio sergeants perform this duty. The sergeant-mechanic is replaced by a mechanic in the 4th company of the transport battalion, which will handle the transportation for the regimental headquarters. This table also provides for eight corporals at each of the combat battalion headquarters, 3 scouts, 1 signal corporal, 2 wireless corporals (as against one of the old table), 1 postman and one telephone corporal. Two wireless corporals are required in order to provide the necessary relief. Experience has shown that one signal corporal will prove sufficient. The rangefinder operators have been eliminated as no occasion had been found for their use. The instrument corporals, as such, have also been eliminated for the reasons that the corporals mentioned perform all the functions required at battalion headquarters.

Heretofore the number of privates and privates 1st class supplied to battalion headquarters has proved insufficient for the work required of them. It is therefore proposed that the number of privates 1st class be increased from 6 to 10 with the following duties assigned to them; 1 operator battalion commander's instrument; 4

linesman; 2 wireless operators; 1 signaller and 2 instrument privates. The two latter privates 1st class perform the duties required of 2 corporals under the old table. The total number of privates assigned to each combat battalion has been increased by 4 (from 16 to 20), with the following duties: 2 linesman, 3 scouts, 3 telephone operators, 4 orderlies, 3 messengers, 4 panelmen and 1 signaller.

The duties assigned to officers have been slightly modified so as to meet the needs actually existing and those that may arise. One officer (a 1st lieutenant) has been designated as orienteur officer for each battalion, a practice which was generally followed in heavy artillery and which proved entirely successful. Radio and telephone duties in the battalion have been combined under one designation that of signal duties, and one officer (a 2nd lieutenant), designated as signal officer has been assigned to each battalion. As a matter of actual practice, this arrangement was followed in recent operations and the front and proved highly successful, two officers being unnecessary. A regimental gas officer (a 1st lieutenant) has also been supplied. Although the old table provided none, one officer was required by orders to perform duties pertaining to gas warfare and protection against gas.

The materiel has been changed in accordance with the proposed plans mentioned heretofore. Reel trucks and reel carts have been eliminated. None had been supplied to heavy artillery units, and as far as can be determined, none could have been used advantageously under the conditions actually encountered. Actual conditions encountered in practice are that telephone lines ordinarily follow terrain over which it would be impossible to use a horse or motor-drawn reel cart or truck; and even through the lines should follow roads and routes which could be travelled by such vehicles, care must be exercises to see that the lines are so laid that they will not be cut by moving traffic. Considering the fact that the cart or truck must travel no faster than the linemen on foot engaged in effecting the proper installation, this vehicle becomes only a means of transport which an ordinary standard truck could satisfactorily supplant. This, together with small hand reels, provides ample construction equipment to pay lines over all kinds of terrain.

Table 222:

The creation of the transport battalion requires that changes be made in table 222 (supply company). Although all chauffeurs, assistant chauffeurs and wagoners have been withdrawn, the total enlisted personnel has been increased by one; from 114 to 115 and the number of officers from four to five, exclusive of the ordnance officer, due to the requirements of the new battalion. One officer (a 1st lieutenant) should be sent to each separate combat battalion when detached, to act as supply officer for that battalion, leaving the captain and a 2nd lieutenant to remain with company.

A certain number of enlisted men (8) are assigned to each combat battalion for the purpose of handling rations and battalion supplies. This scheme was actually followed during the recent operations and was justified in all particulars. A corporal has been added to act as noncommissioned gas officer for the organization. The sergeant-mechanic has been eliminated; the mechanic of the 4th Transport Company performing the duties formerly required of this man. One sergeant-major, junior grade, has been assigned to the transport battalion headquarters to act as supply concommissioned officer, due to the requirements of the transport battalion. The number of motor cars has been increased from one to five, allowing one for headquarters and one for each supply officer when on duty with a battalion operating independently. It is recommended that a car be also supplied to the ordnance officer.

Table I:

It is recommended that Table I of Individual Mobile Equipment be amended so as to cover each item for a battery having a total enlisted strength of 188 instead of 237, and so as to eliminate the articles enumerated under "Clothing for Chauffeurs and Motorcyclists" except in so far as these articles are required by tractor drivers and their assistants.

Table II:

It is recommended that Table II of Individual Mobile Equipment of a Headquarters Company be amended to meet the requirements of an enlisted strength of 257 as set forth in the proposed amended Table 221.

Table III:

It is recommended that Table III be amended to meet the requirements of a total enlisted strength of 115 as set forth in the proposed amended Table 222.

Table IV:

No changes are recommended in Table IV.

Table V:

It is recommended that Table V be amended to meet the requirements of a total strength as shown in proposed amended Table 205.

It is also recommended that amendment be made to Table V at page 26 be eliminating the words "Typewriter Corona" and the words "ribbon, typewriter, Corona, red and black" and inserting the following notations after the word "typewriter":

1	2	3	4	5	6	7
Articles	Battery	HQ Company	Supply Company	Medical Department	Total Regiment	Remarks
Typewriter	1	4a	10b	1	21	(a) 3 Regimental eadquarters, 1 headquarters company (b) 2 Supply company, 4 Battalion headquarters, 4 transport port companies

The supply of typewriters hitherto furnished was entirely inadequate for needs of regiment. The work demanded of a typewriter is of such a nature that a standard typewriter is required.

It is also recommended that amendment be made to Table V at Page 28 thereof, by changing the table of "Vehicles, Ordnance Department" to read as follows:

1	2	3	4	5	6	7	8
Articles	Battery	Transport Company	HQ Company	Supply Company	Medical Department	Total Regiment	Remarks
Car, motor, staff observation			4			4	
Car, reconnaissance			4			4	
Lighting set, trail mobile 1						6	

Trailer, wireless				1		1	
Tractor, caterpillar, 10-ton	4					24	
Truck, artillery, supply	1					6	
Truck, artillery, repair		1				4	
Truck, wrecking		1				4	

It is further recommended that amendment be made to Table V at page 28 thereof, by changing the table of "Motor Transport Service" to read as follows:

1	2	3	4	5	6	7	8
Articles	Battery	Transport Company	HQ Company	Supply Company	Medical Department	Total Regiment	Remarks
Car, motor, 5-passenger	2	1	9	5	1	31	
Cart, water, trail, mobile				12		12	
Kitchen, rolling, trail				12		12	
Motorcycle, w/sidecars	4	6	23	8	4	83	
Truck, cargo, 3-ton		48				192	
Truck, tank		2				8	
Truck, light delivery			5			5	

Table VI:

No changes are recommended in Table VI.

Table VII:

It is recommended that the signal corps equipment be modified so as to include only the actual needs of a regiment of heavy artillery and that this equipment be standardized for all types of mobile heavy artillery used by the American forces using equipment of American construction only.

The changes as shown upon the following revised table are recommended in the signal corps equipment as listed in the present Table VII. The eliminations of additions to this equipment were made to meet the requirements of this materiel for the following reasons:

The present signal equipment scheduled for telephone systems includes material for light pole line construction which was never actually used and which is burdensome to transport. Such items as 8-pin cross arms and a large number of lance poles for example. This construction is ordinarily cared for by the Signal Corps and there is neither personnel or other material provided an artillery unit to perform this kind of construction. Ordinary twisted pair insulated wire laid along fences, existing pole lines, and trees forms the lines for the construction of artillery signal details. The number of lance poles ha been reduced to that necessary, for it was never found in practice that even as many as are not proposed were actually used, but a margin is allowed for losses and unforseen conditions.

Three pair cable was used in practice in very few cases and the amount of this material, since it is very burdensome to transport has been reduced accordingly.

It is considered that the camp model telephone is better for posts of command than the Type 1375-B since they furnish better transmission and are more comfortable to use. The button switch in the transmitter circuit of the 1375-B set is very tiresome to

operate during a long conversation and the hook switch on the camp model obviates its necessity.

One additional 12-line switchboard is proposed for a regimental headquarters in order to provide sufficient terminal facilities for the number of lines actually terminating at such stations.

The outpost twist is too light for line construction and it is proposed to provide heavy twist pair instead. A small amount of outpost twist is recommended for inside station, bell and switchboard wiring.

For visual signalling it is considered that the 24 om. projector with combination flags is ample. The 35 cm. projector is difficult to carry, requires a storage battery and is not needed.

The proposed change in radio personnel and equipment enables the regimental commander to be, at all times, in direct communication with battalion commanders. Four panelmen have been added to regimental headquarters and also to battalion headquarters. Old tables made no provision for them and if aeroplane observation is desired, their services are indispensable.

Table VIII:

With a view of securing uniformity in artillery service, it is recommended that sights and other angle measuring instruments be graduated in mils and that similarly-designed sights of the panoramic type be supplied all artillery.

The table of orienteur, fire-control and drafting equipment have been compiled with the idea of standardizing this equipment for all types of guns of large calibre and of providing all material of this class actually needed at the front.

Previous tables of equipment call for special designs of fire-control instruments for different types of guns but this is not necessary if a common unit of angular measurement is adopted. Azimuth instruments should be graduated in accordance with this unit. The small transit assigned to each battery in these tables fulfills the purpose of the aiming circle of the 155 mm. equipment and of the director of the British howitzer equipment.

The unit of graduation for tapes and plotting scales is dependent upon the unit of measurement and scale of the maps to be generally used for artillery purposes.

Tables IX and X:

In addition to the equipment listed in Tables IX and X, it is recommended that an addition to the traveling lock be designed which will prevent the slipping of the gun while traveling, should the pressure in the recuperator system drop, such a device would eliminate the necessity for rope lashing or blocking which is always unsatisfactory.

The Board also deems it advisable to equip the limbers with a protected compartment, to be fastened to the front or rear of the limber, suitable designed with a spring bottom for carrying the rocking bar sights when moving the guns. Carrying these sight gears in their positions on the guns is a poor practice, and if they are removed and no suitable provision made for their careful transportation, serious damage will sooner or later result.

It has been found that considerable difficulty had been experienced with the recuperator plugs in maintaining a fit which could be made or would remain sufficiently

tight to prevent any trace of an oil leak and at times a noticeable air leak. In most instances this was due to the fact that it was practically impossible to tighten them sufficiently against a washer of fiber or leather to withstand the pressure carried in the recuperator system. The Board therefore recommends that for this purpose copper washers be supplied, as in several cases such washers were used with the desired results, provided of course, these washers were properly annealed. There is a further advantage obtained by the use of copper washers in that they may be ued repeatedly, if properly annealed each time.

It is recommended that the number of gins be reduced from one per battery to one per battalion (of two batteries) and that each battery be equipped with two jacks of the railroad type and of approximately 15-ton capacity.

Appendix I and II and General Notes:

No changes are recommended in the tables contained therein.

The Board having no further business before it adjourned, sine die December 31, 1918.

M. A. CROSS,
Colonel, C. A. C.
President.

T. D. Johnson
1st Lieutenant, C. A. C.
Recorder

HQ 18th Training Area
Approved:

Wm. C. Davis.
Brigadier General, U. S. A.
Commanding

Table 205 (Recommended Revision)

Regiment of 8-inch Howitzers, Motorized, Personnel from Coast Artillery Corps

Exhibit "A"

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
			Battalion				Transport Bn			Regiment							
	Units	Battery (a)	HQ	Batteries	Total	Battport Co (g)	HQ (g)	Trans-4 Cos (g)	Total	HQ	HQ Co (b)	Supply Co (c)	4 Bns	Sup-Total	Med & Chap	Ord Dept	Dept Aggregate
2	Colonel									1				1			1
3	Lt Col									1				1			1
4	Major		1		1		1		1				4	4	1		5
5	Captain	1	1	2	3	1	1	4	5	2A	1	1	14	18)	3	1	53
6	1st Lt	2	314 1k	4	4	2		8	8		8b	3	20	31)			
7	2nd Lt	2	3i	4	4	2		8	8		6b	1	20	27			27
8	Chap & band ldr										1			1	1		2
9	Total com	5	2	10	12	5	2	20	22	4	16t	5	58	83	5	1	89
10	Sgt maj, sr gr (d)										2			2			2
11	Ord sgt															4	
12	Sgt maj, jr gr (e)		1k				1k					4		4			4
13	Sgt maj, jr gr (f)		1i				1i				4			4			4
14	1st Sgt	1		2	2	1		4	4		1	1	10	12			12
15	Sgt, lcl														1		1
16	Master gun		1i							1i	4			4			4
17	Elec sgts		1i							1i	4			4			4
18	Mess sgt	1		2	2	1		4	4		1	1	10	12			12
19	Radio sgt		1i							2i	5			5			5
20	Supply sgt	1		2	2	1		4	4		1	1	10	12			12
21	Sergeant	13	1i	26	26	8	1i	32	32		17b	2	110	129	3	4	136
22	Corporal	20		40	40	15		60	60		34b	5	180	219		8	227
23	Cook	4		8	8	4		16	16		4	6	40	50			50
24	Mechanic	4		8	8	2		8	8		4	5	32	41			41
25	Wagoner(s)	4		8	8	54		216	216				240	240			240
26	Bugler	3		6	6	2		8	8		4		26	30			30
27	Pvt, lcl	49		98	98	55		220	220		41	10	514	565	29	12	606
28	Private	88		176	176	74		296	296		82	48	824	954		4	958
29	Band, all										49			49			49
30	Total enl	188		376	376	217		868	868		257	83	1996	2336	33	32	2401
31	AGGREGATE	193	2	386	388	222	2	888	890	4	273	88	2054	2419	38	33	2490

	1	2	3	4	5	6	7	8	9	10	11	12	13
			Battalion				Transport Bn			Regiment			
	Units	Battery (a)	HQ	Batteries	Total	Battport Co (g)	HQ (g)	Trans-4 Cos (g)	Total	HQ	HQ Co (b)	Supply Co (c)	4 Bns
32	Ambulance												
33	Car, 5-pass	2	1i	4	4	1	1i	4	4		9	4	16
34	Car, motor, staff observer		1i							1i	4		
35	Car, reconnaissance		1i							1i	4		
36	Cart, water, trail, mobile	1k		2k	2k	1k		4k	4k		1k	12	10k
37	Kitchen, rolling trail	1k		2k	2k	1k		4k	4k		1k	12	10k
38	Lighting set, trail, mobile	1		2	2								6
39	Motorcycle, side-car	4	3i	8	8	6	2i	24	24		23	8	48
40	Tractor, caterpillar, 10-ton	4		8	8								24
41	Truck, cargo, 3-ton					48		192	192				192
42	Truck, arty, supply	1		2	2								6
43	Truck, arty, repair					1		4	4				4
44	Trailer, 10-ton capacity	2		4	4								12
45	Truck, tank					2		8	8				8
46	Truck, wrecking					1		4	4				4
47	Truck, light Delivery, 1-ton		1i				1i			1i	5		
48	Trailer, wireless									1i	1		
49	Gun	4		8	8								24

	1	2	3	4	5	6	7	8	9	10	11	12	13
			Battalion				Transport Bn			Regiment			
	Units	Battery (a)	HQ	Batteries	Total	Bat-port Co (g)	HQ (g)	Trans-4 Cos (g)	Total	HQ	HQ Co (b)	Supply Co (c)	4 Bns
50	Pistol	48	2	96	98	57	2	228	230	4	150	30	524
51	Rifle	145		290	290	165		660	660		123	58	1530
52	Gun, anti-aircraft machine	2		4	4								12

(a) See table 206
(b) See table 221
(c) See table 222
(d) Performs duty of regimental sergeant major, personnel sergeant
(e) Performs duty of regimental supply sergeant
(f) Performs duty of battalion sergeant major
(g) See table "transport company"
(h) Furnished by medical department
(i) From headquarters company, not totaled
(k) From supply company, not totaled
(s) Paragraph V. G. O. number 150, W. D. 1917
(t) Two perform duties of color sergeant field artillery

Note. For tractor, 10-ton, one wagoner as chauffeur and one private 1cl as assistant tractor and one private as assistant chauffeur.

(A) One adjutant; one personnel officer

Table 206 (Recommended Revision) Battery of 8-inch Howitzers, Motorized, (Army Artillery)

1	2	3	4	5	6	7	8	9	10	11
	Btry HQ	Fire Control	Signal	Msgr& Scout	1st Section	2nd Section	3rd Section	4th Section	5th Section	6th Section
1 Unit										
2 Captain	1									
3 1st Lt	2									
4 2nd Lt	2									
5 Total com	5									
6 1st Sgt	1									
7 Mess sgt	1									
8 Supply sgt	1									
9 Sergeant	1k2 1e	1	1		m1	m1	m1	m1	1	1
10 Corporal	f1	2	2	1	1	1	1	1	1	1
11 Cook	4									
12 Mechanic					1r	1r	1r	1r		
13 Wagoner					h1r	h1r	h1r	h1r		
14 Bugler	3									
15 Private, 1cl		2r	d4r	2r	1j5r1o	1j5r1o	1j5r1o	1j5r10	1o4r	1o4r
16 Private	3r		c5r		7r	7r	7r	7r	7r	7r
17 Total enl	16	b5	12	3	16	16	16	16	13	13
18 AGGREGATE	21	5	12	3	16	16	16	16	13	13
19 Car, motor, 5-pass	2									
20 Cart, water, trail, mobile	1s									
21 Kitchen, rolling trail	1s									
22 Lighting set, trail, mobile	1									
23 Motorcycle w/ sidecars	4									
24 Tractor					1	1	1	1		
25 Truck, arty supply	1									
26 Howitzer, 8"					1	1	1	1		
27 Pistol	18	3	3	1	2	2	2	2	2	2
28 Rifle	3	2	9	2	14	14	14	14	11	11
29 Gun, antiaircraft machine	2									

Remarks

(a) In charge of machine gun;
(b) Orienteur and observation detail
(c) 3 Telephone operators; 1 signaller; 1 lineman
(d) 1 Signaller; 3 lineman
(e) Performs duties of chief mechanic
(f) Battery clerk
(h) Tractor drivers
(j) Assistant tractor driver
(k) In charge of gas defense
(m) Gun commander
(n) In charge of ammunition
(o) Gun telephone operator
(r) Armed with rifle; all others with pistol
(s) From supply company, not totaled

Note. Reserve Section. Ammunition detail; gas guard; machine gun sections; military police duty; kitchen police, etc.

Transport Company
Table (Recommended)

Exhibit "C"

155 mm. Gun & 8-inch, 9.2 Mark 1 or 11 Howitzer Regiments, Motorized,
(Army Artillery)

		2	3	4	5	6	7	8	9	10	11
1	Units	Co HQ	1st Section	2nd Section	3rd Section	4th Section	5th Section	6th Section (Ammo Servors	7th Section (Motorcar & Motorcycle dvr) Detached	Aggregate	Remarks
2	Captains	1								1	(a) 1 mechanical officer; 1 convoy officer
3	1st Lt	2a								2	(b) Expert Mechanics
4	2nd Lt	2								2	(c) Chief of Section
5	Total com	5								5	(d) In charge of gasoline and oil supply
6	1st Sgt	1								1	(e) Company Clerk
7	Mess sgt	1								1	(f) Assistant expert mechanic
8	Supply sgt	1								1	(g) Squad leaders mounted on motorcycle
9	Sergeant	2b	1c	1c	1c	1c	1c	1d		8	(h) Driver for Battery Arty Supply Truck
10	Corporal	1e3 2f	2g	2g	2g	2g	2g	2g		15	(j) Company Commander's Chauffeur
11	Cook	4								4	(k) Driver, cargo truck
12	Mechanic	2r								2	(m) Assistant driver of cargo truck
13	Wagoner	2pr	10kr	10kr	10kr	10kr	8kr	2tr	2hr	54	(o) 5 drivers, Motor Cars, 5-Pass; 1 driver, Motor Car, Staff Observation; 1 driver, Motor Car, Reconnaissance; 1 driver, truck, light delivery 1-ton; 11 drivers, motorcycles w/side-cars
14	Bugler	2								2	(p) 1 driver, truck, wrecking; 1 driver, truck, repair, artillery
15	Private 1cl	1j	7mr	7mr	7mr	7mr	7mr		19o	55	(s) From Supply Company not totaled
16	Private	4r	3m5r	3m5r	3m5r	3m5r	1m5r	45r		741	
17	Total enlisted	23	25	25	25	25	23	50	21	217	
18	AGGREGATE	28	25	25	25	25	23	50	21	222	
19	Car, motor, 5-pass	1								1	
20	Cart, water, trail, mobile	1s									
21	Kitchen, rolling trail mobile	1s									
22	Motorcycle, side-car		1	1	1	1	1	1		6	
23	Truck, cargo, 3-ton		10	10	10	10	8			48	
24	Truck, tank							2		2	

		2	3	4	5	6	7	8	9	10	11
1	Units	Co HQ	1st Section	2nd Section	3rd Section	4th Section	5th Section	6th Section (Ammo Servors	7th Section (Motorcar & Motorcycle dvr) Detached	Aggregate	Remarks
25	Truck, wrecking	1								1	(t) 2 drivers, truck, tank
26	Truck, repair, artillery	1								1	(r) Armed w/rifle all others w/pistol
27	Pistol	20	3	3	3	3	3	3	19	57	
28	Rifle	8	22	22	22	22	20	47	2	165	

Exhibit "E"

Supply Company
Table 222 (Recommended Revision)
(Recommended Revision)
155mm Gun & 8-inch, 9.2 Mark I or II Howitzer Regiments, Motorized
(Army Artillery)
Confidential Series C. Personnel from C. A. C. Maximum and Minimum Strength

1	1 Units	2 Co HQ	3 Regt Section	4 1st Bn Section	5 2nd Bn Section	6 3rd Bn Section	7 Total Company	8 Ord Dept Attached	9 Total	10 Remarks
2	Captain	1					1		1	(a) Performs duties of regimental supply sergeant
3	1st Lieutenant			1	1	1	3	1	4	(b) 1 accompanies each battalion when detached
4	2nd Lieutenant	1					1		1	(c) Includes one company clerk and 1 gas corporal
5	Total commissioned	2		1	1	1	5	1	6	(d) For regiment & battalion officers' messes
6	Ordnance sergeant							4	4	(e) Cobbler
7	Sgt maj, (a) jr gr		1	1(b)	1(b)	2(b)	4		4	(f) 1 Rolling kitchen, motor, trail, for transport company attached
8	1st Sergeant	1					1		1	(g) 1 for transport company attached
9	Mess sergeant	1					1		1	(r) Armed with rifles
10	Supply sergeant	1					1		1	Note. Ordnance department to man 4 arty repair trucks. Each truck to have ordnance sergeant. 1 sergeant expert machinist; 2 corporals machinists, 1 private, 1cl acetylene welder; 1 private, 1cl electrician; 1 private, 1cl blacksmith; 1 private machinist helper
11	Sergeant	2					2	4	6	
12	Corporal	5c					5	8	13	
13	Cook	2	1d	1d	1d	1d	6		6	
14	Mechanic	1r	1er	1er	1er	1er	5		5	
15	Private, 1cl	10					10	12	22	
16	Private	26	1d	7 1d	7 1d	7 1d	48	4	52	
17	Total enlisted	49	4	10	10	10	83	32	115	
18	AGGREGATE	51	4	11	11	11	88	33	121	
19	Car, motor, 5-pass; Q.M.C.	1		1	1	1	4	1	5	
20	Kitchen, rolling trail, mobile	1	2f	3f	3f	3f	12		12	
21	Motorcycle w/side car	5		1	1	1	8		8	
22	Cart, water trail	1	1g	3g	3g	3g	12		12	
23	Pistol	14	2	3	3	3	25	33	58	
24	Rifle	37	2	8	8	8	63		63	

(Recommended Revision)

Table VII
Signal Corps Equipment
8" Howitzer Regiments

Exhibit "F"

1	2	3	4	5	6
Articles	Battery	HQ Company	Supply Company	Total Regiment	Remarks
Axes, hand	4	6	18	48	Articles shown under Supply Company in column 4 for use in Battalion Headquarters. Divide equally among the Battalion Headquarters of the Regiment
Bags, tool, service, complete	1	1	3	10	
Barometer, aneroid, graduated in millimeters and inches	1			6	
Barometer, mercurial, graduated in millimeters and inches			3	3	Articles shown under the Headquarters Company in column 3 for the use of Regiment Headquarters.
Bars, digging, standard		2	6	8	
Batteries, dry for flashlight	10	20	60	140	
Batteries, dry, tungsten, for telephones	26	28	84	268	
Batteries, No. 6, for vibrating bells	8	12	24	84	Note. Identification panels 5 x 9 yards,
Bells, electric, vibrating	2	4	9	25	1 set black and white with diamond shape.
Belts, linemen's tool, w/ring & safety strap	2	2	6	20	1 set black and white, square shape.
Books, message, field, form 217-A	10	10	30	100	Signal panels rectangular 2 x 9 yards
Cable, 3 pair, lead covered, ft		300	1200	1500	black and white complete.
Clips, testing					
Climbers, linemen, complete w/straps & pads, pairs	2	2	6	20	Note. Radio trailer equipped with a radio set capable of receiving damped
Chronometers, marine	1	1	3	10	waves and capable of sending and receiving
Electrolyte, 5 gallon cans		1	3	4	a distance of 25 miles undamped waves, 500
Envelopes, field message, form 144-A		500	1500	2000	meters to 1000 meters. All electric
Flashlights, electric, hand	5	10	30	70	energy to be supplied by a generator con-
Fuzes,1-amp for 4- and 12-line switchboards	10	20	60	140	nected to a gasoline motor mounted on
Glasses, field, prism, binocular, 8 power	5	9	21	60	trailer; the above generator to be capable
Hammers, sledge	2	2	6	20	and equipped to charge storage batteries.
Hammers, carpenter's claw	2	1	3	16	
Headsets, telephone	6	6	18	60	(a) Receiving and sending damped waves
Headsets, radio		4		4	250 meters to 500 meters. Receive 5
Hydrometers, Baume		2	6	8	miles. Energy from storage batteries.
Insulators, clamp	16	12	36	144	
Kits, inspector's pocket	2	3	9	24	
Kits, flag, combination, standard	2	6	12	30	
Knives, electrician	8	4	12	64	
Knobs, wooden	860	600	2430	8190	
Ladders	1	3	6	14	
Lamps for flashlights, extra	5	10	30	70	
Marlin, pounds	5	5	15	50	

1	2	3	4	5	6
Articles	Battery	HQ Company	Supply Company	Total Regiment	Remarks
Megaphones	2		3	15	
Nails, wire, 20d, pound	23	23	69	230	
Panels, heavy artillery, identification, large, sets		1	3	4	
Panels, heavy artillery, signal, large, sets		1	3	4	
Pliers, side cutting, 8"	8	10	30	88	
Poles, lance		50	150	200	
Poles, bamboo, with tips fitted		3	9	12	
Projectors, 24 cm. without spare batteries	2	3	6	21	
Reel cart, hand	2	2	6	20	
Sapinettes				1000	
Saws, hand, cross-cut	1	1	3	10	
Screws, 8 x 1½"	100	200	600	1400	
Sets, radio (a)		1	3	4	
Screwdrivers, 6"	4	4	12	40	
Screwdrivers, 3"	4	4	12	40	
Shovels, short-handled, round point	2	2	6	20	
Staples, Blake, insulated, No. 5	400	660	1980	5040	
Switch, push-button type	1	4	6	16	
Switchboard, telephone, 4-line, monocord type	4	1	3	28	
Switchboard, telephone 12-line, monocord type		2	3	5	
Tags, cable, heavy artillery	75	100	300	850	
Tape, friction, pounds	4	3	9	36	
Tape, rubber, pounds	2	2	6	20	
Telephones, W. E. 1375-B	12	12	36	120	
Telephones, camp model	1	2	6	14	
Terminal strips, 10 per strip	2	4	6	22	
Thermometers, weather, graduated in Centigrade and Fahrenheit	2			12	
Voltmeters, western model	280	1	3	4	
Watches, wrist, luminous dial, with wristlets	2	2	6	20	
Wave meter		1	3	4	
Wire, insulated, heavy, twisted, pair, miles	7½	9½	31½	86	

1	2	3	4	5	6
Articles	Battery	HQ Company	Supply Company	Total Regiment	Remarks
Wire, G. I., No. 12, B. W. G. 109 mils, miles				2	
Wire, light, twist, pair, inside wiring, miles	2	4	6	22	

(Recommended Revision)

Table VIII

Exhibit "G"

8-Inch Howitzer Regiments

1	2	3	4	5	6
Articles	Battery	Supply Company	HQ Company	Total Regiment	Remarks
Orienteur Equipment.					
Alidade, open sight	1	3		9	The items shown in
Alidade, telescopic	1	3		9	column 3 under
Chest, instrument	1	3		9	supply company for
Chest, rod and tripod	1	3		9	use of each
Compass, prismatic	1	3	1	10	battalion; to be
Declinator, with screws, for use on plane table	1	3		9	equally divided among the 3
Engineer field manual	1	3	1	10	battalion head
Ephemeris		3		3	quarters of the
Flashlights, with extra batteries	4	6		30	regiment.
Logarithms, table of, in degrees, 5 place	1	3	1	10	Items shown in
Logarithms, table of, in mils, 5 place	1	3	1	10	column 4 under headquarters
Magnifying glass, with handle		3	1	4	company for use
Orienteur Officer's Manual	1	3	1	10	of regimental
Paint, white, small cans	6	3		39	headquarters.
Paint, black, small cans	6	3		39	
Plane table, topographic, with tripod and case	1	3		9	
Protractor, small, graduated in degrees	1	6	2	14	
Protractor, large, graduated in degrees	1	6	2	14	
Protractor, small, graduated in mils	1	6	2	14	
Protractor, large, graduated in mils	1	6	2	14	
Range poles	2	6		18	
Scale, boxwood	2	6	2	20	
Scale, graduated, one yard	1	3	1	10	
Square, zinc, graduated for plotting coordinates	2	6	2	20	
Stadia rod, folding		3		3	
Tally pins	6	30		66	
Tape, steel, short	1	3		9	
Tape, repair outfit		3		3	
Transit, small, with tripod, graduated in mils	1			6	
Transit, standard, with tripod		3		3	
Traverse tables		3		3	
Fire-Control Equipment					
Aiming posts, circular head	8			48	
Aiming posts, diamond head	4			24	
Aiming posts, square head	8			48	

1	2	3	4	5	6
Articles	Battery	Supply Company	HQ Company	Total Regiment	Remarks
Azimuth instrument, graduated in mils	2	3		15	
Azimuth instrument, periscopic, graduated in mils	1	3		9	
Board, firing, small	1			6	
Board, firing, large	1	3	1	10	
Flashlights, with extra batteries	6	6		42	
Lamps or lanterns	16	6		102	
Plotting board, range and deflection	1			6	
Protractor, parallax, in mils	1			6	
Range tables	8	24	2	74	
Stop watches	6			36	
Scissors telescope and tripod			1	1	
Drafting Material.					
Brushes, water color, 2 each, numbers 1-6, inclusive	12	36	12	120	
Bureau of standard, circular No. 47	1	3	1	10	
Celluloid, sheets, 20 x 25 inches, transparent, half frosted and half clear	12	36	12	120	
Compass, beam, bar or trammel points, micrometer adjustment	1	3	1	10	
Crayons, lumber, boxes, red	1	3	1	10	
Dividers, proportional, 8½"	1	3	1	10	
Drawing instrument, set	1	3	1	10	
Envelopes, Manila, 10" x 15"	24	72	24	240	
Eraser, art gum	6	18	6	60	
Eraser, pencil, ruby, No. 112	3	18	3	39	
Eraser, ink, typewriter, disc.	3	9	3	30	
Eraser, sponge	3	9	3	30	
Eraser, steel	2	6	2	20	
Glue, pint cans	1	3	1	10	
Horn centers, ½" diameter	1	3	1	10	
Ink, drawing, black, waterproof, bottles	3	9	3	30	
Ink, drawing, blue, waterproof, bottles	1	3	1	10	
Ink, drawing, brick red, waterproof, bottles	1	3	1	10	
Ink, drawing, brown, waterproof, bottles	1	3	1	10	
Ink, fountain pen, bottles, in wood case, with filler	2	6	2	20	
Ink, water color, burnt sienna, full pans	2	6	2	20	
Ink, water color, burnt amber, full pans	2	6	2	20	
Ink, water color, Chinese white, full pans	2	6	2	20	
Ink, water color, crimson lake, full pans	2	6	2	20	
Ink, water color, Hoeker's green full pans	2	6	2	20	
Ink, water color, Prussian blue full pans	2	6	2	20	
Magnifying glass, pocket	1	3	1	10	

1	2	3	4	5	6
Articles	Battery	Supply Company	HQ Company	Total Regiment	Remarks
Map tube, galvanized iron, 37" x 6"	1	3	1	10	
Pencil points, for beam compass	12	36	12	120	
Pencil points, for dividers	12	36	12	120	
Pen holders, crow quill	1	3	1	10	
Pen holders, drawing	2	6	2	20	
Pen holders, writing	2	6	2	20	
Pins, colored head, cubes, one each black, red, blue, green, yellow and white	6	18	6	60	
Paint boxes, japanned tin, for 12 full pans and brushes	1	3	1	10	
Paper, computation, pads, ruled 8" x 10½"	6	18	6	60	
Paper, computation, pads, unruled 4" x 6"	6	18	6	60	
Paper, cross section, 10-meter roll, metric graduation, 50 cm, wide opaque	1	3	1	10	
Paper, cross section, 10-meter roll, metric graduation, transparent	1	3	1	10	
Paper, drawing, 35" x 60 yard roll, single mounted	1	3	1	10	
Paper, paragon drawing, sheets, double mounted 24" x 36"	12	36	12	120	
Paper, drawing, sheets, thin eggshell, 24" x 36"	12	36	12	120	
Paper, Manila, sheets, 24" x 36"	12	36	12	120	
Paper, vegetable tracing, 30" x 10 yard roll	1	3	1	10	
Parallel rules, rolling 12"	1	3	1	10	
Paste, jar of library	1	3	1	10	
Pens, crow quill	2	6	2	20	
Pens, drawing, Gillott, No. 170	24	72	24	240	
Pens, drawing, Gillott, No. 290	24	72	24	240	
Pens, drawing, Gillott, No. 303	24	72	24	240	
Pens, drawing, Gillott, No. 404	24	72	24	240	
Pencils, blue	3	9	3	30	
Pencils, brown	3	9	3	30	
Pencils, green	3	9	3	30	
Pencils, red	3	9	3	30	
Pencils, drawing, Venus 6H	12	36	12	120	
Pencils, drawing, Venus 3-4	12	36	12	120	
Pencils, drawing, Venus 9H	12	36	12	120	
Reconnaissance sets, US Engineer Corps	1	2	1	10	
Rubber bands (box) 1 size 10 and 1 size 32	2	6	2	20	
Sandpaper pads, pencil sharpeners	1	3	1	10	
Sealing wax, stick	1	3	1	10	
Shears, 12" long	1	3	1	10	
Sponge cup with sponge	1	3	1	10	
Straightedge	1	3	1	10	
Tables, vertical angle, stadia degrees and meters	2	6	2	20	

1	2	3	4	5	6
Articles	Battery	Supply Company	HQ Company	Total Regiment	Remarks
Tapes, steel map	2	6	2	20	
Tapes, steel, pocket, inches, and millimeters, 72" long	4	12	4	40	
Thumb tacks, solid head, long point	144	432	144	1440	
Tracing lines, 36" x 10 yard roll	1	3	1	10	
Transit books, US Engineer Corps, standard	6	18	6	60	
Triangles, 6" celluloid, 30 and 60 degrees	1	3	1	10	
Triangles, 6" celluloid, 45 degrees	1	3	1	10	
Triangles, 12" celluloid, 30 and 60 degrees	1	3	1	10	
Triangles, 12" celluloid, 45 degrees	1	3	1	10	
"T" square, 36"	1	3	1	10	

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Not to be Taken Into Front Line Trenches

EQUIPMENT MANUALS FOR SERVICE IN EUROPE

Series C, No. 1

Regiment of 8-inch Howitzers (British) Marks VI and VII (Motorized)

Showing both

British Equipment

and

American Equipment

GENERAL HEADQUARTERS

AMERICAN EXPEDITIONARY FORCES

General Staff--First Section

August, 1918

TABLE OF CONTENTS

REGIMENT OF 8-INCH HOWITZERS (BRITISH)

Page

Table 1--Individual Mobile Equipment of a Battery . . . . . .

Table 2--Individual Mobile Equipment of a Headquarters Company . . . . . .

Table 3--Individual Mobile Equipment of a Supply Company . . . . . .

Table 4--Individual Mobile Equipment of Medical Department Attached . . . . . .

Table 5--Total Mobile Equipment of a Regiment . . . . . .

Table 6--Special Quartermaster, Engineer and Chemical Warfare Service Property of a Regiment . . . . . .

Table 7--Total Signal Corps Equipment of a Regiment . . . . . .

Table 8--Total Fire Control, Drafting Materials and Supplies for a Regiment . . . . . .

Table 9--Composition of Artillery Equipment of a Regiment of 8-inch Howitzers (British), Marks VI and VII . . . . . .

Table 10--Composition of Artillery Equipment of a Regiment of 8-inch Howitzers (Vickers, Mark VI), American Equipment . . . . . .

Table 11--Anti-Aircraft Machine Gun Equipment for a Regiment, 8-inch Howitzers . . . .

GENERAL HEADQUARTERS
AMERICAN EXPEDITIONARY FORCES
OFFICE OF THE CHIEF OF STAFF

August, 1918

1. Hereafter all property in the hands of combatant troops in service in Europe will be divided into classes as follows:

2. Mobile equipment is the equipment prescribed for use in troop movements, temporary billets, and open warfare. It is limited to the animals, vehicles and articles of equipment prescribed in Tables of Organization, the equipment and clothing worn on the person, and the articles carried in pack and on mount and transported in field, combat and divisional trains.

3. The mobile equipment will be carried in all classes of service.

4. Special equipment shown in Table 6, herein, is the equipment which, in addition to the Mobile equipment, is prescribed for use at the front.

6. The tables given herewith cover all property in the hands of combatant troops and include Quartermaster, Ordnance, Medical, Gas Service, Engineer and Signal property. This equipment manual modifies for European service the allowance specified as equipment A, B and C, described in Par. 319, Compilation of Orders, War Department 1881-1915, and all equipment in excess of the allowances specified in this manual will be turned in at once to the Salvage Service, S. O. S.

7. This manual modifies existing tables of allowance and equipment only in so far as is considered necessary to meet conditions of service in Europe. Due to the fact that different types of equipment are being issued to our troops, and that other changes are to take place in the future, the names of articles and figures given herein will not be strictly applicable in all cases. Where such differences arise the provisions of the manual will be considered to apply in so far as practicable to the corresponding article of other types.

8. The manual is intended as a guide for organization commanders in determining amounts of equipment and supplies to be kept on hand, and it is authority to supply officers for issues in accordance with its provisions. IT IS NOT INTENDED TO REGULATE OR LIMIT IN ANY WAY CALLS FOR SUPPLIES NECESSARY TO THE EFFICIENT CONDUCT OF OPERATIONS, NOR TO INTERFERE WITH THE DISTRIBUTION OR SUCH SUPPLIES AS ARE DICTATED BY THESE CONSIDERATIONS.

9. MISTAKES IN THIS MANUAL SHOULD BE BROUGHT PROMPTLY TO THE ATTENTION OF GENERAL HEADQUARTERS, A. E. F., G-1.

BY COMMAND OF GENERAL PERSHING:

JAMES W. McANDREW,
Chief of Staff

SEE EXHIBIT "A" FOR RECOMMENDED REVISION

CONFIDENTIAL
SERIES C

TABLE 205--REGIMENT OF 8-INCH HOWITZERS, MOTORIZED
(Personnel from Coast Artillery Corps)
MINIMUM AND MAXIMUM STRENGTH

Corrected to April 12, 1918

1	2	3	4	5	6	7	8	9	10	11	12	13	14
		Battalion			Regiment								
Units	Btry (a)	HQ	2 Btrys	Total	HQ	HQ Co (b)	Supply Co (f)	3 BN	Total	Med Dept and Chap	Ord Dept (g)	Aggregate	Remarks
2 Colonel	..	..	..	..	1	..	..	..	1	..	..	1	(a) See table 206.
3 Lieutenant Colonel	..	..	..	..	1	..	..	..	1	..	..	1	(b) See table 221.
4 Major	..	1	..	1	..	..	..	3	3	1	..	4	(c) Chauffeur
5 Captain	1	1	2	3	2A	1	1	9	13)	3	1	41	(d) Assistant chauffuer
6 1st Lieutenant	2	..	4	4	..	11	1	12	24)				(f) See table 222.
7 2nd Lieutenant	2	i3	4	4	..	9	1	12	22	..	..	22	(g) See table 222.
8 Chaplain	..	..	..	..	..	..	..	..	..	1	..	1	(i) From headquarters
9 Total Commissioned	5	2	10	12	4	21	3	36	64	5	1	70	company; not totaled
10 Sgt Maj, Sr Gr (c)	..	..	..	..	..	2	..	..	2	..	..	2	(k) From supply
11 Ordnance Sergeant	..	..	..	..	..	..	..	..	..	..	4	4	company; not totaled
12 Sgt Maj, Jr Gr (j)	..	k1	..	..	..	..	3	..	3	..	..	3	(m) Furnished by medi-
13 Sgt Maj, Jr Gr (o)	..	i1	..	..	..	3	..	..	3	..	..	3	cal department
14 1st Sergeant	1	..	2	2	..	1	1	6	8	..	..	8	(w) Pulled by 2½-ton
15 Sergeant, 1st Class	..	..	..	..	..	..	..	..	..	1	..	1	artillery tractor.
16 Master Gunner	..	i1	..	..	i1	4	..	..	4	..	..	4	(e) One performs
17 Electrician Sergeant	..	i1	..	..	i1	4	..	..	4	..	..	4	duties of regimental
18 Mess Sergeant	1	..	2	2	..	1	1	6	8	..	..	8	sergeant major, field
19 Radio Sergeant	..	i2	..	..	i2	8	..	..	8	..	..	8	artillery; one person-
20 Supply Sergeant	1	..	2	2	..	1	1	6	8	..	..	8	nel sergeant.
21 Sergeant	12	..	24	24	..	16t	3	72	91	3	3	97	(j) Performs duties of
22 Corporal	24	..	48	48	..	40	5	144	189	..	6	195	regimental supply ser-
23 Cook	4	..	8	8	..	4	6	24	34	..	..	34	geant, field artillery.
24 Mechanic	4	..	8	8	..	3	4	24	31	..	..	31	(o) Performs duties of
25 Wagoner (s)	23	i1c	46	46	..	7	2	138	147	..	..	147	battalion sergeant
26 Bugler	3	..	6	6	..	4	..	18	22	..	..	22	major, field artillery.
27 Private, 1st Class	54	i1c	108	108	..	40	28	324	392)	29	7	1196	(s) Paragraph V, G. O.
28 Private	110	i1d	220	220	..	68	32	660	760)		8		No. 150, W. D., 1917.
29 Band (all grades)	..	..	..	..	..	28	..	..	28	..	..	28	(t) Two perform duties
30 Total Enlisted	237	..	474	474	..	234	86	1422	1742	33	28	1803	color sergeant, field
31 Aggregate	242	2	484	486	4	255	89	1458	1806	38	29	1873	artillery.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
			Battalion			Regiment								
	Units	Btry (a)	HQ	2 Btrys	Total	HQ	HQ Co (b)	Supply Co (f)	3 BN	Total	Med Dept and Chap	Ord Dept (g)	Aggregate	Remarks
32	Ambulance (M. D.)	..	..	..	..	..	..	..	..	..	3	..	3	Note. For tractors, 2½-ton, 1 wagoner as chauffeur and 1 private as assistant chauffeur. For tractors, 5-ton, 1 wagoner as chauffeur and 1 private first class as assistant chauffeur. For tractor 10 or 20-ton, 1 wagoner as chauffeur, 1 private first class, and 1 private as assistant chauffeur. For ammunition, supply, wireless, telephone and tank truck, 1 wagoner as chauffeur, 1 private as assistant chauffeur, and necessary number of privates. For reel and fire control truck, 1 private first class as chauffeur and 1 private as assistant chauffeur. For 3-ton and light repair truck, and reconnaissance car and motor car, 1 private first class as chauffeur. (A) One adjutant, one personnel officer.
33	Car, motor (5-pass) (Q.M.C.)	3	..	6	6	..	5	1	18	24	1	..	25	
34	Car, motor, staff observation (O.D.)	..	il	..	..	il	4	..	..	4	..	..	4	
35	Car, recommaissance (O.D.)	1	..	2	2	..	..	..	6	6	..	..	6	
36	Cart, reel, regtl and bn (O.D.)	..	il	..	..	il	4	..	..	4	..	..	4w	
37	Kitchen, rolling trail (Q.M.C.)	k1	..	k2	..	..	k1	8	..	8	..	..	8	
38	Motorcycle w/side car (Q.M.C.)	12	..	24	24	..	24	8	72	104	4m	..	108	
39	Tractor, artillery, 2½-ton, (O.D.)	..	il	..	..	il	4	..	..	4	..	..	4	
40	Tractor, artillery, 20-ton (O.D.)	4	..	8	8	..	..	..	24	24	..	..	24	
41	Truck 3-ton (O.D.)	k2 10	..	k4 20	16	k2	9	16	48	73	2	..	75	
42	Truck, ammo (O.D.)	12	..	24	24	..	..	..	72	72	..	..	72	
43	Truck, arty repair (O.D.)	k1	..	k2	..	..	..	7	..	7	..	..	7	
44	Truck, arty supply (O.D.)	k1 7	..	k2 14	13	..	1	8	36	45	..	..	45	
45	Truck, repair, light (O.D.)	..	..	..	..	..	..	1	..	1	..	..	1	
46	Truck, reel and fire control (O.D.)	1	..	2	2	..	..	..	6	6	..	..	6	
47	Truck, tank (O.D.)	1	..	2	2	..	..	1	6	7	..	..	7	
48	Truck, telephone switchboard, 2-ton (O.D.)	..	..	..	..	il	1	..	..	1	..	..	1	
49	Truck, Wireless (O.D.)	..	..	..	..	..	1	..	..	1	..	..	1	
50	Howitzer, 8-inch	4	..	8	8	..	..	..	24	24	..	..	24	

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
			ONE BATTERY--FOUR HOWITZERS												
			Special Detail			Firing Battery							Combat Train		
						1st Plt		2nd Plt			3rd Plt		4th Plt		
1	Units	HQ	Instrument Detail	Signal Detail	Scout	1st Section	2nd Section	3rd Section	4th Section		5th Section	6th Section	7th Section	8th Section	9th Section	Total One Btry
26	Truck, artillery, repair (O.D.)	1s	..	..	..	..	..	..	..		..	..	..	..	..	..
27	Truck, artillery, supply (O.D.)	..	..	..	..	..	..	..	..		..	..	..	..	71s	6v
28	Truck, reel and fire control (O.D.)	..	..	1	..	..	..	..	..		..	..	..	..	..	1
29	Truck, tank (O.D.)	..	..	..	..	..	..	..	..		..	..	..	..	.1	1
30	Howitzer, 8-inch	..	..	..	..	1	1	1	1		..	..	..	..	..	4
31	Pistol	9	1	1	..	6	3	4	3		3	5	3	3	2	43
32	Rifle	6	6	11	4	23	22	23	22		19	15	14	14	20	199
33	Gun, anti-aircraft machine	..	..	..	..	..	..	..	..		..	1	..	1	..	2

(a) Agent with battalion headquarters
(b) One agent with supply company
(c) Chauffeur
(d) Ranger finder
(e) Fire control instruments
(f) Three telephone operators, one signaller, one lineman
(g) Two telephone operators, one signaller, one lineman
(i) Performs duties of chief mechanic, field artillery
(j) One battery clerk
(J) Paragraph V, G.O. No. 150, W.D., 1917
(k) Assistant chauffeur
(r) Armed with rifle; all others with pistols
(s) From supply company; not included in total
(t) For transportation of passengers, fuel, oil, water, ammunition, baggage and rations
(w) For transportation of cannoneers, or (see Note [t])
(x) One driver, scouts' motorcycles
(v) Cleaning and preserving materials and spare parts; four to carry tools.

Note. For tractors, 10 or 20-ton, 1 wagoner as chauffeur and 1 private 1st class and 1 private as assistant chauffeur.
For ammunition, supply, wireless, telephone and tank truck, 1 wagoner as chauffeur and 1 private as assistant chauffeur, and necessary number of privates.
For reel and fire control truck, 1 private first class as chauffeur and 1 private as assistant chauffeur.
For 3-ton light, repair and personnel trucks, reconnaissance cars and motor cars, 1 private 1st class as chauffeur.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
			Battalion			Regiment								
	Units	Btry (a)	HQ	2 Btrys	Total	HQ	HQ Co (b)	Supply Co (f)	3 BN	Total	Med Dept and Chap	Ord Dept (g)	Aggregate	Remarks
51	Pistol	43	2	86	88	4	200	18	264	486	..	29	515	
52	Rifle	199	..	398	398	..	55	71	1194	1320	..	..	1320	
53	Gun, anti-aircraft machine	2	..	4	4	..	..	..	12	12	..	..	12	

SEE EXHIBIT "B" FOR RECOMMENDED REVISION

TABLE 206--BATTERY OF 8-INCH HOWITZERS, MOTORIZED
(Army Artillery)
(Personnel from Coast Artillery Corps)
MAXIMUM AND MINIMUM STRENGTH

CONFIDENTIAL
SERIES C

Corrected to April 12, 1918

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
		ONE BATTERY--FOUR HOWITZERS												
		Special Detail			Firing Battery							Combat Train		
					1st Plt		2nd Plt			3rd Plt		4th Plt		
1 Units	HQ	Instrument Detail	Signal Detail	Scout	1st Section	2nd Section	3rd Section	4th Section	5th Section	6th Section	7th Section	8th Section	9th Section	Total One Btry
2 Captain	1	..	..	..	..	..	..	..	..	..	..	..	..	1
3 1st Lieutenant	1	..	..	..	1	..	..	..	..	..	..	..	..	2
4 2nd Lieutenant	..	..	..	..	..	..	..	..	..	1	..	..	..	2
5 Total Commissioned	2	..	..	..	1	..	1	..	..	1	..	..	..	5
6 1st Sergeant	1	..	..	..	..	..	..	..	..	..	..	..	..	1
7 Mess Sergeant	1	..	..	..	..	..	..	..	..	..	..	..	..	1
8 Supply Sergeant	..	..	..	..	..	..	..	..	..	..	..	..	1	1
9 Sergeant	..	1	1	..	2[1i]	1	1	1	1	1	1	1	1i	12
10 Corporal	aj2r	1d2r	2r	x2r	2	2	2	2	2	2	2	2	..	24
11 Cook	4	..	..	..	..	..	..	..	..	..	..	..	..	4
12 Mechanic	..	..	..	..	1r	..	1r	..	..	1r	..	..	1r	4
13 Wagoner (J)	..	..	..	..	c2r	c2r	c2r	c2r	c2r	c2r	c2r	c2r	c7r	23
14 Bugler	1	..	..	..	1	..	..	..	..	1	..	..	..	3
15 Private, 1st Class	b4r1c	2e4r2c	g4r1c	x2r	3c6r1k	2c6r1k	2c6r1k	2c6r1k	4r	4r	4r	4r	..	54
16 Private	..	..	f5r1k	..	2k14r	2k14r	2k14r	2k14r	2k13r	2k8r	2k8r	2k8r	7k12r	110
17 Total enlisted	13	7	12	4	28	25	26	25	22	19	17	17	22	237
18 Aggregate	15	7	12	4	29	25	27	25	22	20	17	17	22	242
19 Car, motor (5-passenger) (Q.M.C.)	1	1	..	..	1	..	..	..	..	..	..	..	..	3
20 Car, reconnaissance														
21 Kitchen, rolling, trail (Q.M.C.)	1s	..	..	..	..	..	..	..	..	..	..	..	..	..
22 Motorcycle with side car (Q.M.C.)	1	1	1	2	1	..	1	..	1	..	1	1	2	12
23 Tractor, artillery, 20-ton (O.D.)	..	..	..	1	1	1	1	..	..	..	..	..	..	4
24 Truck, 3-ton (O.D.)	2s	..	..	..	2	2	2	2	..	..	..	..	..	8
25 Truck, ammunition (O.D.)	..	..	..	..	1	1	1	1	2	2	2	2	..	12

SEE EXHIBIT "D" FOR RECOMMENDED REVISION

TABLE 221--HEADQUARTERS COMPANY (ARMY ARTILLERY)

6-inch Gun and 8-inch, 9.2-inch Mark I or II, 240 mm, Model 1918, Howitzer Regiments, Motorized

CONFIDENTIAL (Personnel from Coast Artillery Corps) Corrected to April 12, 1918

SERIES C MAXIMUM AND MINIMUM STRENGTH

1	2	3	4	5	6	7	8
1 Units	Regimental Section & Company HQ	Band Section	1st Battalion	2nd Battalion	3rd Battalion	Total	Remarks
2 Captain	1	..	..	..	..	1	(a) One reconnaissance officer, one
3 1st Lieutenant	11a	..	..	..	..	11	telephone officer, one radio officer,
4 2nd Lieutenant	..	..	3t	3t	3t	9	four aeroplane observers, four bal-
5 Total commissioned	12	..	3	3	3	21	loon observers, ten 1st lieutenants
6 Sergeant Major, Sr Gr	2h	..	..	..	..	2	attached to regimental headquarters.
7 Sergeant Major, Jr Gr	..	..	1	1	1	3	(b) One in charge regimental scouts,
8 1st Sergeant	1	..	..	..	..	1	one in charge regimental signal de-
9 Master Gunner	1	..	1	1	1	4	tail, one in charge regimental
10 Electrician Sergeant	1	..	1	1	1	4	instruments, one in charge postal
11 Mess Sergeant	1	..	..	..	..	1	service, one in charge wireless sta-
12 Radio Sergeant	2	..	2	2	2	8	tion, two personnel sergeants.
13 Supply Sergeant	1	..	..	..	..	1	(c) Chauffeurs
14 Sergeant	1x2s10b	..	2g	2g	2g	16	(d) One rangefinder operator, one
15 Corporal	10d	..	10i	10i	10i	40	signal corporal, two instrument cor-
16 Cook	4	..	..	..	..	4	porals, three scouts, one wireless
17 Mechanic	..	..	1r	1r	1r	3	operator, one company clerk.
18 Wagoner (Y)	c4r	..	c1r	c1r	c1r	7	(h) One performs duties of regimental
19 Bugler	1	..	1	1	1	4	sergeant major, field artillery, one
20 Private, 1st class	er2215c	..	r6Lc	r6Lc	r6Lc	40	personnel sergeant.
21 Private	4k20f2r	..	1kr16m	1kr16m	1kr16m	68	(e) Includes one in charge regimental
22 Band (all grades) (u)	..	28	..	..	..	28	commander's instrument, one telephone
23 Total enlisted	80	28	42	42	42	234	operator, two wireless operators.
24 Aggregate	92	28	45	45	45	255	(f) One wire man, four telephone
25 Car, motor, 5-passenger (Q.M.C.)	5	..	..	..	..	5	operators, four orderlies, three mes- sengers, three scouts.
26 Car, motor, staff observation (O.D.)	1	..	1	1	1	4	(g) One agent regimental headquar- ters, one scout.
27 Cart, reel, regimental and battalion (O.D.)	1	..	1	1	1	4	(i) One rangefinder operator, two in- strument corporals, three scouts, two
28 Kitchen, rolling, trail (Q.M.C.)	s1	..	..	..	..	..	signal corporals, one wireless cor- poral, one postman.

1	2	3	4	5	6	7	8
1 Units	Regimental Section & Company HQ	Band Section	1st Battalion	2nd Battalion	3rd Battalion	Total	Remarks
29 Motorcycle with side car (Q.M.C.)	24	..	..	..	..	24	(k) Assistant chauffeur.
30 Tractor, artillery, 2½-ton (O.D.)	1	..	1	1	1	4w	(L) One operator battalion commander's instrument, one telephone operator, two wireless operators, one signaller.
31 Truck, 3-ton (O.D.)	11s2	..	..	..	..	9n	
32 Truck, ammo (O.D.) (o)	9	..	..	..	..	9n	(m) One wireman, three scouts, four telephone operators, four orderlies, three messengers.
33 Truck, artillery, supply (O.D.)	1	..	..	..	..	1	
34 Truck, telephone, switchboard, 2-ton (O.D.)	1	..	..	..	..	1	(n) For transportation cannoneers, one for ordnance personnel attached to supply company.
35 Truck, wireless (O.D.)	1	..	..	..	..	1	(o) Six-inch gun regiments only.
36 Pistol	64	28	36	36	36	200	(r) Armed with rifle; all others with pistols.
37 Rifle	28	..	9	9	9	55	

(u) One band leader, one assistant band leader, one sergeant bugler, two band sergeants, four band corporals, two musicians first class, four musicians second class, thirteen musicians.

(t) Three 2d lieutenants attached, one liaison officer, one telephone officer, one radio officer.

(s) From supply company; not totaled.

(w) Two reel carts.

Note. For tractors 10 to 20-ton, 1 wagoner, as chauffeur and 1 private, 1st class, and 1 private as assistant chauffeur. For ammunition, supply, wireless, telephone and tank trucks, 1 wagoner as chauffeur and 1 private as assistant chauffeur and necessary number of privates. For reel and fire control trucks, 1 private, 1st class, as chauffeur and 1 private as assistant chauffuer. For 3-ton light, repair and personnel trucks, reconnaissance cars, and motor cars, 1 private, 1st class, as chauffeur. For tractors, 2½-ton, 1 wagoner as chauffeur, 1 private as assistant chauffeur. For tractors, 5-ton, 1 wagoner as chauffeur and 1 private, 1st class, as assistant chauffeur.

(x) Performs duties of chief mechanic, field artillery.

(Y) Paragraph V, G. O. 150, W. D., 1917.

(z) Perform duties of color sergeant, field artillery.

SEE EXHIBIT "E" FOR RECOMMENDED REVISION

TABLE 222--SUPPLY COMPANY

6-inch Gun and 8-inch, 9.2 Mark I or II, 240 mm, Model 1918, Howitzer Regiments, Motorized (Army Artillery)

CONFIDENTIAL (Personnel from Coast Artillery Corps)

SERIES C MAXIMUM AND MINIMUM STRENGTH Corrected to March 14, 1918

1	2	3	4	5	6	7	8	9	10
Units	Co HQ	Regt Section	1st Bn Section	2nd Bn Section	3rd Bn Section	Total Company	Attached	Aggregate	Remarks
2 Captain	1	..	..	..	..	1	(1	3	(a) One accompanies each battalion when detached.
3 1st Lieutenant	1	..	..	..	..	1	(		
4 2nd Lieutenant	1	..	..	..	..	1	..	1	(b) For regimental and battalion officers' messes.
5 Total commissioned	3	..	..	..	..	3	1	4	
6 Ordnance Sergeant	..	..	..	..	..	..	4	4	(c) Chauffeur.
7 Sergeant Major, jr gr (i)	..	..	alt	alt	alt	3	..	3	(d) Includes one company clerk.
8 1st Sergeant	1t	..	..	..	..	1	..	1	(e) Cobbler.
9 Mess Sergeant	1t	..	..	..	..	1	..	1	(f) 25 in 6-inch gun regiments; 6 in supply company; 1 in each battery; 1 in headquarters company.
10 Supply Sergeant	1t	..	..	..	..	1	..	1	
11 Sergeant	1x31t	..	..	..	..	3	3	6	
12 Corporal	r5d1t	..	..	..	..	5	6	11	
13 Cook	2	1b	1b	1b	1b	6	..	6	
14 Mechanic	r1	..	r1e	r1e	r1e	4	..	4	(i) Performs duties of regimental supply sergeant.
15 Wagoner (y)	r2c	..	..	..	..	2	..	2	
16 Private, 1st Class	r144c	r2c	r4c	r4c	r4c	28	7	35	
17 Private	r282k	r1b	r1b	r1b	r1b	32	8	40	
18 Total Enlisted	58	4	8	8	8	86	28	114	(k) Assistant chauffeur.
19 Aggregate	61	4	8	8	8	89	29	118	(r) Armed with rifle; all others armed with pistols.
20 Car, motor, 5-passenger (Q.M.C.)	1	..	..	..	..	..	..	1	
21 Kitchen, rolling trail (Q.M.C.)	1	1	2	2	2	8	..	8	(s) Only 3 in 6-inch gun regiments; 1 for each battalion.
22 Motorcycle with side car (Q.M.C.)	5	..	1	1	1	8	..	8	(t) Motorcyclist.
23 Truck, 3-ton (O.D.), ration & baggage (o) (Q.M.C.)	2	2	4	4	4	16	..	16	(w) Manned by ordnance department personnel.
24 Truck, artillery repair (O.D.)	1ws	..	2ws	2ws	2ws	7s	..	7s	(x) Performs duties of chief mechanic, field artillery.
25 Truck, artillery supply (O.D.)	2zf	..	2w	2w	2w	8f	..	8f	(y) Paragraph V, G. O. No. 150, W. D. 1917.

	1	2	3	4	5	6	7	8	9	10
	Units	Co HQ	Regt Section	1st Bn Section	2nd Bn Section	3rd Bn Section	Total Company	Attached	Aggregate	Remarks
26	Truck, repair, light (O.D.)	1	..	..	..	..	1	..	1	(z) One of these manned by company personnel; other by ordnance personnel.
27	Truck, tank (O.D.)	1	..	..	..	..	1	..	1	
28	Pistol	11	1	2	2	2	18	29	47	
29	Rifle	50	3	6	6	6	71	..	71	

Note. For tractors, 2½-ton, 1 wagoner as chauffeur, 1 private as assistant chauffeur. For 3-ton, light repair and and personnel trucks, reconnaissance cars and motor cars, 1 private 1st class as chauffeur. For tractors, 5-ton, 1 wagoner as chauffeur and 1 private 1st class as assistant chauffeur. For tractors, 10- or 20-ton, 1 wagoner as chauffeur and 1 private 1st class and 1 private as assistant chauffeurs. For ammunition, supply, wireless, telephone and tank trucks, 1 wagoner as chauffeur and 1 private as assistant chauffeur, and necessary number of privates. For reel and fire control trucks, 1 private first class as chauffeur, and 1 private as assistant chauffeur.
(o) Trucks, ration and baggage (Q.M.C.) for 6-inch gun regiments only; other regiments have trucks, 3-ton (O.D.).

Changes Noted on Page 8 of this Report

TABLE I

SETS OF INDIVIDUAL MOBILE EQUIPMENT FOR ALL ENLISTED MEN
OF A BATTERY OF 8-INCH HOWITZERS (MOTORIZED)

1	2	3	4	5
Articles	1 1st Sgt 1 Mess Sgt 1 Sup Sgt, 12 Sgts	8 Cpls 4 Mechs 23 Wagoners		
Worn or carried on the person	16 Cpls, 4 Cooks 3 Buglers	54 Pvts 1st Cl 110 Pvts	Total Btry	Remarks
Number in each group	38p	199r	237	(p) Armed with pistol. (r) Armed with rifle.
QUARTERMASTER PROPERTY				
Belt, waist	1	1	237	(1) For winter use
Blankets, O.D. (1)	1	1	237	when ordered by the
Breeches, service, wool	1	1	237	Army or other indepen-
Bugle, with sling (2)	..	..	3	dent commander, there
Cap, overseas	1	1	237	will be added to the
Coat, fatigue	1	1	237	normal individual
Coat, service, wool	1	1	237	mobile equipment, 1 or
Chevrons and sleeve insignia (3)	..	..	..	2 O.D. blankets, spe-
Drawers, pair	2	2	474	cial provision to be
Dubbin, 4 oz can (4)	1	1	242	made for their trans-
Gloves, heavy leather, prs	1	1	237	portation, 1 pair
Gloves, wool, O. D., prs	1	1	237	lined gloves or one
Hat, fatigue	1	1	237	finger mittens, 1
Laces, shoe, extra, prs	2	2	474	overcoat.
Ornament, bronze	2	2	474	(2) Carried by buglers
Ornament, bronze, letters	1	1	237	only.
Overcoat (1)	1	1	237	(3) Chevrons and
Pin, shelter tent (4)	5	5	1235	sleeve insignia as
Pole, shelter tent (4)	1	1	247	prescribed will be
Puttees, spiral, wool, prs	1	1	237	issued 3 to each indi-
Rations, reserve (4)	2	2	484	vidual to be worn on
Shirt, O. D. wool	2	2	474	the right sleeve of
Shoes, prs	2	2	474	the overcoat, service
Slicker	1	1	237	coat and O.D. shirt.
Socks, wool, prs	4	4	948	(4) Includes officers.
Tag, identification	2	2	474	(5) A toilet kit con-
Tape, identification tag, yds	1	1	237	sists of:
Tent, shelter half (4)	1	1	247	1 brush, shaving
Toilet kit (5)	1	1	237	1 brush, tooth
Trousers, fatigue	1	1	237	1 comb
Undershirt	2	2	474	1 mirror
Whistle and chain (6)	..	..	13	1 razor
				1 soap, hand, cake
ORDNANCE PROPERTY				1 soap, shaving, cake
Bayonet	..	1	199	1 towel, face
Bayonet scabbard	..	1	199	(6) Whistle and chain
Breech cover	..	1	199	will be carried by the
Breech stick	..	1	199	1st sergeant and

1	2	3	4	5
Articles	1 1st Sgt 1 Mess Sgt 1 Sup Sgt, 12 Sgts 16 Cpls, 4 Cooks 3 Buglers	8 Cpls 4 Mechs 23 Wagoners 54 Pvts 1st Cl 110 Pvts	Total Btry	Remarks
Worn or carried on the person				
Brush and thong (7)	..	1	199	sergeants.
Can, condiment	1	1	237	(7) If any rifles are
Can, meat	1	1	237	provided with spare
Canteen	1	1	237	parts containers, this
Canteen cover dismounted	1	1	237	number will be reduced
Cartridges, ball, cal. 30	..	100	19900	accordingly.
Cartridges, pistol, cal. .45 (4)	35	..	1505	
Cartridge, belt, cal. .30 dismounted	..	1	199	
Cup	1	1	237	
Fork	1	1	237	
Front sight cover	..	1	199	
Gun sling	..	1	199	
Haversack	1	1	237	
Helmet, steel (4)	1	1	242	
Knife	1	1	237	
Magazine, pistol, extra (4)	4	..	172	
Magazine, pocket, web, dbl (4)	2	..	86	
Oiler and thong case (7)	..	1	199	
Pack carrier	1	1	237	
Pistol belt (4)	1	..	43	
Pistol, cal. .45 (4)	1	..	43	
Pistol holster (4)	1	..	43	
Pouch for 1st aid packet	1	1	237	
Rifle, U. S. cal. .30	..	1	199	
Rifle scabbard	..	1	199	
Spoon	1	1	237	
MEDICAL PROPERTY				
Foot powder or grease box (4)	1	1	242	
Packet, 1st aid (4)	1	1	242	
CHEMICAL WARFARE SERVICE PROPERTY				
Respirator, British, S. B. (4)	1	1	242	

TABLE I (Continued)

ARTICLES OF MOBILE EQUIPMENT DISTRIBUTED WITHIN A BATTERY OF 8-INCH HOWITZERS.

1	2	3
QUARTERMASTER PROPERTY		HOW DISTRIBUTED
Brassards: (8)		As directed by organization commander.
Blue (Agents and Signalmen)	..	
Green (Guides and Scouts)	..	(8) See G. O. No. 59, H. A. E. F., 1917.
Red (Orderlies and Messengers)	30	
CLOTHING FOR CHAUFFEURS AND MOTORCYCLISTS		
Boots, hip, rubber, pairs	76	
Coat, oilskin	76	
Gauntlets, winter, pairs (9)	76	(9) For winter use.
Gloves, heavy leather, pairs	76	
Goggles, mica or compound	76	
Helmet, wool, or toque (9)	76	
Mackinaw or jerkin (9)	76	
Overshoes, arctic, pairs (9)	76	
Socks, extra heavy, pairs (9)	152	
Trousers, oilskin (10)	12	(10) For motorcyclists only.
ORDNANCE PROPERTY		
Cleaning rod, barrack	30	
Screwdriver (rifle)	30	

Changes as Noted on Page 8 of this Report

SETS OF INDIVIDUAL MOBILE EQUIPMENT FOR ALL ENLISTED MEN OF A HEADQUARTERS COMPANY OF A REGIMENT OF 8-INCH HOWITZERS (MOTORIZED)

1	2	3	4	5
Articles	2 Sgts Maj, Sr Gr 3 Sgts Maj, Jr Gr 1 1st Sgt, 4 Mast Gnrs, 4 Elec Sgts 1 Mess Sgt, 8 Radio Sgts, 1 Sup Sgt, 16 Sgts, 40 Cpls, 4 Cks, 4 Bugl, 63 Pvts 28 Bandmen	3 Mechs 7 Wagoners 40 Pvts, 1st Cl 5 Pvts	Total Company	Remarks
Number in each group	179p	55r	234	(p) Armed with pistol. (r) Armed with rifle.
QUARTERMASTER PROPERTY				
Belt, waist	1	1	234	(1) For winter use. When ordered by the Army or other individual commanders there will be added to the normal individual mobile equipment, 1 or 2 O. D. blankets, special provision to be made for their transportation, 1 pair of lined gloves, or one finger mittens, 1 overcoat.
Blanket, O. D. (1)	1	1	234	
Breeches, service, wool	1	1	234	
Bugle with sling (2)	..	..	4	
Cap, overseas	1	1	234	
Coat, fatigue	1	1	234	
Coat, service, wool	1	1	234	
Chevrons & sleeve insignia (3)	..	..	..	
Drawers, prs.	2	2	468	
Dubbin, 4 oz. can (4)	1	1	265	
Gloves, heavy leather, prs.	1	1	234	
Gloves, wool, O. D., prs (1)	1	1	234	
Hat, fatigue	1	1	234	
Laces, shoe, prs.	2	2	468	(2) Carried by bugler only.
Ornaments, bronze	2	2	468	
Ornaments, bronze, letters	1	1	234	
Overcoat (1)	1	1	234	(3) Chevrons and sleeve insignia as prescribed will be issued: 3 to each individual, to be worn on the right sleeve of the overcoat, service coat, and O. D. shirt.
Pin, shelter tent (4)	5	5	1480	
Pole, shelter tent (4)	1	1	296	
Puttees, spiral, wool, prs.	1	1	234	
Rations, reserve (4)	2	2	530	
Shirt, O. D., wool	2	2	468	
Shoes, prs.	2	2	468	
Slickers	1	1	234	
Socks, wool, prs.	4	4	936	(4) Includes officer.
Tag, identification	2	2	468	
Tape for identification tags, yds.	1	1	234	(5) A toilet kit consists of 1 brush, shaving; 1 brush, tooth; 1 comb; 1 mirror; 1 razor; 1 cake soap, hand; 1 cake soap, shaving; 1 towel, face.
Tent, shelter half (4)	1	1	296	
Toilet kit (5)	1	1	234	
Trousers, fatigue	1	1	234	
Undershirt	2	2	468	
Whistle and chain	..	..	17	(6) Whistle and chain will be carried by the 1st sergeant and sergeants.
ORDNANCE PROPERTY				
Bayonet	..	1	55	

1	2	3	4	5
Articles	2 Sgts Maj, Sr Gr 3 Sgts Maj, Jr Gr 1 1st Sgt, 4 Mast Gnrs, 4 Elec Sgts 1 Mess Sgt, 8 Radio Sgts, 1 Sup Sgt, 16 Sgts, 40 Cpls, 4 Cks, 4 Bugl, 63 Pvts 28 Bandmen	3 Mechs 7 Wagoners 40 Pvts, 1st Cl 5 Pvts	Total Company	Remarks
Bayonet scabbard	..	1	55	(7) If any rifles are provided with spare part containers this number will be reduced accordingly.
Breech cover	..	1	55	
Breech stick	..	1	55	
Brush and tong (7)	..	1	55	
Can, condiment	1	1	234	
Can, meat	1	1	234	
Canteen	1	1	234	
Canteen cover, dismounted	1	1	234	
Cartridges, ball, cal. .30	..	100	5500	
Cartridges, cal. .45 (4)	35	..	7350	
Cartridge belt, cal. .30 dismounted	..	1	55	
Cup	1	1	234	
Fork	1	1	234	
Front sight cover	..	1	55	
Gun sling	..	1	55	
Haversack	1	1	234	
Helmet, steel (4)	1	1	265	
Knife	1	1	234	
Magazine, pistol, extra (4)	4	..	840	
Magazine pocket, web double (4)	2	..	420	
Oiler and thong case (7)	..	1	55	
Pack carrier	1	1	234	
Pistol belt (4)	1	..	210	
Pistol, cal. .45 (4)	1	..	210	
Pistol holster (4)	1	..	210	
Pouch for 1st aid packet	1	1	234	
Rifle, U. S. cal. .30	..	1	55	
Rifle, scabbard	..	1	55	
Spoon	1	1	234	
MEDICAL PROPERTY				
Foot powder or grease, box (4)	1	1	265	
Packet, 1st aid (4)	1	1	265	
CHEMICAL WARFARE SERVICE PROPERTY				
Respirator, British, S. B. (4)	1	1	265	

TABLE II (Continued)
ARTICLES OF A HEADQUARTERS COMPANY OF A REGIMENT OF 8-INCH HOWITZERS DISTRIBUTED WITHIN THE ORGANIZATION

1	2	3
QUARTERMASTER PROPERTY		HOW DISTRIBUTED
Brassards: (8)		As directed by the organization commander.
Blue: Agents and signalmen	..	
Green: Guides and scouts	..	(S) See G. O. No. 59, H. A. E. F., 1917.
Red: Orderlies and messengers	..	
Housewife	30	
CLOTHING FOR CHAUFFEURS AND MOTORCYCLISTS		
Boots, hip, rubber, prs	74	
Coat, oilskin	74	
Gauntlets, winter, prs (9)	74	(9) For winter use.
Gloves, heavy leather, prs	74	
Goggles, mica or compound	74	
Helmet, wool or toque (9)	74	
Mackinaw or jerkin (9)	74	
Overshoes, arctic, prs (9)	74	
Socks, extra heavy, prs (9)	148	
Trousers, oilskin (10)	24	(10) For motorcyclists only.
ORDNANCE PROPERTY		
Cleaning rod, barrack	7	
Screwdriver (rifle)	7	

Changes as Noted on Page 9 of this Report

SETS OF INDIVIDUAL MOBILE EQUIPMENT FOR ALL ENLISTED MEN OF A HEADQUARTERS COMPANY OF A REGIMENT OF 8-INCH HOWITZERS (MOTORIZED)

1	2	3	4	5
Articles Worn or carried on the person	3 Sgts Maj, Jr Gr 1 1st Sgt 1 Mess Sgt 1 Sup Sgt 3 Sgts 6 Cooks	5 Cpls 4 Mechs 2 Wagoners 28 Pvts, 1st Cl 32 Pvts	4 Ord Sgts 3 Sgts 6 Cpls 7 Pvts, 1st Cl 8 Pvts	Total Company	Remarks
Number in each group	15 p	71 r	28 p	114	(p) Armed with pistol. (r) Armed with rifle.
QUARTERMASTER PROPERTY					(1) For winter use. When ordered by the Army or other independent commander, there will be added to the normal individual mobile equipment: 1 or 2 O. D. blankets, special provision to be made for their transportation; 1 pair of lined gloves or one-finger mittens; 1 overcoat.
Belt, waist	1	1	1	114	
Blanket, O. D. (1)	1	1	1	114	
Breeches, service, wool	1	1	1	114	
Cap, overseas	1	1	1	114	
Chevrons and sleeve insignia (2)	..	..	..	..	
Coat, fatigue	1	1	1	114	
Coat, service, wool	1	1	1	114	
Drawers	2	2	2	228	
Dubbin, 4 oz can (3)	1	1	1	118	
Gloves, heavy, leather, prs (1)	1	1	1	114	(2) Chevrons and sleeve insignia as prescribed will be issued: 3 to each individual, to be worn on the right sleeve of the overcoat, service coat and O. D. shirt.
Gloves, wool, O. D., prs (1)	1	1	1	114	
Hat, fatigue	1	1	1	114	
Laces, shoe, extra prs	2	2	2	228	
Ornaments, bronze	2	2	2	228	
Ornament, bronze, letters	1	1	1	114	
Overcoat (1)	1	1	1	114	
Pins, shelter tent (3)	5	5	5	610	
Pole, shelter tent (3)	1	1	1	122	(3) Includes officers.
Puttees, spiral, wool, prs	1	1	1	114	
Rations, reserve (3)	2	2	2	236	(4) a toilet kit consists of: 1 brush, shaving; 1 brush, tooth; 1 comb; 1 mirror; 1 razor; 1 cake soap, hand; 1 cake soap, shaving; 1 towel, face.
Shirts, O. D.	2	2	2	228	
Shoes, prs	2	2	2	228	
Slicker	1	1	1	114	
Socks, wool, prs	4	4	4	456	
Tags, identification	2	2	2	228	
Tape, identification tag, yds	1	1	1	114	
Tent, shelter half (3)	1	1	1	122	(5) Whistle and chain will be carried by the 1st sergeant and sergeants.
Toilet kit (4)	1	1	1	114	
Trouser, fatigue	1	1	1	114	
Undershirt	2	2	2	228	
Whistle and chain (5)	..	..	..	3	
ORDNANCE PROPERTY					
Bayonet	..	1	..	71	
Bayonet scabbard	..	1	..	71	
Breech cover	..	1	..	71	

1	2	3	4	5
Articles Worn or carried on the person	3 Sgts Maj, Jr Gr 1 1st Sgt 1 Mess Sgt 1 Sup Sgt 3 Sgts 6 Cooks	5 Cpls 4 Mechs 2 Wagoners 28 Pvts, 1st Cl 32 Pvts	4 Ord Sgts 3 Sgts 6 Cpls 7 Pvts, 1st Cl 8 Pvts	Total Company	Remarks
Breech stick	..	1	..	71	(6) If any rifles are provided with spare part containers this number will be reduced accordingly.
Brush and thong (6)	..	1	..	71	
Can, condiment	1	1	1	114	
Can, meat	1	1	1	114	
Canteen	1	1	1	114	
Canteen cover, dismounted	1	1	1	114	
Cartridges, ball, cal. .30	..	100	..	7100	
Cartridges, pistol, cal. .45 (3)	35	..	35	1645	
Cartridge belt, cal. .30 dismounted	..	1	..	71	
Cup	1	1	1	114	
Fork	1	1	1	114	
Front sight cover	..	1	..	71	
Gun sling	..	1	..	71	
Haversack	1	1	1	114	
Helmet, steel (3)	1	1	1	118	
Knife	1	1	1	114	
Magazine, pistol, extra (3)	4	..	4	188	
Magazine pocket, web, double (3)	2	..	2	94	
Oiler and thong case (6)	..	1	..	71	
Pack carrier	1	1	1	114	
Pistol belt	1	..	1	47	
Pistol, cal .45	1	..	1	47	
Pistol holster	1	..	1	47	
Pouch, 1st aid packet	1	1	1	114	
Rifle, U. S. cal. .30	..	1	..	71	
Rifle, scabbard	..	1	..	71	
Spoon	1	1	1	114	
MEDICAL PROPERTY					
Foot powder or grease, box (3)	1	1	1	118	
Packet, 1st aid (3)	1	1	1	118	
CHEMICAL WARFARE SERVICE PROPERTY					
Respirator, British, S. B. (3)	1	1	1	118	

TABLE III (Continued)

ARTICLES OF A SUPPLY COMPANY OF A REGIMENT OF 8-INCH HOWITZERS DISTRIBUTED WITHIN THE ORGANIZATION

1	2	3
QUARTERMASTER PROPERTY		
Brassards: (7)		
Blue: Agents and signalmen.		
Green: Guides and scouts.		(7) See G. O. No. 59, H. A. E. F., 1917.
Red: Orderlies and messengers.		
Housewife	14	
CLOTHING FOR CHAUFFEURS AND MOTORCYCLISTS		
Boots, hip, rubber, prs	58	
Coat, oilskin	58	
Gauntlets, winter, prs. (8)	58	(8) For winter use.
Gloves, heavy leather, prs	58	
Goggles, mica or compound	58	
Helmet, wool, or toque (8)	58	
Mackinaw or jerkin (8)	58	
Overshoes, arctic, prs (8)	58	
Socks, wool, extra heavy, prs (8)	116	
Trousers, oilskin (9)	8	(9) For motorcyclists only.
ORDNANCE PROPERTY		
Cleaning rod, barrack	9	
Screwdriver (rifle)	9	

TABLE IV

SETS OF INDIVIDUAL MOBILE EQUIPMENT OF MEDICAL DEPARTMENT PERSONNEL ATTACHED TO A REGIMENT OF 8-INCH HOWITZERS (MOTORIZED)

Articles Worn or carried on the person	1 Sgt, 1st Cl 3 Sgts 29 Pvt, 1st Cl Pvts	Total Detach-ment	Remarks
Number in each group	33	33	
QUARTERMASTER PROPERTY			(1) For winter use. When ordered by the Army or other independent commander there will be added to the normal individual mobile equipment: 1 or 2 O. D. blankets, special provision to be made for their transportation; 1 pair of lined gloves or one-finger mittens, 1 overcoat.
Belt, waist	1	33	
Blanket, O. D. (1)	1	33	
Breeches, service, wool	1	33	
Cap, overseas	1	33	
Chevrons and sleeve insignia (2)	..	..	
Coat, service, wool	1	33	
Drawers	2	66	
Dubbin, 4 oz can (3)	1	38	
Gloves, heavy leather, pairs	1	33	
Gloves, wool, O. D., pairs (1)	1	33	
Laces, shoe, extra pairs	2	66	(2) Chevrons and sleeve insignia as prescribed will be issued 3 to each individual to be worn on the right sleeve of the overcoat, service coat and O. D. shirt.
Ornaments, bronze	2	66	
Ornaments, bronze, letters	1	33	
Overcoat (1)	1	33	
Pins, shelter tent (3)	5	215	
Pole, shelter tent (3)	1	43	
Puttees, spiral, wool, pairs	1	33	
Rations, reserve (3)	2	76	
Shirts, O. D.	2	66	(3) Includes officers.
Shoes, pairs	2	66	
Socks, wool, pairs	4	132	(4) A toilet kit consists of: 1 brush, shaving; 1 brush, tooth; 1 comb; 1 mirror; 1 razor; 1 soap, hand, cake; 1 soap, shaving, cake; 1 towel, face.
Tags, identification	2	66	
Tape, identification tag, yards	1	33	
Tent, shelter half (3)	1	43	
Toilet kit (4)	1	33	
Undershirt	2	66	
ORDNANCE PROPERTY			
Can, condiment	1	33	
Can, meal	1	33	
Canteen	1	33	
Canteen cover, dismounted	1	33	
Cup	1	33	
Fork	1	33	
Hand axe and carrier	1	33	
Haversack	1	33	
Helmet, steel (3)	1	38	
Knife	1	33	
Pack carrier	1	33	
Pouch for 1st aid packet	1	33	
Spoon	1	33	

Articles Worn or carried on the person	1 Sgt, 1st Cl 3 Sgts 29 Pvt, 1st Cl Pvts	Total Detachment	Remarks
MEDICAL PROPERTY			
Belt, web, with pouch for diagnosis tags and instruments, with contents, complete (3)	1	37	
Brassards, Red Cross (3)	1	38	
Diagnosis tags, book of (3)	1	37	
Foot powder or grease box (3)	1	38	
Packet, first aid (3)	1	38	
CHEMICAL WARFARE SERVICE PROPERTY			
Respirator, British, S. B. (3)	1	38	

ARTICLES DISTRIBUTED WITHIN THE DETACHMENT OF MEDICAL PERSONNEL ATTACHED TO A REGIMENT OF 8-INCH HOWITZERS

1	2	3
QUARTERMASTER PROPERTY		HOW DISTRIBUTED
Housewife	4	As directed by the detachment commander.
CLOTHING FOR CHAUFFEURS AND MOTORCYCLISTS		(5) For winter use.
Boots, hip, rubber, pairs	10	(6) For motorcyclists only.
Coat, oilskin	10	
Gauntlets, winter, pairs (5)	10	
Gloves, heavy leather, pairs	10	
Goggles, mica or compound	10	
Helmet, wool or toque (5)	10	
Mackinaws or jerkins (5)	10	
Overshoes, arctic, pairs (5)	10	
Socks, extra heavy, pairs (5)	20	
Trousers, oilskin (6)	4	

Changes as noted on pages 1-10 of this report in addition to changes noted below.

TABLE V
TOTAL MOBILE EQUIPMENT OF A REGIMENT OF 8-INCH HOWITZERS

Articles	Battery	HQ Company	Supply Company	Medical Department	Total Regiment	Remarks
QUARTERMASTER PROPERTY						
Axe and helve	4	5	4	3	36	
Bag, water, sterilizer and cover	3	3	2	..	23	
Bedsack (1)	..	..	..	..	..	(1) 1 bedsack and 1 or
Green: Guides and scouts	..	..	..	..	..	
Red: Orderlies and messengers	..	..	..	..	..	
Breeches, service, wool	237	234	114	33	1803	
Brush, typewriter	..	5	..	..	5	
Bucket, G. I.	4	4	4	3	35	
Bugle with sling	3	4	..	..	22	
Can, oil, typewriter	..	5	..	..	5	
Cap, overseas	237	234	114	33	1803	
Carborundum wheel	..	..	1	..	1	
Chevrons and sleeve insignia	..	..	..	..	..	
Coat, fatigue	237	234	114	..	1770	
Coat, service, wool	237	234	114	33	1803	
Cobbler's outfit, hand (2)	1	1	1	..	8	(2) Note No. 3.
Containers, mineral oil	2	2	2	..	16	
Desk, field, small complete (3)	1	7	1	..	14	(3) Note No. 4.
Drawers	474	468	228	66	3606	
Dubbin, 4-oz cans	242	265	118	38	1873	
Gloves, heavy leather, pairs	237	234	114	33	1803	
Gloves, O. D., wool, prs.	237	234	114	33	1803	
Hat, fatigue	237	234	114	..	1770	
Housewife (4)	30	30	14	4	228	(4) Note No. 6.
Instrument, band, sets	..	1	..	..	1	
Iron, bar, asstd., lbs	..	..	60	..	60	
Laces, shoe, extra prs	474	468	228	66	3606	
Lanterns, combination complete	4	4	6	3	37	
Ornament, bronze	474	468	228	66	3606	
Ornament, bronze, letters	237	234	114	33	1803	
Overcoat	237	234	114	33	1803	
Paulin, large	1	1	1	..	8	
Pickaxe and helve	4	12	6	3	45	
Pin, shelter tent	1235	1480	610	215	9715	
Pole, shelter tent	247	296	122	43	1943	
Puttees, spiral, wool, pairs	237	234	114	33	1803	

Articles	Battery	HQ Company	Supply Company	Medical Department	Total Regiment	Remarks
Range, field, No. 1 or 2, complete (5)	..	..	..	..	..	(5) Note No. 7 and 8.
Rations, field	484	530	236	76	3746	Usually none will be issued; may be issued to detachments and organizations when necessary and available.
Rations, reserve	726	795	354	114	5619	
Ribbon,-typewriter, "Corona"-red-and black,-(6)	..	9	..	..	9	
Shirt, O. D.	474	468	228	66	3606	
Shoes, pairs	474	468	228	66	3606	
Shoe repairing outfit (7)	..	..	3	..	3	(6) 3 for each bn HQ.
Slicker	237	234	114	33	1803	(7) Note No. 12, 1 for each battalion.
Sling, color	..	2	..	..	2	
Socks, wool, pairs	948	936	456	132	7212	
Spade	4	12	6	3	45	
Standards, regimental, artillery, with staff and case	..	1	..	..	1	
Standards, national, silk, with staff and case	..	1	..	..	1	
Standards, national service, with staff and case	..	4	..	..	4	
Stretcher, shoe	1	1	1	..	8	
Tag, identification	474	468	228	66	3606	
Tape, identification tag, yards	237	234	114	33	1803	
Tent, shelter half	247	296	122	43	1943	
Toilet kit (8)	237	234	114	33	1803	(8) Note No. 9.
Tools, butcher's kit (9)	..	..	1	..	1	(9) Note No. 11.
Trousers, fatigue	237	234	114	..	1770	
Typewriter	..	5	..	..	5	
Typewriter,-"Corona" standard keyboard, but replace commercial "c" with degree sign and exclamation point with plus sign (10)	1	4a	10b	1	21	
	..	3	..	..	3	(10) 1 for each bn HQ.
Undershirt	474	468	228	66	3606	(a) 3 regts HQ, 1 HQ co
Whistle and chain	13	17	3	..	98	(b) 2 supply Co, 4 bn HQ, 4 transport co.
CLOTHING FOR CHAUFFEURS AND MOTORCYCLISTS						
Boots, hip, rubber, prs	76	74	58	19	598	
Coat, oilskin	76	74	58	19	598	
Gauntlets, winter, prs	76	74	58	19	598	
Gloves, heavy leather, prs	76	74	58	10	598	
Goggles, mica or compound	76	74	58	10	598	

Articles	Battery	HQ Company	Supply Company	Medical Department	Total Regiment	Remarks
Helmet, wool or toque	76	74	58	10	598	
Mackinaw or jerkin	76	74	58	10	598	
Overshoes, arctic, prs	76	74	58	10	598	
Socks, extra heavy, prs	152	148	116	20	1196	
Trousers, oilskin	12	24	8	4	108	
Note. For issue of expendable quartermaster supplies see A. R. F. S. R.						
ORDNANCE PROPERTY						
Bayonet	199	55	71	..	1320	
Bayonet scabbard	199	55	71	..	1320	
Breech cover	199	55	71	..	1320	
Breech stick	199	55	71	..	1320	
Brush and thong	199	55	71	..	1320	
Can, condiment	237	234	114	33	1803	
Can, meat	237	234	114	33	1803	
Canteen	237	234	114	33	1803	
Canteen cover, dismounted	237	234	114	33	1803	
Cartridges, ball, cal. .30	19900	5500	7100	..	132000	
Cartridges, pistol, cal. .45	1505	7350	1645	..	18025	
Cartridge belt, cal. .30 dismounted	199	55	71	..	1320	
Cleaning rod, barrack	30	7	9	..	196	
Cup	237	234	114	33	1803	
Fork	237	234	114	33	1803	
Front sight cover	199	55	71	..	1320	
Gun sling	199	55	71	..	1320	
Hand ax and carriers	..	..	..	33	33	
Haversack	237	234	114	33	1803	
Helmet, steel	242	265	118	38	1873	
Knife	237	234	114	33	1803	
Magazine, pistol, extra	172	840	188	..	2060	
Magazine pocket, web, double	86	420	94	..	1030	
Marking outfit, M. 1910 for stamping metal	1	1	1	..	8	
Oiler and thong case	199	55	71	..	1320	
Pack carrier	237	234	114	33	1803	
Pistol belt	43	210	47	..	515	
Pistol, cal. .45	43	210	47	..	515	
Pistol holster	43	210	47	..	515	
Pistol cleaning kit	1	1	1	..	8	
Pouch, 1st aid packet	237	234	114	33	1803	
Rifle, U.S. Cal. .30	199	55	71	..	1320	
Rifle scabbard	199	55	71	..	1320	
Screwdriver (rifle)	30	7	9	..	196	
Spoon	237	234	114	33	1803	

Articles	Battery	HQ Company	Supply Company	Medical Department	Total Regiment	Remarks
MEDICAL PROPERTY						
Belt, web, with pouch for diagnosis tags and instruments and contents complete (11)	..	..	..	37	37	(11) For contents, see par. 907 Manual Medical Department 1916.
Brassards, Red Cross	..	..	..	38	38	
Combat equipment (12)	..	..	..	..	3	(12) 1 for each battalion. See par. 866 and 867, Manual Medical Department 1916.
Diagnosis tags, book of	..	..	..	37	37	
Foot powder or grease box	242	265	118	38	1873	
Litters	5	5	2	..	37	
Packet, first aid	242	265	118	38	1873	
CHEMICAL WARFARE SERVICE PROPERTY						
Respirators, British, S. B.	242	265	118	38	1873	
VEHICLES ORDNANCE DEPARTMENT						
Cars, motor, staff observation	..	4	..	..	4	
Cars, reconnaissance	1	..	..	..	6	
Carts, reel, regimental and battalion	..	4	..	..	4	
Tractors, artillery 2½-ton	..	4	..	..	4	
Tractor, artillery, 20-ton	4	..	..	..	24	
Truck, artillery, repair	..	..	7	..	7	
Truck, artillery, supply	6	1	8	..	45	
Truck, repair light	..	..	1	..	1	
Truck, reel and fire control	1	..	..	..	6	
Truck, telephone switchboard, 2-ton	..	1	..	..	1	
Truck, wireless	..	1	..	..	1	
MEDICAL DEPARTMENT						
Ambulance, motor	..	..	..	3	3	
MOTOR TRANSPORT SERVICE						
Car, motor, 5-passenger	3	5	1	1	25	
Kitchen, rolling, trail (13)	..	..	8	..	8	(13) Note No. 10.
Motorcycle with side car	12	24	8	4	108	

Articles	Battery	HQ Company	Supply Company	Medical Department	Total Regiment	Remarks
Truck, 3-ton	8	9	16	2	75	
Truck, ammunition	12	..	..	..	72	
Truck, tank	1	..	1	..	7	

TABLE VI

SPECIAL QUARTERMASTER, ENGINEER AND CHEMICAL WARFARE SERVICE PROPERTY FOR ORGANIZATION OF 8-INCH HOWITZERS, FOR USE WHEN IN THE LINE.

TO BE DRAWN UPON ARRIVAL IN THE SECTOR

1	2	3	4	5	6	
Articles	Battery	HQ Company	Supply Company	Medical Department	Total Regiment	Remarks
QUARTERMASTER PROPERTY						(1) To be used in the discretion of the organization commander in emergency.
Alcohol, solidified, cans (1)	150	150	75	25	1150	(2) For use in cold weather; 1 pair to each man on duty in emplacements.
Overshoes, arctic, pairs (2)	..	..	..	..	..	(3) One for each man on duty in emplacements.
Cans, Marmite	10	10	6	3	70	(4) Four days' reserve to be held in reserve. See G. O. No. 38, H. A. E. F., 1917.
Jerkins (3)	..	..	..	..	..	(5) One for each dugout.
Rations, reserve (4)	..	..	..	..	..	(6) One to be kept in each dugout when not in use.
ENGINEER PROPERTY						(7) One to be kept in each dugout when not in use.
Augers, earth	12	10	6	3	91	(8) To be used where necessary
Picks and helves (6)	20	20	10	3	153	(9) To be issued as required.
Saws, cross-cut 2-man, 6-foot	2	2	2	..	16	(10) Five per cent to be kept in reserve.
Shovels, short-handle (7)	10	10	10	3	83	(11) To be issued as required.
Spades	10	10	10	3	83	
Suction pump, with 12 feet or more of rubber hose (8)						
CHEMICAL WARFARE SERVICE PROPERTY						
Gloves, oilskin (9)	..	..	..	..	..	
Bellsar triangle	4	4	2	..	30	
Chloride of lime, kegs	4	4	2	..	30	
Fire tins	3	3	2	2	25	
Klaxon horns	1	1	1	1	9	
Respirator, British, S. B. (10)	..	..	..	..	..	
Suits, oilskin (11)	..	..	..	..	..	

SEE EXHIBIT __ FOR RECOMMENDED REVISION

TABLE VII

SIGNAL CORPS EQUIPMENT FOR A REGIMENT OF 8-INCH HOWITZERS

1	2	3	4	5	6
Articles	Battery	HQ Company	Supply Company	Total Regiment	Remarks
(b) Axes, hand	8	3	12	63	
(b) Bags, tool, service, complete	1	1	3	10	
(a) Barometer, aneroid, graduated in milimeters & inches	1	..	..	6	
(a) Barometer, mercurial, graduated in milimeters & inches	..	..	3	3	
(b) Bars, digging, standard	2	2	6	20	
(b) Batteries, dry, tungsten, Type A	9	8	24	86	
(b) Batteries, dry, tungsten, No. 703	24	24	72	340	
(a) Bells, electric, vibrating	4	6	12	42	
(b) Belts, linemen's, tool, with ring and safety strap	1	1	3	10	
(b) Binding posts	15	10	30	130	
(b) Blocks, 2 sheave (W. E. No. 760330)	1	2	3	11	
(b) Books, message, field, Form 217-A	10	10	30	100	
(a) Cable, 3 pair, lead covered, ft	..	1700	3100	6800	
(b) Clips, testing	8	6	18	72	
(b) Climbers, linemen, complete with straps and pads, pair	1	2	3	11	
(a) Electrolyte (10-litre carboys)	..	1	3	4	
(b) Envelopes, field message, Form 144 A	..	500	1500	2000	
(b) Flashlights, electric, hand	5	5	15	50	
(a) Fuzes, 1 amp. for 4 and 12-line switchboards	40	40	120	400	
(a) Glasses, field, prism binocular, 8-power, French	5	9	21	60	
(b) Grips, Buffalo, No. 2	1	1	3	19	
(b) Hammers, sledge	2	2	6	20	
(b) Hammers, carpenters, claw	2	1	3	16	
(a) Headsets, telephone	6	6	18	60	
(a) Hydrometers, Baume	..	2	6	8	
(b) Insulators, clamp	16	12	36	144	
(b) Insulators, with lag screws, Repp. type	123	77	231	1046	
(b) Kits, inspectors, pocket	2	3	9	24	
(b) Kits, flag, combination, standard	2	6	12	64	
(b) Knives, electrician	8	4	12	64	
(a) Knobs, wood French type	860	600	2430	8190	
(a) Ladders	1	2	6	14	
(b) Lamps for flashlights	4	4	12	40	

1	2	3	4	5	6
Articles	Battery	HQ Company	Supply Company	Total Regiment	Remarks
(b) Marlin, pounds	5	5	15	50	
(b) Megaphones	2	1	3	16	
(b) Nails, wire, 20 pounds	23	23	69	230	
(a) Panels, heavy artillery, identification, large, sets	..	1	3	4	
(a) Panels, heavy artillery, rectangular, large, sets	..	1	3	4	
(b) Pliers, side cutting, 8"	8	10	30	88	
(b) Poles, lance (1)	100	100	300	1000	(1) Not to be supplies troops at training centers, but shipped to mobilization points when troops go to the front.
(a) Poles, bamboo with tips fitted	..	3	9	12	
(a) Projectors, 24 cm, without spare batteries	..	3	6	9	
(a) Projectors 35 cm	..	1	3	4	
(a) Reels, barrow	2	2	6	20	
(a) Sapinettes (1)	..	..	..	1000	
(b) Saws, hand, cross cut	1	1	3	10	
(a) Screws, lag, 3/8 x 4"	..	..	..	1200	
(a) Sets, radio type E-10	..	1	3	4	
(b) Screwdrivers, 6"	4	4	12	40	
(b) Screwdrivers, 3"	4	4	12	40	
(b) Shovels, long handled, round point	2	2	6	20	
(b) Shovels, spoon	1	1	3	10	
(b) Staples, Blake insulated No. 5	400	660	1980	5040	
(a) Switchboard, telephone, 4-line monocord type	4	1	3	28	
(a) Switchboard, telephone, 12-line, monocord type	..	1	3	4	
(a) Tags, cable, heavy artillery	75	100	300	850	
(b) Tape, friction, pounds	4	3	9	36	
(b) Tape, rubber, pounds	2	2	6	20	
(b) Telephones, W. E. 1375 B	12	12	36	120	
(a) Thermometers, weather graduated in Centigrade and Fahrenheit	2	..	..	12	
(a) Voltammeters, Weston Model, 280	..	1	3	4	
(b) Watches, wrist, luminous dial, with wristlets	2	2	6	20	
(a) Wave meter, type No. 2, French	..	1	3	4	
(b) Wire, G. I., No. 12, B. W. G., 109 mils, Miles	..	..	..	2	
(b) Wire, outpost, twisted pair, miles	7½	9½	31½	86	

SEE EXHIBIT G FOR RECOMMENDED REVISION

TABLE VIII

FIRE CONTROL AND DRAFTING EQUIPMENT AND SUPPLIES FOR A REGIMENT OF 8-INCH HOWITZERS

1	2	3	4	5	6
Articles	Battery	HQ Company	Supply Company	Total Regiment	Remarks
ORDNANCE PROPERTY FIRE CONTROL EQUIPMENT					
Aiming circle with tripod and case	2	..	..	12	Items shown in column 3, under Headquarters Company, to be equally divided among the 3 battalion headquarters of the regiment.
Azimuth instruments (special)	2	3	1	16	
Azimuth instruments (periscopic)	2	3	1	16	
Alidade, open sight	1	3	..	9	
Alidade, telescopic	1	3	1	10	
Arms, metal, graduated in meters	3	6	1	25	Items shown in column 4 under supply company is for use of regimental headquarters.
Artillery Board	1	6	1	13	
Batteries, extra, for flashlights	42	126	12	390	
Bulbs, extra, for flashlights	21	63	6	195	
B. C. telescope	1	3	1	10	
B. C. telescope case	1	3	1	10	
B. C. telescope tripod	1	3	1	10	
B. C. telescope tripod case	1	3	1	10	
Board, range and deflection (Wilson)	1	3	..	9	
Boxes, for siege lamps (capacity 4 lamps)	4	..	..	24	
Chest instrument	1	3	1	10	
Chest rod	1	3	1	10	
Clinometer, hand	1	3	..	9	
Compass, prismatic	2	6	1	19	
Candle for siege lamps (1)	..	..	..	..	(1) Supplied by Q. M. corps as required.
Carbide, pounds	90	270	90	900	
Deviation Board	1	3	..	9	
Directors, No. 5	2	..	..	12	
Flashlights, with hoods	5	15	..	45	
Flashlights, without hoods	10	30	6	96	
Lamps, siege	16	..	..	96	
Lamps, acetylene	1	3	2	11	
Level rod	1	3	..	9	
Periscope, British, No. 14 (2)	3	3	1	22	(2) Not furnished if periscopic azimuth instruments are supplied.
Plane table, complete	1	3	1	10	
Plotter aircraft observation	1	3	..	9	
Post, aiming, circular head	8	..	..	48	
Post, aiming, diamond head	4	..	..	24	
Post, aiming, square head	8	..	..	48	
Range tables	12	36	6	114	
Range tables, abridged	12	36	6	114	
Ranging poles	4	12	..	36	
Record hand tally	1	3	..	9	
Rule, howitzer correction (British)	4	..	..	24	
Rules, range (British)	2	6	..	18	
Tally pins	12	36	..	108	

1	2	3	4	5	6
Articles	Battery	HQ Company	Supply Company	Total Regiment	Remarks
Tape repair outfit	1	3	..	9	
Tape, steel, 100 meter	1	3	..	9	
Tape, steel, 30 meter	2	6	..	18	
Telescopes, sterescopic with case and tripod (British)	1	3	1	10	
Telescope, variable power, with case and tripod	2	6	1	19	
Transit	1	3	1	10	
Watches, stop	6	18	2	56	
DRAFTING MATERIALS AND SUPPLIES, ORDNANCE PROPERTY					
Beam compass bar or Trammel points, micrometer, adjustments	1	3	1	10	
Bureau of standard circular no. 47	1	3	1	10	
Drawing board 24" x 36"	1	3	1	10	
Drawing instruments, set equal to standard set of office drawing instruments, U. S. Engineer Department (Theodore Alteneder & Son, Phila)	1	3	1	10	
Engineer Field Manual (3)	1	3	..	9	
Ephemaris (current year), French, if possible	1	3	1	10	
Log tables, 7-place degree, vega or equal	1	3	..	9	
Log tables, 5-place, grades	2	6	1	19	
Log tables, 5-place, mils	6	18	1	55	
Orienteur Officers Manual (Translation of French Edition by Geological Survey)	2	6	1	19	
Parallel, rubber, rolling, 12-inch	1	3	1	10	
Proportional dividers, 8½", finely divided for lines and circles, with rack movement, adjustable points	1	3	1	10	
Protractors, 12" dia, full circle celluloid, degrees	1	3	1	10	
Protractors, 6" dia, full circle celluloid grades	1	3	..	9	
Protractors, 12" full circle celluloid grades	1	3	1	10	
Protractors, 6" full circle celluloid grades	1	3	..	9	
Protractors, 12" full circle celluloid mils	1	3	1	10	
Protractors, 6" full circle celluloid mils	1	3	..	9	

1	2	3	4	5	6
Articles	Battery	HQ Company	Supply Company	Total Regiment	Remarks
Protractors, metal semicircular 6" graduated in mils and having a coordinate square and scale 1/20000, German silver	1	3	1	10	
Reconnaissance, sets	1	3	1	10	
Scales, map, boxwood, 30 cm. long metric graduation 1/20000 and 1/50000. (Theodore Alteneder & Sons, Phila)	4	12	1	37	
Scales, map, boxwood 30 cm. long metric graduation, 1/5000 and 1/10000 straight edge 1 meter long, graduated in millimeters, steel nickel plated	2	6	1	19	
Straightedge, 1 meter long, graduated in millimeters, steel nickel plated	2	3	1	16	
Tapes, steel, amp scale 1/20000 1½ m	2	3	1	16	
Tapes, steel, pocket, inches and millimeters, 72 inches long	4	12	..	36	
Transit books	6	18	..	54	
Triangles, 12" celluloid, 30 and 60 degrees	1	3	1	10	
Triangle, 6" celluloid, 30 and 60 degrees	1	3	..	9	
Triangle, 12" celluloid, 45 degrees	1	3	1	10	
Triangle, 6" celluloid, 45 degrees	1	3	1	9	
"T" square, 36"	1	3	1	10	
Vertical angle table, Stadia degrees and meters	2	6	..	18	
Celluloid sheets, 20 x 25" transparent half frosted and half clear	12	36	6	114	
Computation paper, pads, ruled, 8 x 10½	6	18	6	60	
Computation paper, pads unruled 4" x 6"	6	18	6	60	
Cross section paper, 10 meter roll, metric graduation, 50 cm wide opaque	1	3	1	10	
Cross section paper, 10 meter roll, metric graduation, 50 cms, transparent	1	3	1	10	
Drawing ink, black waterproof bottle	3	9	2	29	
Drawing ink, green waterproof bottle	1	3	1	10	
Drawing ink, blue waterproof bottle	1	3	1	10	

1	2	3	4	5	6
Articles	Battery	HQ Company	Supply Company	Total Regiment	Remarks
Drawing ink, brown waterproof bottle	1	3	1	10	
Drawing ink, brick red waterproof bottle	1	3	1	10	
Drawing paper, double mounted, paragon, 24 x 36" sheets	12	26	12	120	
Drawing paper, thin eggshell, 24" x 26" sheets	12	36	..	108	
Drawing paper, single mounted 36" wide, 10 yard roll	1	3	..	9	
Drawing paper, Whatman's, 35" cold pressed 10 yard rolls	1	3	1	10	
Erasers, rubber, pencil	3	18	..	36	
Erasers, rubber, typewriter	3	9	..	27	
Erasers, steel	2	6	..	18	
Erasers, artists gum	6	18	..	54	
Erasers, sponge	3	9	..	27	
Glue, pints	1	3	..	9	
Horn centers, 1-2" dia.	1	3	..	9	
Ink, fountain pen, with filler, bottles	2	6	..	18	
Lumber crayons	1	3	..	9	
Magnifying glasses, pocket	1	3	..	9	
Manila envelope, 10 x 15"	24	72	..	216	
Manila paper, 24 x 36" sheets	12	36	..	108	
Map tube, galvanized iron 27 x 6"	1	3	..	9	
Oil stone, in case 3"	1	3	..	9	
Paint boxes, Japanned for 12 full pans and brushes	1	3	1	10	
Paste, library, jar	1	3	..	9	
Pencils, colored, red	3	9	2	29	
Pencils, colored, blue	3	9	2	29	
Pencils, colored, brown	3	9	2	29	
Pencils, colored, green	3	9	2	29	
Pencils, drawing 3-H	12	36	6	114	
Pencils, drawing 6-H	12	36	6	114	
Pencils, drawing, 9-H	12	36	6	114	
Pencils, writing, No. 2	36	108	..	324	
Pencil points, for beam compass	12	36	6	114	
Pencil points for dividers	12	36	6	114	
Pen holders, writing	2	6	..	18	
Pen holders, drawing	2	6	..	18	
Pen holder, crowquill	1	3	..	9	
Pens, crowquill	2	6	..	18	
Pens, drawing Gillett No. 303	24	72	12	228	
Pens, drawing Gillett No. 179	24	72	12	228	
Pens, drawing Gillett No. 290	24	72	12	228	
Pens, drawing Gillett, No. 404	24	72	12	228	
Pins, colored head, cubes, red, blue, black, green, yellow and white	6	18	6	60	

1	2	3	4	5	6
Articles	Battery	HQ Company	Supply Company	Total Regiment	Remarks
Rubber bands, boxes, size 19 and size 32	1	3	..	9	
Sandpaper pads, pencil pointers	1	3	..	9	
Sealing wax, stick	1	3	..	9	
Shears, office, 12-inch	1	3	..	9	
Sponge cup, with sponge	1	3	..	9	
Thumb tacks, gross	1	3	..	9	
Tracing linen, 36" 10 yard roll	1	3	1	10	
Tracing paper, 30" 10 yard roll	1	3	1	10	
Water colors, Prussian blue	2	6	1	19	
Water colors, burnt sienna	2	6	1	19	
Water colors, Hockers green	2	6	1	19	
Water colors, crimson lake	2	6	1	19	
Water colors, burnt umber	2	6	1	19	
Water colors, Chinese white	2	6	1	19	
Water colors, brushes, No. 1 to 6	12	36	12	120	

SEE PAGE 12 OF THIS REPORT

TABLE IX

COMPOSITION OF ARTILLERY MATERIEL FOR A REGIMENT OF 8-INCH HOWITZERS (BRITISH) MARKS VI AND VII

(If Regiment is Provided with American Equipment, See Table No. 10.)

1	2	3	4	5	6
Articles	Battery	HQ Company	Supply Company	Total Regiment	Remarks
ORDNANCE PROPERTY					
I. WHEELED MATERIEL					
Howitzers, B. L., 8-inch	4	..	..	24	
Carriages, for Howitzers, B. L., 8-inch	4	..	..	24	
Carrier, transporting firing platform, 8-inch howitzer, Mark I	4	..	..	24	
Limbers, B. L., 8-inch howitzer, Mark III with engine draught connector	4	..	..	24	
II. SIGHTS					
Carriers, No. 7 dial sight No. 5	4	..	..	24	
Cases:					
Large clinometer	4	..	..	24	
No. 7 dial sight and carrier	4	..	..	24	
Sight clinometer	4	..	..	24	
Clinometer, large (Clinometer field Mark IV) if large is not available)	4	..	..	24	
Clinometer, sight	4	..	..	24	
Sights, dial No. 7	4	..	..	24	
Sights, rocking bar, 8-inch B. L. howitzers	4	..	..	24	
III. TOOLS AND ACCESSORIES					
(a) (For carriage)					
Adapters, oil filling, with caps	4	..	..	24	
Adapters, pressure gauge, with caps	4	..	..	24	
Braziers, charcoal	4	..	..	24	
Cans, lubricating, No. 9	4	..	..	24	
Compressors, air, portable, hand driven	2	..	..	12	
Covers, waterproof, black, 10' x 20'	4	..	..	24	
Funnel, filling, cylinder, No. 3	4	..	..	24	
Gauges, pressure, No. 5	4	..	..	24	
Handspikes, lifting carriage	24	..	..	144	

1	2	3	4	5	6
Articles	Battery	HQ Company	Supply Company	Total Regiment	Remarks
Hose, pump, liquid, portable, 5' lengths	2	..	..	12	
Measures, filling, hydraulic buffer, No. 1, Mark II	4	..	..	24	
Pipes, connecting compressor to recuperator	2	..	..	12	
Pump, liquid, portable, Mark I	2	..	..	12	
Shoe, recoil, detachable (for use with scotches)	4	..	..	24	
Spanners, B. L. 8" Howitzer equipments:					
No. 1 Mark II	4	..	..	24	
No. 2	4	..	..	24	
No. 3	4	..	..	24	
No. 4	4	..	..	24	
No. 5	4	..	..	24	
No. 6	4	..	..	24	
No. 7 (Different for Marks VI and VII)	4	..	..	24	
No. 8	4	..	..	24	
No. 9	4	..	..	24	
No. 10	4	..	..	24	
No. 11	4	..	..	24	
No. 12	4	..	..	24	
No. 13	4	..	..	24	
No. 14 Mark II	4	..	..	24	
No. 15	4	..	..	24	
No. 16	4	..	..	24	
No. 17 Mark VI only	4	..	..	24	
No. 21	4	..	..	24	
No. 22 Mark VII only	4	..	..	24	
no. 23 Type 3 rams only	4	..	..	24	
Syringes, extracting liquid	4	..	..	24	
Tommy, carriage	4	..	..	24	
Tools, withdrawing split pins	4	..	..	24	
Washers, cap, adapter, pressure gauge	8	..	..	48	
Washers, connection, pressure gauge to adapter	8	..	..	48	
Washers, connection, adapter, oil filling	16	..	..	96	
Washers, packing, coupling nut, pressure gauge	8	..	..	48	
Washers, plug adapter, pressure gauge	8	..	..	48	
(b) (For Howitzers and Breech.)					
Bearers, projectile	4	..	..	24	
Bits, vent, 18"	4	..	..	24	
Books, gun (or registers siege)	4	..	..	24	
Bore sight	1	..	..	6	

1	2	3	4	5	6
Articles	Battery	HQ Company	Supply Company	Total Regiment	Remarks
Boxes, obturator (wood, each to hold 2 obturators)	2	..	..	12	
Boxes, tallow	4	..	..	24	
Brushes, breech screw	4	..	..	24	
Brushes, rammer and sponge	4	..	..	24	
Buckets, sponge, garrison, wood	4	..	..	24	
Cleaners, piasaba, No. 15	4	..	..	24	
Covers, breech (different for Marks VI and VII)	4	..	..	24	
Covers muzzle, No. 5	4	..	..	24	
Disc, adjusting, obturator	2	..	..	12	
Gauges, thickness, obturator	2	..	..	12	
Lanyards, firing, No. 23	8	..	..	48	
Presses, obturator	2	..	..	12	
Pockets, tube, land service	8	..	..	48	
Rimers, vent, T	4	..	..	24	
Screwdrivers, 2-1/8"	2	..	..	12	
Staves, end, No. 15	4	..	..	24	
Staves, intermediate, no. 2	4	..	..	24	
Straps, tube, box, long	8	..	..	48	
Tommies, press, obturator	4	..	..	24	
Trays, loading	4	..	..	24	
Wrenches, breech mechanism, no. 137	4	..	..	24	
Wrenches, breech mechanism, no. 138	4	..	..	24	
(c) (For sights.)					
Cover, rocking bar sight	4	..	..	24	
Screwdrivers, adjusting sights, No. 1, Mark I	4	..	..	24	
Screwdrivers, Boley	1	..	..	6	
Screwdrivers, opticians	1	..	..	6	
Spanners, adjusting sights, no. 1 (no. 18)	4	..	..	24	
Spanners, adjusting sights, 3 (no. 19)	4	..	..	24	
Spanners, adjusting sights, 4 (no. 20)	4	..	..	24	
Tools, no. 7, dial sight:					
No. 1, removing eye piece	1	..	..	6	
No. 2, removing cap, micrometer head	1	..	..	6	
No. 3, removing plug, supporting pillar	1	..	..	6	
No. 4, removing lower prism	1	..	..	6	
No. 5, removing cap, upper prism holder large	1	..	..	6	
No. 6, removing ring, retaining upper prism	1	..	..	6	
No. 7, removing pins, securing toothed segment	1	..	..	6	

1	2	3	4	5	6
Articles	Battery	HQ Company	Supply Company	Total Regiment	Remarks
No. 16, removing mount, upper prism	1	..	..	6	
No. 17, removing collar, worn spindle of no. 2 carrier	1	..	..	6	
Wrenches, adjusting no. 7, dial sight and carrier	2	..	..	12	
(d) (For maneuvering)					
Blocks, tackle, G. S. 4" circumference cordage, snatch	4	..	..	24	
Carts, trench	2	..	..	12	
Cordage:					
Hawser, hemp, 2 strand, 4" circumference, ½ coils	4	..	..	24	
Hawser, wheel purchase	8	..	..	48	
Lashings, tarred, 2½" circumference 30'	4	..	..	24	
Lashings, tarred, 1½" circumference 18'	16	..	..	96	
Lines, "Iiambro"	4	..	..	24	
Lines, white, 1 pound skeins, skeins	4	..	..	24	
Ropes, drag, heavy, 36' pairs	6	..	..	36	
Ropes, parbuckling, 4" circumference, 108'	4	..	..	24	
Selvages, 36" Mark II	8	..	..	48	
Slings, rope, 6" circumference, 12½' long	2	..	..	12	
Slings, rope, 4" circumference, 5' long	2	..	..	12	
Twine, packing, middling, balls	2	..	..	12	
Twine, whipping, pounds	2	..	..	12	
Yarn, spun, hemp, tarred, 3 thread	8	..	..	48	
Gyns, triangles, 7 ton	1	..	..	6	
Gyns, triangles, falls	1	..	..	6	
Gyns, triangles, shoes	3	..	..	18	
Gyns, triangles, slings	2	..	..	12	
Gyns, triangles, tackles	1	..	..	6	
Handles, winch no. 7	2	..	..	12	
Handspikes, common, 6"	24	..	..	144	
Harness man loops, sets	8	..	..	48	
Jacks, lifting screw no. 1	4	..	..	24	
Levers, 14'	2	..	..	12	
Planks, moving guns:					
Half, 12" x 6'	8	..	..	48	
Half, 12" x 4'	8	..	..	48	
Special, 15" x 10' oak (for bad ground)	24	..	..	144	
Whole, 17" x 10' fir	8	..	..	48	

1	2	3	4	5	6
Articles	Battery	HQ Company	Supply Company	Total Regiment	Remarks
Platform, firing, 8" howitzer	4	..	..	24	
Including each:					
Apex pin and nut 1	..	..	..	..	
Beam, rear, bottom 1	..	..	..	..	
Beam, rear, top 1	..	..	..	..	
Beam, rear, side 2	..	..	..	..	
Bolts, T head 4	..	..	..	..	
Clamps, beam, rear 2	..	..	..	..	
Clamping chains 2	..	..	..	..	
Clamping strips 2	..	..	..	..	
Draught, eye, w/bolt 1	..	..	..	..	
Handspikes, lifting beams 4	..	..	..	..	
Platform, wheel 1	..	..	..	..	
Rods, reinforcing and fastenings set 1	..	..	..	..	
Tool chest, platform 1	..	..	..	..	
Wrenches, ratchet 2	..	..	..	..	
Posts, picket, 5'	12	..	..	72	
Rollers, ground, 6" diameter x 3'	4	..	..	24	
Rollers, ground, 5' diameter x 2'	4	..	..	24	
Scotches firing, 21" wide, medium	8	..	..	48	
Scotches, firing, 21" wide, small	8	..	..	48	
Scotches, travelling	12	..	..	72	
Skids 6" x 9" x 3'	6	..	..	36	
Skids 3" x 6" x 3'	4	..	..	24	
Skids 4" x 5" x 3'	8	..	..	48	
Tackles, luff, 84'	8	..	..	48	
(e) (For preparation of position)					
Adzes	4	..	..	24	
Adze helves (1 spare)	5	..	..	30	
Axes	8	..	..	48	
Axe helves (4 spare)	12	..	..	72	
Bucket, water canvas	20	..	..	120	
Crowbar, 5' 6"	4	..	..	24	
Hatchet	8	..	..	48	
Hatchet handle (4 spare)	12	..	..	72	
Hooks, bill	8	..	..	48	
Lantern, with wicks and globes	12	..	..	72	
Lantern globes (spare)	12	..	..	72	
Lantern wicks (spare)	12	..	..	72	
Level, masons'	4	..	..	24	
Mauls, wooden, iron bound, heavy	12	..	..	72	
Maul handles (4 spare)	16	..	..	96	
Picks	24	..	..	144	
Pick helves (6 spare)	30	..	..	180	
Rammers, earth	12	..	..	72	
Shovel, short handle	12	..	..	72	
Shovel handle, short (spare)	2	..	..	12	
Shovel, long handle	32	..	..	192	

1	2	3	4	5	6
Articles	Battery	HQ Company	Supply Company	Total Regiment	Remarks
Shovel handle, long (spare)	8	..	..	48	
Sledge hammer, 10 pound	4	..	..	24	
Sledge hammer handle (2 spare)	6	..	..	36	
Sickle	10	..	..	60	
Spades	20	..	..	120	
Spade handles (spare)	4	..	..	24	
Stones, scythe	2	..	..	12	
Straight edge, 10 feet, wooden	2	..	..	12	
Tape, 100 ft metallic woven	2	..	..	12	
Wedges, sawyers, steel, 10"	2	..	..	12	
Wedges, sawyers, steel, 7"	4	..	..	24	
Wheelbarrows	8	..	..	48	
(f) (For Ammunition)					
Gauges, shell, B. L. 8" body	2	..	..	12	
Gauges, shell, B. L. band, high	2	..	..	12	
Gauges, shell, B. L. band, low	2	..	..	12	
Keys, fuze:					
No. 53, 2" percussion or graze fuze	24	..	..	144	
No. 59, Mark I, G-3, fuze-hole plugs and 2" plugs	2	..	..	12	
(Also for G. S. special and 2" fuze holes plugs except 2" no. 3 Marks IV and V and no. 8	..	..	..	..	
Wadmiltilts, large	2	..	..	12	
(g) (Chests and Boxes) (Not elsewhere enumerated)					
Boxes, mobilization, stores no. 1, with locks	2	..	..	12	
Boxes, mobilization stores, no. 2, with locks	4	..	..	24	
Boxes, mobilization stores, no. 5, with locks	4	..	..	24	
Boxes, store:					
No. 1 carriage, limber and small mechanism spares	4	..	..	24	
No. 2 breech carrier complete	1	..	..	6	
No. 3 sighting gear spares	1	..	..	6	
No. 4 spare parts breech mechanism	4	..	..	24	
Keys for boxes	4	..	..	24	

IV. SPARE PARTS

(Specify Mark and number of howitzers and carriage when ordering.)

1	2	3	4	5	6
Articles	Battery	HQ Company	Supply Company	Total Regiment	Remarks
(a) (For carriage)					
Brakes:					
Blocks	4	..	..	24	
Disc, spring no. 83	16	..	..	96	
Buffer, hydraulic:					
Boxes, stuffing:					
Cap	2	..	..	12	
Gland	2	..	..	12	
Rings, hemp packing	8	..	..	48	
Rings, joint	4	..	..	24	
Rings, packing, rubber, L section	8	..	..	48	
Sleeve	2	..	..	12	
Springs, gland	4	..	..	24	
Plugs, air and filling hole	4	..	..	24	
Plugs, adjusting runout, Mark VI only	2	..	..	12	
Valve, adjusting runout, Mark VII only	2	..	..	12	
Washers, leather, air and filling plugs	16	..	..	96	
Washers, packing, leather, stuffing box	8	..	..	48	
Washers, packing, leather, control cylinder	8	..	..	48	
Washers, plugs, adjusting runout Mark VI only	16	..	..	96	
Chains, securing (with eyes) (15 per set) sets	4	..	..	24	
Cradle clamp:					
Pins, spring, keep, with chain and eye	4	..	..	24	
Gear elevating:					
Washers, antifriction	2	..	..	12	
Gear operating sight:					
Collars, securing, pivot bearing	2	..	..	12	
Collars, securing, sight bracket	2	..	..	12	
Pins, spring, pivot bearing with chain and eye	2	..	..	12	
Pins, spring, sight bracket with chain and eye	2	..	..	12	
Screw, adjusting	2	..	..	12	
Gear, quick loading:					
Springs, plunger, left	2	..	..	12	
Springs, plunger, right	2	..	..	12	
Gear traversing:					
Washers, ball thrust, traversing screw	2	..	..	12	

1	2	3	4	5	6
Articles	Battery	HQ Company	Supply Company	Total Regiment	Remarks
Lubricators, oil screw with securing chain	24	..	..	144	
Pads, beating face, leather	4	..	..	24	
Pins, keep, split sets	8	..	..	48	
Plugs, adapter hole, ram and buffer piston rod	4	..	..	24	
Recuperator:					
Boxes, stuffing:					
Cap	2	..	..	12	
Gland	2	..	..	12	
Rings, hemp, packing	16	..	..	96	
Rings, packing, rubber, L section	32	..	..	192	
Sleeve	2	..	..	12	
Springs, gland	2	..	..	12	
Plugs, air and overflown left w/chains and eyes	12	..	..	72	
Plugs, overflow, right, with keep pin	8	..	..	48	
Ram details--Type 1 rams only:					
Rings, packing, leather or rubber, cup shape	48	..	..	288	
Rings, supporting, cup shaped, packing front	2	..	..	12	
Rings, supporting, cup shaped, packing rear	2	..	..	12	
Springs, cup shaped, packing (for leather cups only)	16	..	..	96	
Springs, piston	2	..	..	12	
Ram details--Types 2 and 3 rams only:					
Rings, packing hemp	16	..	..	96	
Rings, packing hemp supplementary	16	..	..	96	
Rings, packing, rubber U section	48	..	..	288	
Rings, supporting U packing front	2	..	..	12	
Rings, supporting U packing rear	2	..	..	12	
Springs, piston	2	..	..	12	
Springs, valve throttle	8	..	..	48	
Spindles, air valves, complete:	4	..	..	24	
Component parts:					
Gland	1				
Neck ring	2				
Nut	1				
Nut, lock	1				
Spindle	1				
Washers, leather, plug adapter, hole	16	..	..	96	
Washers, leather, air and overflow plugs	16	..	..	96	

1	2	3	4	5	6
Articles	Battery	HQ Company	Supply Company	Total Regiment	Remarks
Washers packing leather, plug overflow right	16	..	..	96	
Washers packing leather stuffing box	16	..	..	96	
Washers, plug, adapter, pressure gauge	24	..	..	144	
(b) (For howitzers and breech)					
Carrier, complete	1	..	..	6	
Catch, breech mechanism level	4	..	..	24	
Crossheads	2	..	..	12	
Obturators	4	..	..	24	
Each comprising sub-component parts:					
Disc, protecting, front	1				
Pad	1				
Ring, front	1				
Ring, rear, inner	1				
Ring, rear, outer	1				
Pins, axis, roller, breech screw	1	..	..	6	
Plate, catch breech, mechanism lever	4	..	..	24	
Plate, retaining breech screw	1	..	..	6	
Roller, breech screw	1	..	..	6	
Screw, breech, complete	1	..	..	6	
Screw, fixing control arc	2	..	..	12	
Springs, catch, breech, mechanism lever	8	..	..	48	
Springs, retaining "T" tube no. 1	16	..	..	96	
Springs, vent, "T" axial	4	..	..	24	
Venis, "T" axial	2	..	..	12	
Washer, bearing	4	..	..	24	
(c) (For sights)					
Bubble, spirit glass "A" (For sight clinometer and also cross level)	8	..	..	48	
Carrier no. 7, dial sight no. 5	1	..	..	6	
Screws, fixing, graduated plate	2	..	..	12	
Screws, fixing, lower bracket	2	..	..	12	
Screws, fixing, reader plate	2	..	..	12	
Spring, spiral	2	..	..	12	
Spring, torsional	2	..	..	12	
Washers, spring (Belleville)	2	..	..	12	
Washers for spring	2	..	..	12	
Cases, no. 7, dial sight and carrier	1	..	..	6	
Cases, large clinometer	2	..	..	12	
Clinometer sight	2	..	..	12	

1	2	3	4	5	6
Articles	Battery	HQ Company	Supply Company	Total Regiment	Remarks
Spring, spiral, clinometer	2	..	..	12	
Clinometer, large (Clinometer Field Mark IV if large not available)	2	..	..	12	
Sights, dial no. 1	2	..	..	12	
Sights, dial no. 7	2	..	..	12	
Sights, rocking bar complete, B. L., 8" howitzer	1	..	..	6	
Bolts, gear casing with nuts (5 per set) sets	1	..	..	6	
Lubricators, Rotherham no. 17	6	..	..	36	
Nut, deflection pivot, rocking bar	1	..	..	6	
Nut, spindle worm	1	..	..	6	
Pins, keep, split, sets	6	..	..	36	
Plugs, securing, spirit glass	4	..	..	24	
Reader, range dial (S-34) with hinge pin (S-37), and washer (S-38)	2	..	..	12	
Screws:					
Securing range dial, with nuts	6	..	..	36	
Securing range pinion adjusting nut	3	..	..	18	
Securing cap, nut, cross leveling	4	..	..	24	
Securing carrier, cross spirit level	4	..	..	24	
Securing deflection drum plate	8	..	..	48	
Securing deflection scale plate	4	..	..	24	
Spring plunger, range, dial reader	2	..	..	12	
Washers:					
Disc, spring, deflection pivot	2	..	..	12	
Disc, spring, range pinion	2	..	..	12	
Spindle, worm	1	..	..	6	
(d) (For tools and accessories)					
Bearers, projectiles	2	..	..	12	
Brushes, rammer and sponges	2	..	..	12	
Bits, vent, 18"	4	..	..	24	
Cans, lubricating, no. 9	4	..	..	24	
Compressor, air, portable:					
Links, plains, endless chain	12	..	..	72	
Links, cranked, endless chain	4	..	..	24	
Rings, piston, H. P. (with hydraulic packing)	8	..	..	48	
Rings, piston, L. P. (with hydraulic packing)	4	..	..	24	
Rods, ecentric	2	..	..	12	

1	2	3	4	5	6
Articles	Battery	HQ Company	Supply Company	Total Regiment	Remarks
Springs, valve, large	2	..	..	12	
Springs, valve, small	6	..	..	36	
Valves, large	2	..	..	12	
Gauge, pressure, no. 5	1	..	..	6	
Rimers, vent "T"	12	..	..	72	
Syringes, extracting liquid	2	..	..	12	
Trays, loading	1	..	..	6	
Wrenches, breech mechanism, no. 137	2	..	..	12	
Wrenches, breech mechanism, no. 138	2	..	..	12	

V. TOOLS AND MATERIALS FOR REPAIR

(a) (Artillery repair truck)

One artillery repair truck (from supply company) with standard equipment and load, complete, accompanies each battery.

(b) (Artillery supply truck, load "D")

One artillery supply truck (from supply company), with standard equipment and load "D" of small tools and materials accompanies each artillery repair truck.

(c) (Special tools for 8-inch howitzers)

The following special tools for 8-inch howitzers should be added to load "D" when accompanying 8-inch howitzer batteries:

Chalk, carpenter's, cakes		2
Hammers, copper, 10 oz, with handles		2
Hammers, copper, 24 oz, with handles		2
Lines, carpenter's		4
Pencils, carpenter's		4
Saws, cross-cut 5 ft blades		2
Saws, cross-cut, handles		4
Taps and dies. Whitworth standard bolt threads 5/16" to 1¼" inclusive (with tap wrench and die holder)	Sets	2

(d) (Special material for 8-inch howitzers)

The following special materials for 8-inch howitzers should be added to load "D" when accompanying 8-inch howitzer batteries.

Nails:		
6d	lbs.	5
8d	lbs.	5
10d	lbs.	20
20d	lbs.	20
Screws, machine, iron, flathead, Whitworth Standard:		
3/8" gauge no. 8		24
3/4" gauge no. 13		24
3/4" gauge no. 10		24
1½" gauge no. 13		30
2" gauge no. 14		24
2½" gauge no. 16		18
Screws, machine, iron, roundhead:		
1¼" gauge no. 13		12
Screws, wood assorted sizes	gross	1
Solder, half and half	pounds	5
Soldering paste	pounds	1
Pins, keep, split (spring cotters):		
3/32" x 2"		8
1/8" x 2"		8
3/16" x 2½"		8

3/16" x 2-3/4"	16
¼" x 3½"	8
5/16" x 4"	4
3/8" x 5½"	4

VI. MATERIALS FOR CLEANING AND PRESERVING

(a) (Artillery supply truck, load "A").

Two artillery supply trucks with standard equipment and load "A" of cleaning and preserving materials are assigned to each 8-inch howitzer battery.

(b) (Special cleaning and preserving materials for 8-inch howitzers).

In addition to the loads "A" the following special materials should be carried for 8-inch howitzer:

Brush, wire cleaning		1
Brooms, corn		2
Brooms, whisk		4
Burlaps, 48" wide	yards	40
Chalk, white (cryon)	gross	2
Charcoal for brazier (for winter use)	pounds	200
Graphite, powdered, lubricating	pounds	5
Lavaline	pounds	5
Lubricant, no. 4½	pounds	20
Lye	pounds	5
Oil, buffer (British) (spare)	gallons	70
Paper, cleaning (optical)	ream	1
Putz pomade	pounds	2

APPENDIX I

ARTILLERY REPAIR TRUCK

(a) (Body equipment).	No. per Car
Support for drill press	1
Frame for lathe	1
Drawer for lathe frame	1
Cabinet, bench, complete, including all drawers and compartments	1
Screen, generating unit, assembled	1
Frame, body cover, complete	1
Cover, canvas, for body	1
Ratchets	2
Pickaxe	1
Straps, 12" long (2 for hatchets, 1 for pickaxe and 1 for axe)	4
Shovels, short handled	2
Straps, 15" long (for short-handled shovels)	2
Lantern, complete, with globe and wick	1
Axe	1
Can, safety, 1 gallon capacity	1
Straps, lantern bracket	2
Pads, lantern bracket, complete	2
Buckets, water, canvas	2
Strap, 22-3/4" long (for water bucket)	1
Oil, medium, gasoline engine, gallon	1
Sibley stove, complete	1
Including:	
Shield tent for Sibley stove	1
Joints for Sibley stove	4
Elbow for Sibley stove	1
(b) (Body attachments).	
Generating unit, 4 K. W. complete	1
Spare parts for generating unit:	
Connecting rod bearings — pair	4
Piston rings, 1/8"	4
Piston rings, 3/16"	2
Cylinder head gaskets	2
Valves	2
Valve tappet	1
Drill press	1
Cover, canvas, for drill press	1
Cover, generator	1
Switchboard, complete	1
Lathe, screw cutting 9", Star No. 20, 36" between centers	1
The following accessories for lathe are carried in lathe frame drawer No. 16:	
Straight tool post with rocker, washer, etc	1
Follow rest	1
Face plate 9"	1
Space bolts for steady rest	2
Space bolt for steady rest with blocking	1
Block for straight tool post 2"	1
Drill holder for lathe	1

Lathe clamp dogs		2
Sleeve for lathe centers		1
Lathe centers No. 2 Morse taper		3
Lathe center dog		1
Tall stock wrench		1
Cover lathe		1
Motor, lathe		1
Grinder, bench		1
This includes:		
Norton Alundum wheels 10 x 1" grain 46, grade 0	2	
Adjustable steel wheel guards	2	
Detachment water pot	1	
Operating switch	1	
Cover grinder and emery wheel		1
Compressor, air		1
Compressor, attachments and accessories:		
Hammer, 3BK Boyer riveting and chipping		1
Sets for button head rivets, one each, sizes 3/16, ¼, 5/16, 3/6, 7/16, and ½ (to suit 3BK hammers)		6
Tools, chipping, set of 12		1
Wrenches, for type 3BK hammers, set		1
Nipple, hose, ½" x 3/8"		1
Tank, air receiver, 14" dia. x 48" long		1
Gauge, air pressure		1
Hose, metal, in 10 ft. lengths		1
Valve, check, 3/4" horizontal, brass body		1
Valve, consolidated safety pop, brass		1
Cock, drain brass, for 3/8" pipe tap		1
Hose, 5 ply ½" armored "Quarry" 25 ft. lengths		2
Couplings, female half, extra		2
Couplings, male half, extra		2
Nipples, gas pipe, 3/4" x 2"		3
Tee, malleable iron, 3/4"		1
Valves globe, brass body, No. 12 soft disc		2
Nipples, gas pipe, 3/4" x 4" long		2
Union, malleable; 3/4" with round valve settings, No. 519		1
Apparatus, oxy-acetylene welding and cutting, complete, with the following accessories. (carried in apparatus case)		1
No. 3000 Standard Two-Hose Cutting Torch with five tips, Nos. 1, 2, 3, 4, and 5	1	
No. 2 oxygen regulator, gauges 400 to 3000 lbs	1	
No. 2 acetylene regulator, new style, gauges 30 to 400 lbs	1	
No. 146 Standard Welding Torch with five tips, Nos. 6, 7, 8, 9, and 10	1	
Decarbonizing Torch	1	
25 ft. Standard Black Hose		
25 ft. Standard Red Hose		
Spark Lighter	1	
Pair Canvas Gloves	1	
Bunson Burner (Acetylene)	1	

Atlas Goggles	pair	2
Torch Wrenches		2
Steel Carrying Case		1
Regulating Wrench		1
Carried in Supply Cabinet:		
3/16" Davis-Bournonville Welding Rods	lbs.	6½
1/4" Davis-Bournonville Welding Rods	lbs.	6½
1/8" Davis-Bournonville Welding Rods	lbs.	5½
3/16" Atlas Cast Iron Welding Rods	lbs.	4½
1/4" Vanadium Steel Rods	lbs.	1
1/4" Atlas Cast Iron Welding Rods	lbs.	9
3/16" Nickel Steel Rods	lbs.	11½
1/4" Gem Welding Rods	lbs.	4
1/4" Marvel elding Rods	lbs.	5½
1/4" Aluminum Welding Rods	lbs.	2½
Peerles Aluminum Flux	lb.	1
Marvel Flux	lb.	1
Cast Iron Sealing Powder	lb.	1
Extra set tips for cuting torch (Nos. 1, 2, 3, 4, and 5)		1
Set Tips for Standard Welding Torch (Nos. 6, 7, 8, 9, 10)		1
Set Special Tips for Welding Troch for use with light gauge metal Nos. 0, 1, 2, 3, and 4		1
Set Special Brushes for cleaning, welding and cutting tips		1
Extra Set Atlas Goggles		1
Extra Pair Canvas Gloves		2
Half Dozen Renewals for Spark Lighter		1
Steel Carrying Case		1
Book of Instructions		1
Grinder, tool post		1
This includes:		
Norton Alundum wheel 4 1/2" x 3/8" Grain 3860, grade N		1
Norton Alundum wheel 1 1/2" x 3/8" Grain 3860, grade N		1
Extension Mandrel, 4 1/2" long, 3/8" dia		1
Tooth rest		1
Shank 5/8" x 1" x 4 1/2" and to have 7' lengths of two conductor cables with fused attachment plug and two extra fuses ready for use		1

(c) (Load).

	No. per Car.	Location.
Ameter No. 1002 Ever-ready 0-35 Amp. range	1	Drawer No. 12
Attachment, milling and gear cutting	1	Drawer No. 17
Bushings, expansion (sizes ¼" to 1 1/7") advancing by 16th (in wooden box)	23	Drawer No. 8
Blades, hacksaw, 10"-24 teeth	12	Drawer No. 10
Blades, hacksaw, 10"-14 teeth	12	Drawer No. 10
Batteries, tungsten, American Ever-ready	2	Drawer No. 12
Bulb, lamp, Mazda, American Ever-ready	1	Drawer No. 12
Blocks, drill with clamps, set complete	1	Drawer No. 12
Book, "American Machinists" Hand Book"	1	Drawer No. 7
Book, "Audel's Automobile Questions and Answers for Operators and Repairmen	1	Drawer No. 7
Book, "Automobile Repairing Made Easy"	1	Drawer No. 7

Calipers, lock-joint transfer, inside 10 inch	1	Drawer No. 1
Calipers, lock-joint transfer, outside 10 inch	1	Drawer No. 1
Calipers, hermaphrodite, 6 inch, firm joint with adjustable point	1	Drawer No. 1
Calipers, spring, 6 inch, outside	1	Drawer No. 1
Calipers, spring, 6 inch, inside	1	Drawer No. 1
Calipers, spring, 3 inch, outside	1	Drawer No. 1
Calipers, spring, 3 inch, inside	1	Drawer No. 1
Calipers, pocket slide	1	Drawer No. 1
Calipers, pocket slide	1	Drawer No. 1
Calipers, micrometer outside, graduated 1/1000 of an inch, set	1	Drawer No. 1
Including: One 1", one 2", one 3" micrometers with ratchet stop, one 1", one 2" test gauge and two adjustable wrenches--all in leather case	1	Drawer No. 2
Calipers, inside micrometer, set B containing 10 rods and one 1/2 gauge in case	1	Drawer No. 2
Calipers, micrometer, metric, 0 to 75 mm, set	1	Drawer No. 2
Chisels, cold, 3/8"	2	Drawer No. 10
Chisels, cold, 3/4"	2	Drawer No. 10
Chisels, cold, 1/2"	2	Drawer No. 10
Chisels, cold, 1/4"	2	Drawer No. 10
Copper, soldering, 1 1/2 lbs	1	Drawer No. 10
Copper, soldering, 3/4 lbs	1	Drawer No. 10
Clippers, bolt, 5/16" capacity	1	Drawer No. 10
Cutters, side milling, 1/4"	1	Drawer No. 12
Cutters, side milling, 5/16"	1	Drawer No. 12
Cutters, side milling, 3/8"	1	Drawer No. 12
Cutters, side milling, 7/16"	1	Drawer No. 12
Cutters, side milling, 1/2"	1	Drawer No. 12
Cutters, milling angular, 45 deg., 1/2" x 2 1/2" R. H.	1	Drawer No. 12
L. H.	1	Drawer No. 12
Cutters, milling, convex 1/8"	1	Drawer No. 12
Cutters, milling, convex 1/4"	1	Drawer No. 12
Cutters, milling, convex 3/8"	1	Drawer No. 12
Cutters, milling, convex 1/2"	1	Drawer No. 12
Cutters, milling, double angle, 60 deg., 1/2" x 2 1/2"	1	Drawer No. 12
Cutters, metal slitting, 1/32" x 2 1/2"	1	Drawer No. 12
Cutters, metal slitting, 3/64" x 2 1/2"	1	Drawer No. 12
Cutters, metal slitting, 1/16" x 2 1/2"	1	Drawer No. 12
Cutters, metal slitting, 3/32" x 2 1/2"	1	Drawer No. 12
Cutters, metal slitting, 1/8" x 2 1/2"	1	Drawer No. 12
Cutters, metal slitting, 5/32" x 2 1/2"	1	Drawer No. 12
Cutters, threading tools, for U. S. S. Threads	1	Drawer No. 8
Cutter, circular, glass, capacity, 3" to 22"	1	Drawer No. 12
Chuck, drill, gear No. 0 to 1/2"	2	Drawer No. 12
Chuck, combination geared screw, 3 jaw, rated size 6"	1	Drawer No. 17
This includes: 10 split collets for draw in check sizes 1/8", 5/32", 3/16", 7/32", 1/4", 9/32", 5/16", 3/8", 7/16", 1/2".		Drawer No. 8

Clamps, tool makers, 1 3/4"	2	Drawer No. 12
Clamps, tool makers, 3 ½2"	2	Drawer No. 12
Clamps, "C" 2 ½"	2	Floor box
Clamps, "C" 6 ½"	2	Floor box
Clamps, "C" 4 ½"	2	Floor box
Countersink, round shank, 82!, 5/8" diam	1	Drawer No. 12
Countersink., 90°, ½" diam., 2 ¼" long, body 1" diam.	1	Drawer No. 12
Countersink, 82°, style No. 5	1	Drawer No. 12
Covers, canvas for books	3	
Cylinder, oxygen, 200 cu. ft. capacity (filled)	1	On Truck
Cylinder, acetylene, 200 cu. ft. capacity (filled)	1	On Truck
Compound, "Duplex" valve grinding, 7 oz boxes	2	Drawer No. 13
Dividers, spring, 6 inch	1	Drawer No. 1
Dividers, spring, 3 inch	1	Drawer No. 1
Drills, set of taper shank, 1/2" to 1 1/4" advancing by 64ths from 1/2" to 1" and by 16ths from 1" to 1 1/4"	37	Drawer No. 3
Drill, drift	1	Drawer No. 3
Drill, holder, Morse taper	1	Drawer No. 16
Drills, straight shank carbon steel as follows:		
14 sizes, 6 of each 1/16 to 17/64, by 64ths	84	Drawer No. 4
7 sizes, 3 of each 9/32 to 3/8, by 64ths	21	Drawer No. 4
8 sizes, 2 of each 25/64 to 1/2 inch, by 64ths	16	Drawer No. 4
Drills and countersinks, diam. of drill 1/16", diam. of body 13/64"	2	Drawer No. 12
Drills and countersinks, diam. of drill 3/32" and 1/8" diam. of body ,302"	1	Drawer No. 12
Drill, portable, electric	1	Floor box
Die-stock set complete, U.S. Form Thread	1	Drawer No. 2
This to include 13 sizes of taps, dies and collets. Each set of taps to include taper, plug and bottom all in hardwood case. No. 0-80, No. 4-48, No. 8-36, No. 14-24, No. 1-72, No. 5-44, No. 9-32, No. 2-64, No. 6-40, No. 10-30, No. 3-56, No. 7-36, No. 12-28.		
Drill, hand and breast, with chuck	1	Drawer No. 15
Dresser, emery wheel	1	Drawer No. 10
Dogs, clamp, lathe, 1 3/4" capacity	1	Drawer No. 16
Dogs, clamp, lathe, 2 3/4" capacity	1	Drawer No. 16
Files:		Drawer No. 9
Handsaw taper, single cut, second cut, 5/8" taper 8"	2	
Mill bastard, single cut 8"	2	
Mill bastard, single cut 10"	2	
Mill bastard, single cut 12"	2	
Mill smooth, single cut, 6"	4	
Half round, second cut, double cut 6", 8", 10", 12"	4	
Mill smooth, single cut, 8"	1	
Mill smooth, single cut, 10"	2	
Mill smooth, single cut, 12"	1	
Round bastard, double cut, 12"	2	
Round, second cut, double cut, 6"	1	
Round, second cut, double cut, 8"	1	

Round, second cut, double cut, 10"	1	
Round, second cut, double cut, 12"	1	
Square bastard, double cut 12"	2	
Square bastard, double cut 14"	1	
Flat bastard, double cut 10"	2	
Flat bastard, double cut 12"	3	
Flat bastard, double cut 14"	1	
Flat, second cut, 10"	2	
Flat, second cut, 12"	3	
Half round, bastard, double cut 10"	1	
Half round, bastard, double cut 12"	1	
Square, second cut, double cut 6"	1	
Square, second cut, double cut 8"	1	
Square, second cut, double cut 10"	1	
Square, second cut, double cut 12"	1	
Taper saw, single cut, 4"	4	
Taper saw, single cut, 6"	2	
3 sq. slim, double cut, second cut 6"	2	
Flashlight, without rubber hood	1	Drawer No. 12
Fuses, 5 amp. union, 250 V	20	Drawer No. 12
Fuses, 10 amp. N. E. C. union, 250 V	20	Drawer No. 12
Fuses, 20 amp. N. E. C. union, 250 V	40	Drawer No. 12
Fuses, 50 amp. N. E. C. union, 250 V	20	Drawer No. 12
Funnels, filtering, set	1	Bench cabinet
Including:		
Small special funnel (carried in floor box)	1	
Extra filtering rings for No. 2 funnel	2	
No. 2 Schuyler filtering funnel	1	
Container box	1	
Frame, hacksaw, adjustable	1	Drawer No. 10
Gauge, center	1	Drawer No. 1
Gauge, micrometerdepth with 2 extra rods	1	Drawer No. 1
Gauge, 20 degrees, screw thread	1	Drawer No. 1
Gauge, worm thread	1	Drawer No. 1
Gauge, Drill	1	Drawer No. 1
Gauge, screw pitch, V thread	1	Drawer No. 1
Gauge, thickness, 9 blades	1	Drawer No. 1
Gauge, universal surface, with 9" spindle	1	Drawer No. 12
Grinder, automobile valve	1	Drawer No. 13
Gears, metric transposing, for lathe ----------set	1	Drawer No. 17
Holder, tool "Agrippa" No. 30-L 3/8" x 15/16" x 5-1/8" with 3/32" x 5/8" tool	1	Drawer No. 8
Holder, tool "Agrippa" No. 30-L 3/8" x 15/16" x 5-1/8" with 5/32" x 5/8" tool	1	Drawer No. 8
Holder, tool "Agrippa" No. 0-L 3/8" x 7/8" x 5-½" off-set turning	1	Drawer No. 8
Holder, tool "Agrippa" No. 30-R 3/8" x 15/16" x 5-1/8" with 3/32" x 5/8" tool	1	Drawer No. 8
Holder, tool ((Agrippa)) No. 30-R 3/8" x 15/16" x 5-½" with 5/32" x 5/8" tool	1	Drawer No. 8
Holder, tool "Agrippa" No. 0-R 3/8" x 7/8" x 5-1/2" with 2 high speed ¼" cutters	1	Drawer No. 8

Holder, tool "Agrippa" No. 0-3/8" x 7/8" x 5" with 2 high speed ¼" cutters	1	Drawer No. 8
Holder, tool "Agrippa" No. 20-R 3/8" x 15/16" x 5-¼" with 3/32" x 5/8" high speed steel cutter	1	Drawer No. 8
Holder, tool 3/8" x 7/8" x 5", U. S. thread	1	Drawer No. 8
Holder, bar boring tool, "Agrippa" No. 80	1	Drawer No. 8
Hammer, claw, bell face	1	Drawer No. 10
Hammer, rounding 2 lb	1	Drawer No. 10
Hammer, machine, ball pein, 12 oz	1	Drawer No. 10
Hammer, machine, oct. shape, ball pein, 1 lb	1	Drawer No. 10
Indicator, test	1	Drawer No. 1
Ladle, melting, 1 1/4 pint capacity	1	Bench cabinet
Lamps, carbon, 40 Watt, 110 Volt	20	Bench cabinet
Lamps, adjustable, floor	3	Bench cabinet
Cord extension, complete	1	Floor Box
Including:		
No. 18 P. K. W. P. Cord	20	
lamp guard	1	
swivel attachment plug	1	
aluminum shell socket with wood handle	1	
Mills, end, spiral, No. 1 Morse Taper	8	Drawer No. 8
1/4", 5/16", 3/8", 7/16", right		
1/4", 5/16", 3/8", 7/16", left hand		
Mills, end, spiral, No. 2 Morse Taper	8	Drawer No. 8
1/2", 9/16", 5/8", 3/4", right		
1/2", 9/16", 5/8", 3/4", left		
Mandrels, taper, Nos. 3 to 9 inclusive (in wooden box)	7	Drawer No. 8
Pliers, long round nose 5-1/2"	1	Drawer No. 1
Pliers, curved nose 5-1/2"	1	Drawer No. 1
Punches, center	3	Drawer No. 1
Parallels, 3/8" x 3/4" x 6"	2	Drawer No. 1
Parallels, 1/2" x 1 x 6"	2	Drawer No. 1
Plate, automobile screw, No. 1463 S. A. E. Standard in a hardwood case	1	Drawer No. 5
(each set to contain stock 22" long, plug taps, dies and guides, from ¼" to 1" advancing by 16ths)		
Reamer, hand, "Aivord" set of 25	1	Drawer No. 4
Reamer, taper pin, "Alvord", Nos. 0 to 5, set	1	Drawer No. 4
Rule 6", graduation No. 7	1	Drawer No. 1
Rule 6", graduation No. 10	1	Drawer No. 1
Rule 3", graduation No. 7	1	Drawer No. 1
Rulers, folding 1 meter	4	Drawer No. 2
Rule, 36" English graduation No. 205	1	Drawer No. 17
Square, try, 6" solid steel	1	Drawer No. 1
Square, try, 3" solid steel	1	Drawer No. 1
Square, set, combination, 12 inch	1	Drawer No. 1
Square, patent double, 4 inch (2 blades and stock)	1	Drawer No. 1
Scriber, improved adjustable sleeve	1	Drawer No. 1
Sleeves, Collet, No. 1 taper inside, No. 2 outside	2	Drawer No. 3
Screwdriver, 4", Smith's "Perfect Handle"	1	Drawer No. 10
Screwdriver, 6", Smith's "Perfect Handle"	2	Drawer No. 10
Screwdriver, 8", Smith's "Perfect Handle"	1	Drawer No. 10

Voltmeter, Ever-ready No. 1005., 0-10 Volt range	1	Drawer No. 12
Vise, machinist, swivel jaw and base 3-½"	1	On Truck
Vise, machinist, swivel jaw and base 4"	1	On Truck
Wrench, adjustable tap, length 7" for 1/16" to ¼"	1	Drawer No. 4
Wrench, adjustable tap, length 11" for 3/16" to ½"	1	Drawer No. 4
Wrench, adjustable tap, length 15" for ¼" to 3/4"	1	Drawer No. 4
Wrench, adjustable tap, length 20" for ½" to 1"	1	Drawer No. 10
Wrench, screw, 10" solid bar	1	Drawer No. 10
Wrench, screw, 12" solid bar		
Wrenches, double end auto, Armstrong Bros. Tool Co. No. 5A semi finished for A. L. A. M. Std. nuts and cap screws in canvas. Nos. 23-B, 27-B, 31-B, 33-B, 37-A	5	Drawer No. 10
Wrench, "Trimo" pipe, metal handle 14", capacity ¼" to 1-½" pipe	1	Drawer No. 10
Wrench, 6" adjustable, Model D, B, & S. Co	1	Drawer No. 10
Wrench, 22-½ degree angle, 6" Cresent adjustable	1	Drawer No. 15
Wrench, 8", 22-½ degree angle	1	Drawer No. 10
Wrench, socket, set	1	Drawer No. 13
Wheel, Norton Alundum, 4-½" x 3/8", grain 3860, grade "N" (Extra for tool post grinder)	1	Drawer No. 15
Wheel, Norton Alundum, 1-½" x 3/8", grain 3860, grade "N" (Extra for tool post grinder)	1	Drawer No. 15
Wheel, Norton Alundum, 10" x 1", grain 46, grade "N" (Extra for bench grinder)	2	Drawer No. 6

APPENDIX II

ARTILLERY SUPPLY TRUCK

(a) (Body equipment).	No. per Car
Chest, bench	1
Cover, canvas for Supply Body	1
Pole, ridge wood	1
Axe	1
Straps, 12" logn, (1 for axe handle, 1 for pickaxe handle, 2 for hatchet handles)	4
Lantern complete, including globe and wick	1
Pads, lantern bracket complete	2
Can, safety 1 gal	1
Straps, lantern bracket	2
Buckets, water, canvas	2
Strap, 22.75" long (for water bucket)	1
Vise, swivel, jaw (with bolts, nuts and washers)	1
Shovels, short handled	2
Straps, 15" long (for short handled shovel)	2
Hatchets	2
Pickaxe	1
Oil, medium, gasoline engine, gallon	1
(b) (Load "A").	
Chest, spring	1
Chest, supply (to contain spare parts for gun, gun carriage and limbers)	1
Chest, supply, containing	1
Bolos, Model 1917	20
Scabbards, bolo, Model 1917	20
Brush, varnish, No. 4-0	1
Brushes, varnish, No. 5-0	2
Cable, high tension, S. A. E. Ignition — feet	25
Leather, bridle, back	1
Leather, collar, back	1
Leather, latigo, side	1
Leather, harness, back	1
Magneto, Elsemann G-4 Second Edition complete with impulse starter, closckwise rotation for Nash Trucks; counter clockwise rotation for F. W. D. Trucks	1
Pliers, wire cutting 8"	6
Plugs, spark 7/8" S. A. E. Stndard "Titan"	24
Tape, friction, 3/4", half pound rolls	4
Tape, rubber, 3/4", half pound rolls	4
Wire, copper, No. 16 gauge, B. & S. spool	1
Wire, soft steel, No. 16 gauge, B. & S., spool	1
*Chest Fluid "A" containing:	1
Brushes, varnish, No. 6-0	2
Brushes, paint, 4" flat (commercial)	4

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* Carried on top of Supply Chest.

t For 8-Inch Howitzers, the oil, recoil cylinder, is to be oil, buffer (British) specified in section V (b) of Equipment Tables.

Cans. 2½" gallon capacity ---------- 20
6 will contain lubricating oil.
6 will contain recoil cylinder oil.
2 will contain camouflage paint, green, 2 cream.
2 will contain camouflage paint, yellow, 2 black.
1 will contain kerosene.
Oil, lubricating, gallons ---------- 15
Oil, recoil cylinder, gallons ---------- 15
Paint for camouflage, green, gallons ---------- 5
Paint for camouflage, yellow, gallons ---------- 5
Paint for camouflage, cream, gallons ---------- 5
Paint for camouflage, black, gallons ---------- 2½
Kerosene, gallons ---------- 2½
Straps, 34" long ---------- 4
Straps, 52" long. (The above straps are for use on the Spring Chest, the Fluid Chest, and the two Supply Chests) ---------- 8
*Chest, grindstone, containing: ---------- 1
Grindstone with frame complete ---------- 1
Wrench, grindstone spanner ---------- 1
*Chest, carpenters, with tools complete ---------- 1
This includes:
1 Carpenter's chest.
1 Axe, bench.
2 Bags, canvas for small stores.
1 Bevel, 8".
6 Bits, augur, sizes .25", .5", .75", 1", 1.25" and 1.5".
1 Bit, expansive, two cutters, .875" to 3".
3 Bits, screwdriver, sizes, .375", .625" and .75".
1 Bit, wood countersink, .625" dia.
1 Brace, ratchet, 10" sweep.
3 Chisels, socket, framing sizes .75", 1" and 1.5".
1 Divider, wing 10".
4 Drills, twist, sizes, .187" (3/16"), .218" (7/32"), .25" and .281" (9/32").
1 File, 10", flat bastard.
6 Files, saw, sizes 4" and 6".
1 Gauge, marking.
2 Gauges, socket, firmer, sizes .5" and 1".
1 Hammer, claw.
2 Handles, file.
1 Handle, tool, containing 10 tools.
1 Knife, drawing, 9" blade.
1 Mallet.
1 Nail set.
1 Oiler.
1 Stone, oil mounted.
1 Pincers, small 6".
1 Plane, jack 16".
1 Plane, smoothing 8".
1 Plate, augur handle.
1 Rasp, wood, 10".
1 Reamer, half round.
1 Rule, boxwood, 2 ft., four fold.

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* Carried in Bench Chest.

1 Saw, crosscut, 24", 7 point.
1 Saw, rip, 24", 5 point.
1 Set, saw.
1 Screwdriver, 5" blade.
1 Spoke shave.
1 Square, steel.
1 Tape, linen, 100 ft.
1 Vise, table, 2.5" jaw.
1 Wrench, screw, 12".

*Chest for Cleaning Material and Small Stores	1
Containing:	
Brushes, sash No. 3	3
Brushes, sash No. 5	3
Brush, camel's hair	1
Burners, lantern	2
Chamois skins	2
Cloth, crocus, quire	1
Cloth, emery, No. O, quire	1
Cloth, emery, No. OO, quire	1
Cloth, emery, No. 1/2, quire	1
Globes, lantern	2
Dressing, leather, russet box	3
Oil, clock, 1-ounce bottle	1
Oil, raw linseed, 1 pint can	1
Petrolatum (in tin box) ounce	5½
Cans, 1 gallon capacity, for sal soda	3
Sal soda, pounds	20
Sandpaper, No. OO, quire	1
Sandpaper, No. 2½, quire	1
Wicks, lantern	5
Chest, Miscellaneous (Carried in Bench Chest)	1
Chest, for testing level (Carried in Miscellaneous Chest)	1
Level, testing, complete (Carried in Testing Level Chest)	1
Box, Oil (Carried in Miscellaneous Chest)	1
Cans, one gallon capacity (to contain light slushing oil)	5
Oil, light slushing, gallons	5
Cans, ½-gallon capacity	6

1 will contain sperm oil.
1 will contain neatsfoot oil.
1 will contain O. D. paint, 2nd coat.
1 will contain O. D. paint, 3rd coat.
1 will contain japan drier.
1 will contain cosmic No. 80, soft.

*Tool-Kit, Saddler's sheepskin with tools, complete	1

This includes:
1 Saddler's Sheepskin Tool Kit.
12 Blades, awl, harness, Nos. 43 to 48 inclusive.

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* Carried in Bench Chest.

1 Awl, pegging.
1 Awl, seat, handled.
1 Bag, canvas, for small stores.
1 Carriage, pricking, 3 wheels.
1 Compass, 6".
1 Creaser, double, lignum vitae.
1 Tool, Edge, No. 1.
1 Tool, Edge, No. 2.
2 Blades, extra with followers for draw gauge.
1 Handle, peg awl, with wrench.
1 Hammer, No. 3 riveting.
2 Hafts, patent awl with wrench.
1 Knife, round.
1 Knife, splitting 6".
1 Needle case, leather.
1 Needle, glover's No. 3 paper.
2 Needles, harness No. 4 paper.
2 Needles, harness No. 5 paper.
2 Needles, harness No. 6 paper.
12 Needles, sacking, assorted.
1 Nippers, cutting 10".
1 Oilstone, unmounted.
1 Pliers, 6".
4 Punches, round assorted.
1 Punch, revolving 4 tubes.
1 Rivet, set.
1 Rule, boxwood, 2 ft, 4 fold.
1 Palm, sewing, leather.
1 Slicker, steel.
1 Shears, 10" bent trimmers.
1 Knife, shoe, broad point.
1 Knife, shoe, square point.
1 Clamp, stitiching.
1 Screwdriver, 3" blade.
1 Tool, claw.
2 Thimbles, best aluminum lined, 2 sizes.

CARRIED IN FLOOR LOCKERS

Handles, axe		4
Handles, hatchet		4
Handles, pickaxe		4
Handles, shovel, short		3
Handles, sledge, model .913		2
Sponges 4"		20
Waste, white cotton	pounds	25

CARRIED WHERE MOST EXPEDIENT

Crowbar 60"		2
Rope, manilla, 1" diameter, 150 foot long		1
Rivets and burrs, brass .5", No. 10	pound	1
Rivets and burrs, brass .625", No. 10	pound	1
Handles, shovel, long		2
Blades, awl, harness assorted Nos. 43 to 48 inclusive		6

Hafts, awl, patent, with wrench		1
Buckles, bar tongueless 5/8" brass		10
Buckles, bar tongueless 1" brass		15
Buckles, roller bar 5/8" bronze		10
Buckles, roller 1¼" bronze		50
Buckles, satchel, 3/8" bronze		20
Buckles, wire 3/4" brass		25
Button, style No. 1, with washer		10
Duck, cotton olive drab, 22" No. 1 yards		23
Clips, end 5/8" brass		25
Clips, end 1" brass		5
Clips, end 1½" brass		25
Fastening, carr durable, male and female		10
Hook, side strap wheel		2
Fastening, Mills military		10
Needles, glovers, No. 3, papers		1
Needles, harness, No. 4, papers		1
Needles, harness, No. 5, papers		1
Needles, harness, No. 6, papers		1
Rope, 3/8" manila hemp, foot		100
Screws, wood, 1" brass, No. 6, 1 gross package		2
Sheepskins with wool on		2
Tacks, copper No. 20, ½ pound paper		1
Tacks, copper No. 20, ½ pound paper		1
Thimble, aluminum lined steel size 3/4"		1
Thread, carpet No. 18, olive drab, pound		1
Thread, shoe, No. 3, brown, pound		1
Thread, shoe, No. 10, brown, pound		1
Wax, stitching, brown, winter, pound		1
Webbing, olive drab, heavy cotton, 5/8" yard		20
Webbing, olive drab, heavy cotton, 1" yard		30
Sledge, model 1907		1
Block, snatch, for 1.25" rope		1
Soap, castile, cakes		12
Block, tackle, double 8"		1
Bucket, water, galvanized steel		2
Crowbar, 60"		1
Sledge, model 1907		1
Rope, manila, 1" diameter, 150 foot long		1
Bucket, water, galvanized steel		2
Bag for forge coal, containing		1
Coal, Blacksmith's, pounds		50
Chest, supply		1
Chest, "Spring"		1
Containing:		
Bolos, model of 1917		2
Scabbards, bolo, model 1917		2
Metal, babbitt (for medium pressure and high-speed tim 30%, antimony 20%, lead 50%)	pounds	12
Bottle for acid, 16 oz		1
Buckles, roller, 1.25" bronze		30
Box, wooden, labeled "Acid"		1
Burners, lantern		2

Calsium Carbide, 1 pound cans	15
Cloth, crocus, quire	1
Cable, high tension, S. A. E., ignition, feet	25
Cloth, emery, No. ½, quires	2
Carburetor, complete for Nash or FWD trucks according to type employed in organization (Stramberg model, L-2, 1⅛" for Nash, Stroberg type G. 1½" for FWD.)	1
Cloth, emery, No. 00, quires	2
Globes, lantern	2
Magneto, complete for Nash or FWD trucks according to type employed in organization (Eisemann type G-4, Second Series, with impulse starter complete; clockwise rotation for Nash; counterclockwise rotation for FWD.)	1
Acid, muristic (18° to 20° acidity)	1
Measure, copper, 1 quart capacity, graduated in pints and litres	1
Sandpaper, No. 2½, quire	1
Plug, spark, 7/8", S. A. E. ("Titan")	24
Wire, copper, No. 16 gauge, B and S, spool	1
Shellac, orange, 1 pint can	1
Wire, soft steel, No. 16 gauge, B and S, spool	1
Extractor, screw, "Ezy Out", set	1
Clamp, Cooper adjustable (in carton)	12
Wicks, lantern	6
Chest, grindstone	1
containing:	
Grindstone and frame complete, with wrench	1
*Chest, carpenter's with tools, complete	1
For contents see page 58, Load A.	
*Chest, miscellaneous	2
Chest, Fluid "D"	1
containing:	
Brushes, paint, 4", flat (commercial)	4
Brush, varnish, No. 6-0	1
Box, labelled "Sal-Soda"	1
Box, labelled "Sal Ammoniac"	1
Can, screw top, one gallon capacity (for japan dryer)	1
Can, screw top, ½ gallon capacity	4
1 will contain O. D. paint, 2nd coat	
1 will contain O. D. paint, 3rd coat	
1 will contain Borax	
1 will contain Cyanide of Potassium	
Cans, paint, 2½ gallon capacity	4
2 will contain paint for camouflage, green	
2 will contain paint for camouflage, yellow	
2 will contain paint for camouflage, cream	
1 will contain paint for camouflage, black	
1 will conatin engine oil	

* Carried in Bench Chest.

1 will contain coal oil.
1 will contain sperm oil.
1 will contain lard oil.
1 will contain gasoline.
1 will contain Pyrene liquid.
1 will contain turpentine.

Borax	pound	1
Cyanide of potassium	pound	1
Drier, japan	gallon	1
Gasoline	gallon	2½
Oil, engine	gallon	2½
Kerosene	gallon	2½
Oil, sperm	gallon	2½
Oil, lard	gallon	2½
Liquid, Pyrene	gallon	2½
Turpentine	gallon	2½
Paint for camouflage, green	gallon	5
Paint for camouflage, yellow	gallon	5
Paint for camouflage, cream	gallon	5
Paint for camouflage, black	gallon	2½
Paint, olive drab, 2nd coat	gallon	½
Paint, olive drab, 3rd coat	gallon	½
Sal ammoniac, lumps	pounds	1
Sal soda	pounds	5
Tape, fricton 3/4", half pound rolls		5
Tape, rubber 3/4", half pound rolls		5

Chest, forge	1
Containing:	
Punch, fore and creaser	1
Chisel, hot iron	1
Shovel, fire	1
Rake, fire	1
Wrench screw	1
File, flat bastard	1
Punch, nail	1
Tongs, 12 inch	1
Punch, round	1
Tongs, ¾" iron	1
Tongs, ½" iron	1
Pritchel	1
Chisel, cold, 8"	1
Forge, portable	1
Chisel, cold iron	1
Hammer, riveting	1
Hammer, hand	1
Handle, file	1
Oiler	1
Rule	1
Hardie	1
Square	1
Screw-plate, taps and dies (U. S. S.) with tap wrench, including chest	1
Drill, rachet	1

Drills, .25, .375, .5 (2 each)	6
Anvil	1
Legs, forge	3
Aprons	2
Bags, canvas	2
Flatter	1
Punch, square	1
Punch, round	1
Wheel, forge gear	1
Set, rivet, .625"	1
Set, rivet, .5"	1
Set, rivet, .375"	1
Set, rivet, .25"	1
Set, rivet, .187" (3/16")	1
*Chest for bolts and rivets	1
Containing:	
Rivents (round head)	
3/16" diameter, ½" long, pounds	1
3/16" diameter, 3/4" long, pounds	1
3/16" diameter, 1" long, pounds	1
¼" diameter, 1" long, pounds	3
¼" diameter, 3/4" long, pounds	2
¼" diameter, 1 1/4" long, pounds	3
5/16" diameter, 3/4" long, pounds	1
5/16" diameter, 1" long, pounds	1
5/16" diameter, 1½" long, pounds	1
3/8" diameter, 1" long, pounds	8
3/8" diameter, 1 3/4" long, pounds	8
½" diameter, 1¼ " long, pounds	4
½" diameter, 2" long, pounds	4
5/8" diameter, 1½" long, pounds	5
3/4" diameter, 2¼ long, pounds	8
Rivets (countersunk, 60° head)	
3/8" x 3/4" pounds	5
½" x 2½", pounds	5
½" x 3", pounds	5
5/8" x 2½", pounds	5
Rivets, brass (button head).	
¼" diameter, 1" long, pounds	2
Bolts, stove with nuts (round head)	
3/16" x 1"	100
3/16" x 1½"	100
¼" x 1"	100
¼ x 1½"	100
Bolts, machine, (square head with square nuts)	
3/8" x 1¼"	50
3/8" x 2"	50
½" x 1¼"	25
½" x 2"	25
½" x 3"	25

5/8" x 3"	25
3/4" x 2"	25
3/4" x 4"	25

* Carried in Bench Chest.

Washers, wrought iron.	
½" pounds	2
5/16" pounds	2
7/16" pounds	5
9/16" pounds	4
11/16" pounds	4
13/16" pounds	4
Straps, 34" long	4
Straps, 52" long. (These straps for holding the Spring Chest, the Forge Chest and the Fluid Chest in place.)	8
Chest for Bar Stock	1
Containing:	
Forged steel, (round).	
½" diameter x 4 feet long	1
3/8" diameter x 4 feet long	1
½" diameter x 4 feet long	1
5/8" diameter x 4 feet long	1
Forged steel, (flat).	
3/8" x 1" x 4 feet long	1
3/8" x 1¼" x 4 feet long	1
½" x 1¼" x 4 feet long	1
5/8" x 2" x 4 feet long	1
5/8" x 2½" x 4 feet long	1
3/4" x 1½" x 4 feet long	1
3/4" x 2½" x 4 feet long	1
1" x 2" x 4 feet long	1
1" x 3" x 4 feet long	1
Steel, cold rolled (round).	
3/16" diameter x 4 feet long	2
¼" diameter x 4 feet long	2
3/8" diameter x 4 feet long	2
½" diameter x 4 feet long	1
5/8" diameter x 4 feet long	1
3/4" diameter x 4 feet long	1
1" diameter x 4 feet long	1
1¼" diameter x 4 feet long	1
Steel, cold rolled (square)	
½" square x 4 feet long	1
3/4" square x 4 feet long	1
1" square x 4 feet long	1
Steel, cold rolled (hexagon).	
3/4" hexagon x 4 feet long	1
1" hexagon x 4 feet long	1
1¼" hexagon x 4 feet long	1
Rods, brass, round (half hard).	
1/8" diameter x 4 feet long	1
¼" diameter x 4 feet long	1

3/8" diameter x 4 feet long	1
3/4" diameter x 4 feet long	1
Steel, flange.	
1/16" stock, 2 feet x 4 feet, sheared plates	1
3/32" stock, 2 feet x 4 feet, sheared plates	1
1/8" stock, 2 feet x 4 feet, sheared plates	1
3/16" stock, 2 feet x 4 feet, sheared plates	1
¼" stock, 2 feet x 4 feet, sheared plates	1
Steel, tool. Armstrong Special or equal (round).	
⅜" diameter x 3 feet long	1
½" diameter x 3 feet long	1
Steel, tool, Armstrong Special or equal (square).	
3/16" square x 3 feet long	1
¼" square x 3 feet long	1
3/8" square x 3 feet long	1
5/16" square x 3 feet long	1
7/16" square x 3 feet long	1
Steel, tool, Armstrong Special or equal (flat).	
3/8" x ½" x 3 feet long	1
Pipe, wrought iron.	
3/8" pipe, 4 feet long	1
½" pipe, 4 feet long	1
3/4" pipe, 4 feet long	1
1" pipe, 4 feet long	1
Elbows, malleable iron.	
3/8" Standard 1 P Elbow	3
½" Standard 1 P Elbow	3
3/4" Standard 1 P Elbow	3
1" Standard 1 P Elbow	3

CARRIED IN FORGE CHEST.

Bar-bronze for bushings, "Non-Gran" assortment, No. 6-54	1

This includes:

1 Special reinforced canval roll, with strap complete and compartment for carrying bars.
1 Bar, solid 7/8" x 12".
1 Bar, hollow, 1" x 12", ½" hole.
1 Bar, hollow, 1¼" x 12", 5/8" hole.
1 Bar, hollow, 1 3/8" x 12", 3/4" hole.
1 Bar, hollow, 1½" x 12", 7/8" hole.
1 Bar, hollow, 1 5/8" x 12", 1" hole.

CARRIED IN FLOOR LOCKER.

Handles, pick axe	2
Handles, axe	2
Handles, long handled shovel	2

Handles, short handled shovel	3
Handles, hatchet	4
Handles, pick mattock	2
Waste, white cotton, pounds	25

SEE PAGE 12 OF THIS REPORT

TABLE X

COMPOSITION OF ARTILLERY MATERIAL FOR A REGIMENT OF 8-INCH HOWITZERS (VICKERS, MARK VI), AMERICAN EQUIPMENT.
(If Regiment Is Provided with British Equipment, See Table No. 9.)

1	2	3	4	5	6
Articles	Battery	HQ Company	Supply Company	Total Regiment	Remarks
ORDNANCE PROPERTY					
8-Inch Howitzer, model of 1917 (Vickers, Mark VI.)	4	..	..	24	
8-Inch Howitzer carriages, model of 1917 (Vickers, Mark VI), complete, with sight gear, panoramic sight, dial sight, and range quadrant.	4	..	..	24	
8-Inch Howitzer carriage limber model of 1917	4	..	..	24	
8-Inch Howitzer firing platform, model of 1917	4	..	..	24	
SPARE PARTS, TOOLS AND ACCESSORIES OF 8-INCH HOWITZERS, MODEL 1917 (VICKERS, MARK VI)					
TOOLS AND ACCESSORIES FOR HOWITZERS					
Gunner's quadrant	4	..	..	24	
Wrench No. 137	4	..	..	24	
Wrench No. 138	4	..	..	24	
Thickness gauge, obturator	2	..	..	12	
Bronze reamer primer seat	8	..	..	48	
Cold chisel	4	..	..	24	
Screwdriver, 10-inch	4	..	..	24	
Copper hammer	2	..	..	12	
Gunner's punch	4	..	..	24	
Gunner's drill	4	..	..	24	
Large drift	4	..	..	24	
Small punch	4	..	..	24	
Cleaning reamer	4	..	..	24	
Small drift	4	..	..	24	
Wire-cutting pliers, 8-inch	4	..	..	24	
Hand mallet	2	..	..	12	
Lanyard	8	..	..	48	
Ball peen hammer	4	..	..	24	
File, three-cornered, 8-inches long, with handle	4	..	..	24	

1	2	3	4	5	6
Articles	Battery	HQ Company	Supply Company	Total Regiment	Remarks
File, flat, 8 inches long, dead smooth, with handle	4	..	..	24	
File, round, second cut, 8 inches long	4	..	..	24	
File, round, smooth, 8-inch	4			24	
File handles	28	..	..	168	
File, half round, smooth, 8 inches long	4	..	..	24	
File, pillar, No. 6, 6 inches long	4	..	..	24	
File, three-cornered, No. 4	4	..	..	24	
8-inch screw wrench	4	..	..	24	
Obturator press, complete	4	..	..	24	
Muzzle cover	4	..	..	24	
Breech cover	4	..	..	24	
Tool kit, No. 1	4	..	..	24	
File kit	4	..	..	24	
Bronze reamer case	4	..	..	24	
Cover for guns	4	..	..	24	
Spare parts pouch and rolls	4	..	..	24	
SPARE PARTS FOR HOWITZERS					
Breech lock, rotating cam	1	..	..	6	
Rotating cam and control arc screw	6	..	..	36	
Control arc	1	..	..	6	
Rotating cam screw	1	..	..	6	
Lever bearings	1	..	..	6	
Crank shaft with nut and split pin	2	..	..	12	
Bearing washer	4	..	..	24	
Cross head	4	..	..	12	
Lever bearing securing bolt and split pin	2	..	..	12	
Hinge pin and split pin	1	..	..	6	
Lever catch plate screw	2	..	..	12	
Spring retaining block securing pin	2	..	..	12	
Lever catch	2	..	..	12	
Catch plate	2	..	..	12	
Lever catch retaining spring lock	1	..	..	6	
Lever catch spring	4	..	..	24	
Lever arm	1	..	..	6	
Obturator pad	8	..	..	48	
Adjusting disk	6	..	..	36	
Outer rear ring	4	..	..	24	
Front protecting disk	4	..	..	24	
Front ringer	4	..	..	24	
Inner rear ring	4	..	..	24	
Obturator spindle	4	..	..	24	
Obturator spindle spring	4	..	..	24	

1	2	3	4	5	6
Articles	Battery	HQ Company	Supply Company	Total Regiment	Remarks
Obturator spindle vent bushing	6	..	..	36	
Obturator spindle plug	4	..	..	24	
Obturator spindle plug gasket	4	..	..	24	
Obturator box, complete	2	..	..	12	(1) 1 for two batteries.
Breech block (1)	..	..	..	..	
Breech block rollers	6	..	..	36	
Breech block rollers axis pin with split pin	6	..	..	36	
Breech block retaining plate	1	..	..	6	
Breech block retaining plate actuating pin with spring rivet	2	..	..	12	
Retaining plate actuating pin retaining rivet	4	..	..	24	
Carrier (1)	..	..	..	..	(2) Includes firing
Handy oiler (Bennet)	..	..	..	..	and percussion
Breech mechanism, complete (2), (3)	..	..	..	..	mechanism, complete (3) 1 for 1 battery,
Retainer pin with split pin	4	..	..	24	(4) Screw included.
Retainer ring (4)	2	..	..	12	
Firing pin	12	..	..	72	
Firing pin guide	8	..	..	48	
Firing pin housing	8	..	..	48	
Firing mechanism block	8	..	..	48	
Firing mechanism block handle	8	..	..	48	
Firing mechanism housing	6	..	..	36	
Firing mechanism safety plunger housing	2	..	..	12	
Firing mechanism safety plunger can	2	..	..	12	
Firing mechanism safety plunger spring	6	..	..	36	
Firing mechanism safety plunger	6	..	..	36	
Safety plunger guide screw	2	..	..	12	
Percussion hammer	4	..	..	24	
Percussion hammer lock bolt	1	..	..	6	
Percussion hammer lock bolt spring	1	..	..	6	
Lock bolt spring set screw	1	..	..	6	
Percussion hammer lock bolt stud	4	..	..	24	
Percussion hammer operating shaft	1	..	..	6	
Percussion hammer operating shaft collar	1	..	..	6	
Percussion hammer operating shaft collar detent	1	..	..	6	
Percussion hammer bearing bracket (1) (4)	..	..	..	..	
Primer, seat plut	8	..	..	48	
Firing pin spring	12	..	..	72	
Firing mechanism block latch	2	..	..	12	
Firing mechanism block latch spring	6	..	..	36	

1	2	3	4	5	6
Articles	Battery	HQ Company	Supply Company	Total Regiment	Remarks
Firing mechanism block latch spring holder	2	..	..	12	
Firing mechanism block latch holder	2	..	..	12	
Firing mechanism block latch holder screw	8	..	..	48	
Firing mechanism block latch holder handle	2	..	..	12	
Firing mechanism housing screw	6	..	..	36	
Firing mechanism block safety latch bracket	2	..	..	12	
TOOLS AND ACCESSORIES FOR CARRIAGE					
Spanner No. 17	2	..	..	12	
Spanner No. 7	2	..	..	12	
Spanner No. 2	2	..	..	12	
Spanner No. 1	2	..	..	12	
Spanner No. 3	4	..	..	24	
Spanner No. 6	4	..	..	24	
Spanner No. 4	4	..	..	24	
Spanner No. 5	4	..	..	24	
Tool for withdrawing split pins	4	..	..	24	
Spanner No. 11	4	..	..	24	
Spanner No. 9	4	..	..	24	
Hand spike	16	..	..	96	
Spanner No. 15	4	..	..	24	
Spanner No. 10	4	..	..	24	
Spanner No. 8	2	..	..	12	
Tommy bar, 8 inches	2	..	..	12	
Spanner No. 12	2	..	..	12	
Spanner No. 13	2	..	..	12	
Spanner No. 16	2	..	..	12	
Spanner No. 18	4	..	..	24	
Spanner No. 19	4	..	..	24	
Spanner No. 20	4	..	..	24	
Screwdrivers, sight gear	4	..	..	24	
Spanner No. 23	4	..	..	24	
Spanner No. 24	4	..	..	24	
Tubular spanner	4	..	..	24	
Spanner No. 21	2	..	..	12	
Tommy bar, large	4	..	..	24	
Pressure gauge	2	..	..	12	
Adaptor washer	4	..	..	24	
Adaptor	2	..	..	12	
Cap adaptor	2	..	..	12	
Adaptor pressure gauge	2	..	..	12	
Washer, cap adaptor	2	..	..	12	
Washer, adaptor	2	..	..	12	
Lock, point adaptor	2	..	..	12	
Oil strainer	2	..	..	12	
Washer plut adaptor	2	..	..	12	

1	2	3	4	5	6
Articles	Battery	HQ Company	Supply Company	Total Regiment	Remarks
Plug adaptor	2	..	..	12	
Filling measure	2	..	..	12	
Filling measure	2	..	..	12	
Sight covers	4	..	..	24	
Horizontal oiler	4	..	..	24	
Oil can, 6-quart	8	..	..	48	
Tool kit No. 2	4	..	..	24	
Tool kit No. 3	4	..	..	24	
Carriage, spare-part pouch	4	..	..	24	
Trunnion roller-bearing pouch	4	..	..	24	
Tin box for packing	4	..	..	24	
Lubricating can No. 3	4	..	..	24	
Case for lubricating can	4	..	..	24	
Grease box, 3-pound	4	..	..	24	
Clinometer, in case, assemble	4	..	..	24	
Air compressor, portable	2	..	..	12	
Air compressor, connections	2	..	..	12	
Bucket, water	4	..	..	24	
Cleaning brush	8	..	..	48	
Cover for air compressor	2	..	..	12	
Lifting bar for air compressor	4	..	..	24	
Projectile bearer	8	..	..	48	
Air resevoir, filling recuperator	4	..	..	24	
Air reservoir adaptor	2	..	..	12	
Canvas roll for trunnion rollers	1	..	..	6	
Pump, portable, liquid	2	..	..	12	
Syringe, extracting, liquid	2	..	..	12	
Stave, end, No. 15	4	..	..	24	
Staff, intermediate	4	..	..	24	
Sponge and brush	4	..	..	24	
Case, steel, for panoramic sight	4	--	--	24	
Rammer	4	..	..	24	
Loading barrow	4	..	..	24	
Gunners quadrant, model of 1896, with case (5)	..	..	..	..	(5) 2 per battery.
Oil can	12	..	..	72	
Outrigger stay	8	..	..	48	
Outrigger	8	..	..	48	
Shovel, long	4	..	..	24	
Carriage spare parts roll	1	..	..	6	
TOOLS AND ACCESSORIES FOR LIMBER					
Obturator box, complete	4	..	..	24	
Oil can, 6-quart	4	..	..	24	
Paulin, 12 by 12 feet	4	..	..	24	
Lantern, complete	4	..	..	24	
Lantern pads	4	..	..	24	
Lantern straps	4	..	..	24	
Limber spare part pouch	4	..	..	24	
Pole prop	4	..	..	24	
Limber spare parts roll	1	..	..	6	

1	2	3	4	5	6
Articles	Battery	HQ Company	Supply Company	Total Regiment	Remarks
Straps:					
Blanket (paulin)	12	..	..	72	
Ax	4	..	..	24	
Grease box	4	..	..	24	
Pickax	4	..	..	24	
Shovel, short	4	..	..	24	
Pick mattock	4	..	..	24	
Obturator box (this box is a spare accessory)	1	..	..	6	
Picket rope	4	..	..	24	
TOOLS AND ACCESSORIES FOR FIRING PLATFORM					
Spanner No. 22	4	..	..	24	
Spanner No. 25	4	..	..	24	
Pickax	4	..	..	24	
Short-handled shovel	4	..	..	24	
Hatchet	4	..	..	24	
Ax	4	..	..	24	
Long handled shovel	4	..	..	24	
Pick mattock	4	..	..	24	
Spanner, 26-inch	4	..	..	24	
Tommy bar (Spanner No. 26), 13 inch	4	..	..	24	
TOOLS AND ACCESSORIES FOR SUPPLY TRUCK					
Oil can, 7½-gal, (recoil cylinder)	1	..	..	6	
Oil can, 7½ gal, (glycerin)	1	..	..	6	
Obturator box, complete	1	..	..	6	
SPARE ACCESSORIES FOR CARRIAGES AND SPARE PARTS OF ACCESSORIES					
Clinometer assembled in case	1	..	..	6	
Chest for spare sight	1	..	..	6	
Air compressor connection	1	..	..	6	
Chain cap square, pin key	2	..	..	12	
Chain, locking plate, left-hand recuperator	1	..	..	6	
Chain, locking plate, right-hand recuperator	1	..	..	6	
Chain, pin, air-compressor trail	1	..	..	6	
Chain, lock, bolt traveling lock	1	..	..	6	
SPARE PARTS FOR CARRIAGES RECUPERATOR					

1	2	3	4	5	6
Articles	Battery	HQ Company	Supply Company	Total Regiment	Remarks
Locking plate, air plug, right-hand side	4	..	..	24	
Washer air plug, air reservoir, right-hand	12	..	..	72	
Locking plate, front nut air reservoir	4	..	..	24	
Locking plate, rear extention plug	2	..	..	12	
Packing gland, front plug recuperator	16	..	..	96	
Packing gland buffer plug	8	..	..	48	
Lock plate front plug recoil cylinder	4	..	..	24	
Locking plate front plug	4	..	..	24	
Locking plate recuperator liners, rear end	4	..	..	24	
Stud for locking plate	2	..	..	12	
Neck ring air valves	4	..	..	24	
Nut spindle air valve	4	..	..	24	
Filling plug	4	..	..	24	
Adaptor front plug	2	..	..	12	
Stud locking plate, rear	2	..	..	12	
Leather ring, front plug recuperator	24	..	..	144	
Breech nut	2	..	..	12	
Recuperator rod nut front	8	..	..	48	
Collar recuperator rod front	4	..	..	24	
Rear nut, recoil cylinder, piston rod	4	..	..	24	
Front nut recoil cylinder, pistor rod	4	..	..	24	
Bearing strip for piston	4	..	..	24	
Air and filling plug recoil cylinder	8	..	..	48	
Screw securing pin bearing strip	12	..	..	72	
Spring	8	..	..	48	
Packing, garlock, rings	16	..	..	96	
Recuperator rod leather, 0.187 3/16 by 3	8	..	..	48	
Collar recuperator rod, 0.187 3/16 by 2.5		..	..	24	
Rear nut recoil cylinder piston rod, 0.212 5/16 by 3.5		..	..	24	
Front nut recoil cylinder piston		..	..	24	
Ring, packing for air valve (in tin box)	4	..	..	24	
CRADLE					
Nut, hinge bo't cradle	2	..	..	12	
Screw for securing leather pa/	1	..	..	6	
Trunnion roller bearing, comp'te	4	..	..	24	

1	2	3	4	5	6
Articles	Battery	HQ Company	Supply Company	Total Regiment	Remarks
Roller path trunnion roller bearing, outer	2	..	..	12	
Roller path trunnion roller bearing, inner	2	..	..	12	
Roller, trunnion bearing	64	..	..	384	
VARIABLE RECOIL GEAR					
Pin axes, rear connecting rod and split pin	4	..	..	24	
Pin spindle cut-off and split pin	4	..	..	24	
ELEVATING AND TRAVERSING GEAR					
Pivot nut gear box	4	..	..	24	
Bail thrust washer	1	..	..	6	

1	2	3	4	5	6
Articles	Battery	HQ Company	Supply Company	Total Regiment	Remarks
Nut spindle-worm elevating and split pin	2	..	..	12	
Nut pinnion elevating and split pin	4	..	..	24	
Locking plate bushing	2	..	..	12	
Screw pointer, traversing	4	..	..	24	
Collar securing sight-operating bracket	4	..	..	24	
Traversing pointer screws	4	..	..	24	
Traversing pivot nut top carrier	4	..	..	24	
QUICK LOADING GEAR					
Bushing bracket plunger	1	..	..	6	
Pin rod fork end front and split pin	4	..	..	24	
Fork end front rod	4	..	..	24	
Fork end rear rod	4	..	..	24	
Pin rod fork end rear and split pin	4	..	..	24	
Nut for plunger bracket	4	..	..	24	
Spring for quick loading gear	12	..	..	72	
TOP CARRIAGE					
Locking screw key pin	2	..	..	12	
TRAVELING LOCK					
Locking pin, traveling lock	4	..	..	24	
BRAKE					
Brake blocks	12	..	..	72	
Nut, spindle and brake gear	2	..	..	12	
Washer, spindle and brake gear	6	..	..	36	
Coach screw, brake block	12	..	..	72	
Nut pin brake gear and split pin	4	..	..	24	
Nut, pin hanger and split pin	4	..	..	24	
Nut, spindle brake gear	2	..	..	12	
Bolt brake bracket	4	..	..	24	
Collar rocking pin	6	..	..	36	
TRAIL					
in T draft	4	..	..	24	
Nuts, axle bolt (sets)	1	..	..	6	
Nuts, bolt axle (set)	1	..	..	6	
Washer bolt axle	18	..	..	108	
Wheels, carriage complete	2	..	..	12	
Pin, securing air compressor with chain	4	..	..	24	

1	2	3	4	5	6
Articles	Battery	HQ Company	Supply Company	Total Regiment	Remarks
Bolt, securing angle stiffener to spade	8	..	..	48	
Nuts, for bolt	8	..	..	48	
Check nuts	2	..	..	12	
Locking pin, trail, firing platform	2	..	..	12	
Washer, transom bolts	2	..	..	12	
Socket for locking pin, trail	4	..	..	24	
LOADING BARROW					
Loading barrow, complete	1	..	..	6	
SIGHT					
Sight, complete	1	..	..	6	
Nut, securing cotter	2	..	..	12	
Eye fore sight cap	2	..	..	12	
Nut, clamping screw	2	..	..	12	
Bolt for gear case, 6.2 long	2	..	..	12	
Nuts for gear casing bolts	3	..	..	18	
Bolts for gear casing	4	..	..	24	
SPLIT PINS					
0.062 1/16 by 1.25	10	..	..	60	
0.093 3/32 by 1.5	10	..	..	60	
0.125 by 1.75	25	..	..	150	
0.187 3/16 by 1.5	15	..	..	90	
0.187 3/16 by 2.5	15	..	..	90	
0.187 3/16 by 3.25	10	..	..	60	
RIVETS					
Button head:					
0.25 by 2, pound	1	..	..	6	
0.375 by 1.75, pound	3	..	..	18	
0.437 1/16 by 2.25, pound	4	..	..	24	
0.5 by 2, pound	5	..	..	30	
Countersunk head:					
0.187 3/16 by 1.75, pound	1	..	..	6	
0.75 by 2.5, pound	1	..	..	6	
0.375 by 2, pound	2	..	..	12	
0.5 by 1.5 pound	3	..	..	18	
0.5 by 4, pound	5	..	..	30	
0.625 by 2, pound	3	..	..	18	
0.75 by 3.5, pound	5	..	..	30	
CARRIAGE SPARE PARTS CARRIED IN LEATHER POUCH					

1	2	3	4	5	6
Articles	Battery	HQ Company	Supply Company	Total Regiment	Remarks
Fiber washer, air and filling plug	16	..	..	96	
Leather washer plug adaptor front plug	8	..	..	48	
Spring recuperator gland	8	..	..	48	
Spring throttle valve	8	..	..	48	
Adjusting plug retarding	4	..	..	24	
Washer plug recuperator	16	..	..	96	
Washer plug retarding	8	..	..	48	
Packing, front plug recuperator cylinder	2	..	..	12	
Packing, front plug recoil cylinder	2	..	..	12	
Spring recoil cylinder	4	..	..	24	
Joint ring, steel	2	..	..	12	
Joint ring, leather	8	..	..	48	
U-ring, leather	16	..	..	96	
Screws securing bracket, connecting rod	4	..	..	24	
Screw cover, gear box traversing	4	..	..	24	
Screw securing locking plate bush	4	..	..	24	
Screw scale, elevating	4	..	..	24	
Screw pointer, elevating	4	..	..	24	
Screw scale, traversing	4	..	..	24	
Spring plunger, left hand	4	..	..	24	
Spring plunger, right hand	4	..	..	24	
Screw securing bracket, quick-loading gear	4	..	..	24	
Guide pin for bracket	4	..	..	24	
Screws for lever cover bracket	4	..	..	24	
Screw securing cover, elevating and traversing gear	8	..	..	48	
Screw securing guide gun carriage bracket	4	..	..	24	
Locking bolt	4	..	..	24	
Locking pin traveling	6	..	..	36	
Belleville spring washer	6	..	..	36	
Screw clamping	4	..	..	24	
Handle, clamping screw	1	..	..	6	
SPARE PARTS FOR CARRIAGE LIMBERS					
Bolts, axle flange outer with nut	16	..	..	96	
Pins, axle cap with split pins	8	..	..	48	
Pin, coupling engine draft	4	..	..	24	
Wheels, limber, complete	2	..	..	12	
Pin, draft pile	4	..	..	24	
Key, split flat	4	..	..	24	
Chain, key split flat	4	..	..	24	
Outrigger, part (1 off, 1 near)	4	..	..	24	
Eye, chain	4	..	..	24	

1	2	3	4	5	6
Articles	Battery	HQ Company	Supply Company	Total Regiment	Remarks
Stay, outrigger	1	..	..	6	
Key, outrigger, complete	4	..	..	24	
Pin, joint outrigger	8	..	..	48	
Burr, joint pin, outrigger	12	..	..	72	
Key, limber hook	4	..	..	24	
Loop, singletree, middle	4	..	..	24	
Loop, singletree, end	8	..	..	48	
Pin, connecting pole and split pin	4	..	..	24	
Lunette pin, 3.8 long	4	..	..	24	
Lunette pin, 3.9 long	4	..	..	24	
Draft link pin	2	..	..	12	
Connecting pole	2	..	..	12	
Tie, outrigger stay	1	..	..	6	
Bolt, axletree band with nuts	4	..	..	24	
Bolt, stay with nuts	4	..	..	24	
SPLIT PINS					
0.125 by 2	20	..	..	120	
0.187 3/16 by 3.25	20	..	..	120	
RIVETS					
Button head:					
0.25 by 1.75, pound	1	..	..	6	
0.375 by 1.5, pound	3	..	..	18	
0.5 by 1.5, pound	3	..	..	18	
Countersunk head:					
0.25 by 1.5, pound	1	..	..	6	
0.375 by 2, pound	2	..	..	12	
Tube rivets	8	..	..	48	
SPARE PARTS FOR FIRING PLATFORM					
Axle	1	..	..	6	
Eyes for lifting screw	4	..	..	24	
Bolt lifting screw eye	2	..	..	12	
Pin, lifting eye	2	..	..	12	
Nut, lifting screw eye	6	..	..	36	
Firing platform lifting screw eye	2	..	..	12	
Washer seat	2	..	..	12	
Scat, lifting screw	6	..	..	36	
Sleeve, lifting screw	6	..	..	36	
Traveling instruction plate	1	..	..	6	
Screws, securing instruction plate	2	..	..	12	

APPENDIX I

ARTILLERY REPAIR TRUCK

(a) (Body equipment).	No. per Car
Support for drill press	1
Frame for lathe	1
Drawer for lathe frame	1
Cabinet, bench, complete, including all drawers and compartments	1
Screen, generating unit, assembled	1
Frame, body cover, complete	1
Cover, canvas, for body	1
Hatchets	2
Pickaxe	1
Straps, 12" long (2 for hatchets, 1 for pickaxe and 1 for axe)	4
Shovels, short handled	2
Straps, 15" long (for short-handled shovels)	2
Lantern, complete, with globe and wick	1
Axe	1
Can, safety, 1 gallon capacity	1
Straps, lantern bracket	2
Pads, lantern bracket, complete	2
Buckets, water, canvas	2
Strap, 22-3/4" long (for water bucket)	1
Oil, medium, gasoline engine, gallon	1
Sibley stove, complete	1
Including:	
Shield tent for Sibley stove	1
Joints for Sibley stove	4
Elbow for Sibley stove	1
(b) (Body attachments).	
Generating unit, 4 K. W. complete	1
Spare parts for generating unit:	
Connecting rod bearings ---------- pair	4
Piston rings, 1/8"	4
Piston rings, 3/16"	2
Cylinder head gaskets	2
Valves	2
Valve tappet	1
Drill press	1
Cover, canvas, for drill press	1
Cover, generator	1
Switchboard, complete	1
Lathe, screw cutting 9", Star No. 20, 36" between centers	1
The following accessories for lathe are carried in lathe frame drawer No. 16:	
Straight tool post with rocker, washer, etc	1
Follow rest	1
Face plate 9"	1
Space bolts for steady rest	2
Space bolt for steady rest with blocking	1
Block for straight tool post 2"	1

Drill holder for lathe		1
Lathe clamp dogs		2
Sleeve for lathe centers		1
Lathe centers No. 2 Morse taper		3
Lathe center dog		1
Tall stock wrench		1
Cover lathe		1
Motor, lathe		1
Grinder, bench		1
This includes:		
Norton Alundum wheels 10 x 1" grain 46, grade 0	2	
Adjustable steel wheel guards	2	
Detachment water pot	1	
Operating switch	1	
Cover grinder and emery wheel		1
Compressor, air		1
Compressor, attachments and accessories:		
Hammer, 3BK Boyer riveting and chipping		1
Sets for button head rivets, one each, sizes 3/16, ¼, 5/16, 3/6, 7/16, and ½ (to suit 3BK hammers)		6
Tools, chipping, set of 12		1
Wrenches, for type 3BK hammers, set		1
Nipple, hose, ½" x 3/8"		1
Tank, air receiver, 14" dia. x 48" long		1
Gauge, air pressure		1
Hose, metal, in 10 ft. lengths		1
Valve, check, 3/4" horizontal, brass body		1
Valve, consolidated safety pop, brass		1
Cock, drain brass, for 3/8" pipe tap		1
Hose, 5 ply ½" armored "Quarry" 25 ft. lengths		2
Couplings, female half, extra		2
Couplings, male half, extra		2
Nipples, gas pipe, 3/4" x 2"		3
Tee, malleable iron, 3/4"		1
Valves globe, brass body, No. 12 soft disc		2
Nipples, gas pipe, 3/4" x 4" long		2
Union, malleable; 3/4" with round valve settings, No. 519		1
Apparatus, oxy-acetylene welding and cutting, complete, with the following accessories. (carried in apparatus case)		1
No. 3000 Standard Two-Hose Cutting Torch with five tips, Nos. 1, 2, 3, 4, and 5	1	
No. 2 oxygen regulator, gauges 400 to 3000 lbs	1	
No. 2 acetylene regulator, new style, gauges 30 to 400 lbs	1	
No. 146 Standard Welding Torch with five tips, Nos. 6, 7, 8, 9, and 10	1	
Decarbonizing Torch	1	
25 ft. Standard Black Hose		
25 ft. Standard Red Hose		
Spark Lighter	1	
Pair Canvas Gloves	1	

Bunson Burner (Acetylene)	1
Atlas Goggles ----------pair	2
Torch Wrenches	2
Steel Carrying Case	1
Regulating Wrench	1
Carried in Supply Cabinet:	
3/16" Davis-Bournonville Welding Rods ----------lbs.	6½
1/4" Davis-Bournonville Welding Rods ----------lbs.	6½
1/8" Davis-Bournonville Welding Rods ----------lbs.	5½
3/16" Atlas Cast Iron Welding Rods ----------lbs.	4½
1/4" Vanadium Steel Rods ----------lbs.	1
1/4" Atlas Cast Iron Welding Rods ----------lbs.	9
3/16" Nickel Steel Rods ----------lbs.	11½
1/4" Gem Welding Rods ----------lbs.	4
1/4" Marvel elding Rods ----------lbs.	5½
1/4" Aluminum Welding Rods ----------lbs.	2½
Peerles Aluminum Flux ----------lb.	1
Marvel Flux ----------lb.	1
Cast Iron Sealing Powder ----------lb.	1
Extra set tips for cuting torch (Nos. 1, 2, 3, 4, and 5)	1
Set Tips for Standard Welding Torch (Nos. 6, 7, 8, 9, 10)	1
Set Special Tips for Welding Troch for use with light gauge metal Nos. 0, 1, 2, 3, and 4	1
Set Special Brushes for cleaning, welding and cutting tips	1
Extra Set Atlas Goggles	1
Extra Pair Canvas Gloves	2
Half Dozen Renewals for Spark Lighter	1
Steel Carrying Case	1
Book of Instructions	1
Grinder, tool post	1
This includes:	
Norton Alundum wheel 4 1/2" x 3/8" Grain 3860, grade N	1
Norton Alundum wheel 1 1/2" x 3/8" Grain 3860, grade N	1
Extension Mandrel, 4 1/2" long, 3/8" dia	1
Tooth rest	1
Shank 5/8" x 1" x 4 1/2" and to have 7' lengths of two conductor cables with fused attachment plug and two extra fuses ready for use	1

(c) (Load).

	No. per Car.	Location.
Ameter No. 1002 Ever-ready 0-35 Amp. range	1	Drawer No. 12
Attachment, milling and gear cutting	1	Drawer No. 17
Bushings, expansion (sizes ½" to 1 1/7") advancing by 16th (in wooden box)	23	Drawer No. 8
Blades, hacksaw, 10"-24 teeth	12	Drawer No. 10
Blades, hacksaw, 10"-14 teeth	12	Drawer No. 10
Batteries, tungsten, American Ever-ready	2	Drawer No. 12
Bulb, lamp, Mazda, American Ever-ready	1	Drawer No. 12
Blocks, drill with clamps, set complete	1	Drawer No. 12
Book, "American Machinists" Hand Book"	1	Drawer No. 7
Book, "Audel's Automobile Questions and Answers for Operators and Repairmen	1	Drawer No. 7

Book, "Automobile Repairing Made Easy"	1	Drawer No. 7
Calipers, lock-joint transfer, inside 10 inch	1	Drawer No. 1
Calipers, lock-joint transfer, outside 100 inch	1	Drawer No. 1
Calipers, hermaphrodite, 6 inch, firm joint with adjustable point	1	Drawer No. 1
Calipers, spring, 6 inch, outside	1	Drawer No. 1
Calipers, spring, 6 inch, inside	1	Drawer No. 1
Calipers, spring, 3 inch, outside	1	Drawer No. 1
Calipers, spring, 3 inch, inside	1	Drawer No. 1
Calipers, pocket slide	1	Drawer No. 1
Calipers, pocket slide	1	Drawer No. 1
Calipers, micrometer outside, graduated 1/1000 of an inch, set	1	Drawer No. 1
Including: One 1", one 2", one 3" micrometers with ratchet stop, one 1", one 2" test gauge and two adjustable wrenches--all in leather case	1	Drawer No. 2
Calipers, inside micrometer, set B containing 10 rods and one 1/2 gauge in case	1	Drawer No. 2
Calipers, micrometer, metric, 0 to 75 mm, set	1	Drawer No. 2
Chisels, cold, 3/8"	2	Drawer No. 10
Chisels, cold, 3/4"	2	Drawer No. 10
Chisels, cold, 1/2"	2	Drawer No. 10
Chisels, cold, 1/4"	2	Drawer No. 10
Copper, soldering, 1 1/2 lbs	1	Drawer No. 10
Copper, soldering, 3/4 lbs	1	Drawer No. 10
Clippers, bolt, 5/16" capacity	1	Drawer No. 10
Cutters, side milling, 1/4"	1	Drawer No. 12
Cutters, side milling, 5/16"	1	Drawer No. 12
Cutters, side milling, 3/8"	1	Drawer No. 12
Cutters, side milling, 7/16"	1	Drawer No. 12
Cutters, side milling, 1/2"	1	Drawer No. 12
Cutters, milling angular, 45 deg., 1/2" x 2 1/2" R. H.	1	Drawer No. 12
L. H.	1	Drawer No. 12
Cutters, milling, convex 1/8"	1	Drawer No. 12
Cutters, milling, convex 1/4"	1	Drawer No. 12
Cutters, milling, convex 3/8"	1	Drawer No. 12
Cutters, milling, convex 1/2"	1	Drawer No. 12
Cutters, milling, double angle, 60 deg., 1/2" x 2 1/2"	1	Drawer No. 12
Cutters, metal slitting, 1/32" x 2 1/2"	1	Drawer No. 12
Cutters, metal slitting, 3/64" x 2 1/2"	1	Drawer No. 12
Cutters, metal slitting, 1/16" x 2 1/2"	1	Drawer No. 12
Cutters, metal slitting, 3/32" x 2 1/2"	1	Drawer No. 12
Cutters, metal slitting, 1/8" x 2 1/2"	1	Drawer No. 12
Cutters, metal slitting, 5/32" x 2 1/2"	1	Drawer No. 12
Cutters, threading tools, for U. S. S. Threads	1	Drawer No. 8
Cutter, circular, glass, capacity, 3" to 22"	1	Drawer No. 12
Chuck, drill, gear No. 0 to 1/2"	2	Drawer No. 12
Chuck, combination geared screw, 3 jaw, rated size 6"	1	Drawer No. 17
This includes: 10 split collets for draw in check sizes 1/8", 5/32", 3/16", 7/32", 1/4", 9/32", 5/16", 3/8", 7/16", 1/2".		Drawer No. 8

Clamps, tool makers, 1 3/4"	2	Drawer No. 12
Clamps, tool makers, 3 1/2"	2	Drawer No. 12
Clamps, "C" 2 ¼"	2	Floor box
Clamps, "C" 6 ½"	2	Floor box
Clamps, "C" 4 ½"	2	Floor box
Countersink, round shank, 82°, 5/8" diam	1	Drawer No. 12
Countersink., 90°, ½" diam., 2 ¼" long, body 1" diam.	1	Drawer No. 12
Countersink, 82°, style No. 5	1	Drawer No. 12
Covers, canvas for books	3	
Cylinder, oxygen, 200 cu. ft. capacity (filled)	1	On Truck
Cylinder, acetylene, 200 cu. ft. capacity (filled)	1	On Truck
Compound, "Duplex" valve grinding, 7 oz boxes	2	Drawer No. 13
Dividers, spring, 6 inch	1	Drawer No. 1
Dividers, spring, 3 inch	1	Drawer No. 1
Drills, set of taper shank, 1/2" to 1 1/4" advancing by 64ths from 1/2" to 1" and by 16ths from 1" to 1 1/4"	37	Drawer No. 3
Drill, drift	1	Drawer No. 3
Drill, holder, Morse taper	1	Drawer No. 16
Drills, straight shank carbon steel as follows:		
14 sizes, 6 of each 1/16 to 17/64, by 64ths	84	Drawer No. 4
7 sizes, 3 of each 9/32 to 3/8, by 64ths	21	Drawer No. 4
8 sizes, 2 of each 25/64 to 1/2 inch, by 64ths	16	Drawer No. 4
Drills and countersinks, diam. of drill 1/16", diam. of body 13/64"	2	Drawer No. 12
Drills and countersinks, diam. of drill 3/32" and 1/8" diam. of body ,302"	1	Drawer No. 12
Drill, portable, electric	1	Floor box
Die-stock set complete, U.S. Form Thread	1	Drawer No. 2
This to include 13 sizes of taps, dies and collets. Each set of taps to include taper, plug and bottom all in hardwood case. No. 0-80, No. 4-48, No. 8-36, No. 14-24, No. 1-72, No. 5-44, No. 9-32, No. 2-64, No. 6-40, No. 10-30, No. 3-56, No. 7-36, No. 12-28.		
Drill, hand and breast, with chuck	1	Drawer No. 15
Dresser, emery wheel	1	Drawer No. 10
Dogs, clamp, lathe, 1 3/4" capacity	1	Drawer No. 16
Dogs, clamp, lathe, 2 3/4" capacity	1	Drawer No. 16
Files:		Drawer No. 9
Handsaw taper, single cut, second cut, 5/8" taper 8"	2	
Mill bastard, single cut 8"	2	
Mill bastard, single cut 10"	2	
Mill bastard, single cut 12"	2	
Mill smooth, single cut, 6"	4	
Half round, second cut, double cut 6", 8", 10", 12"	4	
Mill smooth, single cut, 8"	1	
Mill smooth, single cut, 10"	2	
Mill smooth, single cut, 12"	1	
Round bastard, double cut, 12"	2	
Round, second cut, double cut, 6"	1	
Round, second cut, double cut, 8"	1	

Round, second cut, double cut, 10"	1	
Round, second cut, double cut, 12"	1	
Square bastard, double cut 12"	2	
Square bastard, double cut 14"	1	
Flat bastard, double cut 10"	2	
Flat bastard, double cut 12"	3	
Flat bastard, double cut 14"	1	
Flat, second cut, 10"	2	
Flat, second cut, 12"	3	
Half round, bastard, double cut 10"	1	
Half round, bastard, double cut 12"	1	
Square, second cut, double cut 6"	1	
Square, second cut, double cut 8"	1	
Square, second cut, double cut 10"	1	
Square, second cut, double cut 12"	1	
Taper saw, single cut, 4"	4	
Taper saw, single cut, 6"	2	
3 sq. slim, double cut, second cut 6"	2	
Flashlight, without rubber hood	1	Drawer No. 12
Fuses, 5 amp. union, 250 V	20	Drawer No. 12
Fuses, 10 amp. N. E. C. union, 250 V	20	Drawer No. 12
Fuses, 20 amp. N. E. C. union, 250 V	40	Drawer No. 12
Fuses, 50 amp. N. E. C. union, 250 V	20	Drawer No. 12
Funnels, filtering, set	1	Bench cabinet
Including:		
Small special funnel (carried in floor box)	1	
Extra filtering rings for No. 2 funnel	2	
No. 2 Schuyler filtering funnel	1	
Container box	1	
Frame, hacksaw, adjustable	1	Drawer No. 10
Gauge, center	1	Drawer No. 1
Gauge, micrometerdepth with 2 extra rods	1	Drawer No. 1
Gauge, 20 degrees, screw thread	1	Drawer No. 1
Gauge, worm thread	1	Drawer No. 1
Gauge, Drill	1	Drawer No. 1
Gauge, screw pitch, V thread	1	Drawer No. 1
Gauge, thickness, 9 blades	1	Drawer No. 1
Gauge, universal surface, with 9" spindle	1	Drawer No. 12
Grinder, automobile valve	1	Drawer No. 13
Gears, metric transposing, for lathe -----set	1	Drawer No. 17
Holder, tool "Agrippa" No. 30-L 3/8" x 15/16" x 5-1/8" with 3/32" x 5/8" tool	1	Drawer No. 8
Holder, tool "Agrippa" No. 30-L 3/8" x 15/16" x 5-1/8" with 5/32" x 5/8" tool	1	Drawer No. 8
Holder, tool "Agrippa" No. 0-L 3/8" x 7/8" x 5-½" off-set turning	1	Drawer No. 8
Holder, tool "Agrippa" No. 30-R 3/8" x 15/16" x 5-1/8" with 3/32" x 5/8" tool	1	Drawer No. 8
Holder, tool ((Agrippa)) No. 30-R 3/8" x 15/16" x 5-½" with 5/32" x 5/8" tool	1	Drawer No. 8
Holder, tool "Agrippa" No. 0-R 3/8" x 7/8" x 5-1/2" with 2 high speed ¼" cutters	1	Drawer No. 8

Holder, tool "Agrippa" No. 0-3/8" x 7/8" x 5" with 2 high speed ¼" cutters	1	Drawer No. 8
Holder, tool "Agrippa" No. 20-R 3/8" x 15/16" x 5-¼" with 3/32" x 5/8" high speed steel cutter	1	Drawer No. 8
Holder, tool 3/8" x 7/8" x 5", U. S. thread	1	Drawer No. 8
Holder, bar boring tool, "Agrippa" No. 80	1	Drawer No. 8
Hammer, claw, bell face	1	Drawer No. 10
Hammer, machine, ball pein, 12 oz	1	Drawer No. 10
Hammer, rounding 2 lb	1	Drawer No. 10
Hammer, machine, oct. shape, ball pein, 1 lb	1	Drawer No. 10
Indicator, test	1	Drawer No. 1
Ladle, melting, 1 1/4 pint capacity	1	Bench cabinet
Lamps, carbon, 40 Watt, 110 Volt	20	Bench cabinet
Lamps, adjustable, floor	3	Bench cabinet
Cord extension, complete	1	Floor Box
Including:		
No. 18 P. K. W. P. Cord	20	
lamp guard	1	
swivel attachment plug	1	
aluminum shell socket with wood handle	1	
Mills, end, spiral, No. 1 Morse Taper	8	Drawer No. 8
1/4", 5/16", 3/8", 7/16", right		
1/4", 5/16", 3/8", 7/16", left hand		
Mills, end, spiral, No. 2 Morse Taper	8	Drawer No. 8
1/2", 9/16", 5/8", 3/4", right		
1/2", 9/16", 5/8", 3/4", left		
Mandrels, taper, Nos. 3 to 9 inclusive (in wooden box)	7	Drawer No. 8
Pliers, long round nose 5 1/2"	1	Drawer No. 1
Pliers, curved nose 5-1/2"	1	Drawer No. 1
Punches, center	3	Drawer No. 1
Parallels, 3/8" x 3/4" x 6"	2	Drawer No. 1
Parallels, 1/2" x 1 x 6"	2	Drawer No. 1
Plate, automobile screw, No. 146 S. A. E. Standard in a hardwood case	1	Drawer No. 5
(each set to contain stock 22" long, plug taps, dies and guides, from ¼" to 1" advancing by 16ths)		
Reamer, hand, "Aivord" set of 25	1	Drawer No. 4
Reamer, taper pin, "Alvord", Nos. 0 to 5, set	1	Drawer No. 4
Rule 6", graduation No. 7	1	Drawer No. 1
Rule 6", graduation No. 10	1	Drawer No. 1
Rule 3", graduation No. 7	1	Drawer No. 1
Rulers, folding 1 meter	4	Drawer No. 2
Rule, 36" English graduation No. 205	1	Drawer No. 17
Square, try, 6" solid steel	1	Drawer No. 1
Square, try, 3" solid steel	1	Drawer No. 1
Square, set, combination, 12 inch	1	Drawer No. 1
Square, patent double, 4 inch (2 blades and stock)	1	Drawer No. 1
Scriber, improved adjustable sleeve	1	Drawer No. 1
Sleeves, Collet, No. 1 taper inside, No. 2 outside	2	Drawer No. 3
Screwdriver, 4", Smith's "Perfect Handle"	1	Drawer No. 10
Screwdriver, 6", Smith's "Perfect Handle"	2	Drawer No. 10
Screwdriver, 8", Smith's "Perfect Handle"	1	Drawer No. 10

Voltmeter, Ever-ready No. 1005., 0-10 Volt range	1	Drawer No. 12
Vise, machinist, swivel jaw and base 3-½"	1	On Truck
Vise, machinist, swivel jaw and base 4"	1	On Truck
Wrench, adjustable tap, length 7" for 1/16" to ¼"	1	Drawer No. 4
Wrench, adjustable tap, length 11" for 3/16" to ½"	1	Drawer No. 4
Wrench, adjustable tap, length 15" for ¼" to 3/4"	1	Drawer No. 4
Wrench, adjustable tap, length 20" for ¼" to 1"	1	Drawer No. 4
Wrench, screw, 10" solid bar	1	Drawer No. 10
Wrench, screw, 12" solid bar	1	Drawer No. 10
Wrenches, double end auto, Armstrong Bros. Tool Co. No. 5A semi finished for A. L. A. M. Std. nuts and cap screws in canvas. Nos. 23-B, 27-B, 31-B, 33-B, 37-A	5	Drawer No. 10
Wrench, "Trimo" pipe, metal handle 14", capacity ¼" to 1-½" pipe	1	Drawer No. 10
Wrench, 6" adjustable, Model D, B, & S. Co	1	Drawer No. 10
Wrench, 22-½ degree angle, 6" Cresent adjustable	1	Drawer No. 15
Wrench, 8", 22-½ degree angle	1	Drawer No. 10
Wrench, socket, set	1	Drawer No. 13
Wheel, Norton Alundum, 4-½" x 3/8", grain 3860, grade "N" (Extra for tool post grinder)	1	Drawer No. 15
Wheel, Norton Alundum, 1-½" x 3/8", grain 3860, grade "N" (Extra for tool post grinder)	1	Drawer No. 15
Wheel, Norton Alundum, 10" x 1", grain 46, grade "N" (Extra for bench grinder)	2	Drawer No. 6

APPENDIX II

ARTILLERY SUPPLY TRUCK

(a) (Body equipment).		No. per Car
Chest, bench		1
Cover, canvas for Supply Body		1
Pole, ridge wood		1
Axe		1
Straps, 12" long, (1 for axe handle, 1 for pickaxe handle, 2 for hatchet handles)		1
Lantern complete, including globe and wick		1
Pads, lantern bracket complete		2
Can, safety, 1 gal.		1
Straps, lantern bracket		2
Buckets, water, canvas		2
Strap, 22.75" long (for water bucket)		1
Vise, swivel, jaw (with bolts, nuts and washers)		1
Shovels, short handled		2
Straps 15" long (for short handled shovel)		2
Hatchets		2
Pickaxe		1
Oil, medium, gasoline engine	gal.	1

(b) (Load "A").		
Chest, spring		1
Chest, supply (to contain spare parts for gun, gun carriage and limbers)		1
Chest, supply, containing:		1
Bolos, Model 1917		20
Scabbards, bolo, Model 1917		20
Brush, varnish, No. 4-0		1
Brushes, varnish No. 5-0		2
Cable, high tension, S. A. E. Ignition	feet	25
Leather, bridle, back		1
Leather, collar, back		1
Leather, latigo, side		1
Leather, harness, back		1
Magneto, Eisemann G-4 Second Edition complete with impulse starter, clockwise rotation for Nash Trucks; counter clockwise rotation for F. W. D. Trucks		1
Pliers, wire cutting 8"		6
Plugs, spark 7/8" S. A. E. Standard "Titan"		24
Tape, frictin, 3/4", half pound rolls		4
Tape, rubber, 3/4", half pound rolls		4
Wire, copper, No. 16 gauge, B. & S. spool		1
Wire, soft steel, No. 16 gauge, B. & S. spool		1
*Chest Fluid "A", containing:		1
Brushes, varnish, No. 6-0		2
Brushes, paint, 4" flat (commercial)		4

*Carried on top of supply Chest.

†For 8-Inch Howitzers, the oil, recoil cylinder, is to be oil, buffer (British) specified in section V (b) of Equipment Tables.

Cans, 2 1/2" gallon capacity	20
6 will contain lubricating oil.	
6 will contain recoil cylinder oil.	
2 will contain camouflage paint, green, 2 cream.	
2 will contain camouflage paint, yellow, 2 black.	
1 will contain kerosene.	
Oil, lubricating, gals.	15
Oil, recall cylinder, gals.	15
Paint for camouflage, green, gals.	5
Paint for camouflage, yellow, gals.	5
Paint for camouflage, cream, gals.	5
Paint for camouflage, black, gals.	2½
Kerosene, gals.	2½
Straps, 34" long	4
Straps, 52" long. (The above straps are for use on the Spring Chest, the Fluid Chest, and the two Supply Chests)	8
*Chest, grindstone, containing:	1
Grindstone with frame complete	1
Wrench, grindstone spanner	1
*Chest, Carpenters, with tools complete	1
This includes:	
1 Carpenter's chest.	
1 Axe, bench.	
2 Bags, canvas for small stores.	
1 Bevel, 8".	
6 Bits, augur, sizes .25", .5", .75", 1", 1.25" and 1.5".	
1 Bit, expansive, two cutters, .875" to 3".	
3 Bits, screwdriver, sizes, .375", .625" and .75".	
1 Bit, wood countersink, .625" dia.	
1 Brace, ratchet, 10" sweep.	
3 Chisels, socket, framing sizes .75", 1" and 1.5".	
1 Divider, wing 10".	
4 Drills, twist, sizes, .187" (3/16"), .218" (7/32"), .25" and .281" (9/32").	
1 File, 10", flat bastard.	
6 Files, saw, sizes 4" and 6".	
1 Gauge, marking.	
2 Gouges, socket, firmer, sizes .5" and 1".	
1 Hammer, claw.	
2 Handles, file.	
1 Handle, tool, containing 10 tools.	
1 Knife, drawing, 9" blade.	
1 Mallet.	
1 Nail set.	
1 Oiler.	
1 Stone, oil unmounted.	
1 Pincers, small 6".	
1 Plane, jack 16".	
1 Plane, smoothing 8".	
1 Plate, augur handle.	
1 Rasp, wood, 10".	
1 Reamer, half round.	

1 Rule, boxwood, 2 ft., four fold.
1 Saw, crosscut, 24", 7 point.
1 Saw, rip, 24", 5 point.
1 Set, saw.

*Carried in Bench Chest.

1 Screwdriver, 5" blade.	
1 Spoke shave.	
1 Square, steel.	
1 Tape, linen, 100 ft.	
1 Vise, table, 2.5" jaw.	
1 Wrench, screw, 12".	
*Chest for Cleaning Material and Small Stores	1
Containing:	
Brushes, sash No. 3	3
Brushes, sash No. 5	3
Brush, camel's hair	1
Burners, lantern	2
Chamois skins	2
Cloth, crocus, quire	1
Cloth, emery, No. 0, quire	1
Cloth, emery, No. 00, quire	1
Cloth, emery, No. 1/2, quire	1
Globes, lantern	2
Dressing, leather, russet, box	3
Oil, clock, 1-ounce bottle	1
Oil, raw linseed, 1 pint can	1
Petrolatum (in tin box) ounce	5½
Cans, 1 gal. capacity, for sal soda	3
Sal sode, pounds	20
Sandpaper, No. 00, quire	1
Sandpaper, No. 2 1/2, quire	1
Wicks, lantern	5
Chest, Miscellaneous (Carried in Bench Chest)	1
Chest, for testing level (Carried in Miscellaneious Chest)	1
Level, testing, complete (Carried in Testing Level Chest)	1
Box, Oil (Carried in Miscellaneous Chest)	1
Cans, one gallon capacity (to contain light slushing oil)	5
Oil, light slushing, gals.	5
Cans, 1/2 gallon capacity	6
1 will contain sperm oil.	
1 will contain neatsfoot oil.	
1 will contain O. D. paint, 2nd coat.	
1 will contain O. D. paint, 3rd coat.	
1 will contain japan drier.	
1 will contain cosmic No. 80, soft.	
Oil, sperm, gal.	½
Oil, neatsfoots, gal.	½
Paint, olive drab, 3rd coat, gal.	½
Paint, olive drab, 2rd coat, gal.	½
Drier, japan, gal.	½
Cosmic, No. 80 soft, gal.	½

*Carried in Bench Chest.

*Tool-Kit, Saddler's sheepskin with tools, complete ---------- 1

This includes:

1	Saddler's Sheepskin Tool Kit.
12	Blades, awl, harness, Nos. 43 to 48 inclusive.
1	Awl, pegging.
1	Awl, seat, handled.
1	Bag, canvas, for small stores.
1	Carriage, pricking, 3 wheels.
1	Compass, 6".
1	Creaser, double, lignum vitae.
1	Tool, Edge, No. 1.
1	Tool, Edge, No. 2.
2	Blades, extra with followers for draw gauge.
1	Gauge, draw, brass without guard.
1	Handle, peg awl, with wrench.
1	Hammer, No. 3 riveting.
2	Hafts, patent awl with wrench.
1	Knife, round.
1	Knife, splitting 6".
1	Needle case, leather.
1	Needle, glover's No. 3 paper.
2	Needles, harness No. 4 paper.
2	Needles, harness No. 5 paper.
2	Needles, harness No. 6 paper.
12	Needles, sacking, assorted.
1	Nippers, cutting 10".
1	Oilstone, unmounted.
1	Pliers, 6".
4	Punches, round assorted.
1	Punch, revolving 4 tubes.
1	Rivet, set.
1	Rule, boxwood, 2 ft. 4 fold.
1	Palm, sewing, leather.
1	Slicker, steel.
1	Shears, 10" bent trimmers.
1	Knife, shoe, broad point.
1	Knife, shoe, square point.
1	Clamp, stitching.
1	Screwdriver, 3" blade.
1	Tool, claw.
2	Thimbles, best aluminum lined, 2 sizes.

CARRIED IN FLOOR LOCKERS.

Handles, axe ----------		4
Handles, hatchet ----------		4
Handles, pickaxe ----------		4
Handles, shovel, short ----------		3
Handles, sledge, model 1913 ----------		2
Sponges 4" ----------		20
Waste, white cotton ----------	lbs.	25

*Carried in each Chest.

APPENDIX II (Continued)

CARRIED WHERE MOST EXPEDIENT.

Crowbar 60"		2
Rope, manilla, 1" diam. 150 ft. long		1
Rivets and burrs, brass .5" No. 10	lb.	1
Rivets and burrs, brass .625", No. 10	lb.	1
Handles, shovel, long		2
Blades, awl, harness assorted Nos. 43 to 48 inclusive		6
Hafts, awl, patent, with wrench		1
Buckles, bar tongueless 5/8" brass		10
Buckles, bar tongueless 1" brass		15
Buckles, roller bar 5/8" bronze		10
Buckles, roller 1 1/4" bronze		50
Buckles, satchel, 3/8" bronze		20
Buckles, wire 3/4" brass		25
Button, style No. 1, with washer		10
Duck, cotton olive drab, 22" No. 1 yds.		23
Clips, end 5/8" brass		25
Clips, end 1" brass		5
Clips, end 1 1/2" brass		25
Fastening, carr durable, male and female		10
Hook, side strap wheel		2
Fastening, Mills military		10
Needles, glovers, No. 3, papers		1
Needles, harness, No. 4, papers		1
Needles, harness, No. 5, papers		1
Needles, harness, No. 6, papers		1
Rope, 3/8" manila hemp ft		100
Screws, wood, 1" brass, No. 6, 1 gross pkgs.		2
Sheepskins with wool on		2
Tacks, copper No. 12, 1/2 lbs. paper		1
Tacks, copper No. 20, 1/2 lbs. paper		1
Thimble, aluminum lined steel size 3/4"		1
Thread, carpet No. 18, olive drab, lb.		1
Thread, shoe, No. 3, brown, lb.		1
Thread, shoe, No. 10, borwn, lb.		1
Wax, stitching, brown, winter, lb.		1
Webbing, olive drab, heavy cotton, 5/8" yd.		20
Webbing, olive drab, heavy cotton, 1" yds.		30
Sledge, model 1907		1
Block, snatch, for 1.25" rope		1
Soap, castile, cakes		12
Block, tackle, double 8"		1
Bucket, water, galv, steel		2
Crowbar, 60"		1
Sledge, model 1907		1
Rope, manila, 1" diam. 150 ft. long		1
Buckets, water, galvanized steel		2
Bag for forge coal, containing		1
Coal, Blacksmith's, pounds		50
Chest, supply		1
Chest, "Spring"		1

Containing:

Bolos, model of 1917		2
Scabbards, bolo, model 1917		2
Metal, babbit (for medium pressure and high-speed tim 30%, antimomy 20%, lead 50%)	lbs.	12
Bottle for acid, 16 oz.		1
Buckles, roller, 1.25" bronze		30
Box, wooden, labeled "Acid"		1
Burners, lantern		2
Calsium Carbide, 1 lb. cans		15
Cloth, crocus, quire		1
Cable, high tension, S. A. E. Ignition, feet		25
Cloth, emery, No. 1/2, quires		2
Carburetor, complete for Nash or FWD trucks according to type employed in organization (Stromberg model L-2, 1 1/4" for Nash, Stromberg type G, 1 1/2" for FWD.)		1
Cloth, emery, No. 00 quires		2
Globes, lantern		2
Magneto, complete for Nash or FWD trucks according to type employed in organization (Eisemann type G-4, Second Series, with impulse starter complete; clock-wise rotation for Nash; counter-clock-wise rotation for FWD.)		1
Acid, muriatic (18° to 20° acidity)		1
Measure, copper, 1 qt. capacity, graduated in pints and litres		1
Sandpaper, No. 2 1/2, quire		1
Ping, spark, 7/8¾, S. A. E. ("Titan")		24
Wire, copper, No. 16 gauge, B and S, spool		1
Shellac, orange, 1 pt. can		1
Wire, soft steel, No. 16 gauge, B and S, spool		1
Extractor, screw, "Ezy Out", set		1
Clamp, Cooper adjustable (in carton)		12
Wicks, lantern		6

Chest, grindstone	1
containing:	
Grindstone and frame complete, with wrench	1
*Chest, carpenter's with tools, complete	1

For contents see page 58, Load A.

*Chest, miscellaneous	2
Chest, Fluid "D"	1
containing:	
Brushes, paint, 4", flat (commercial)	1
Brush, varnish, No. 6-0	1
Box, labelled "Sal-Soda"	1
Box, labelled "Sal Ammoniac"	1
Can, screw top, one gallon capacity (for japan dryer)	1
Can, screw top, 1/2 gal. capacity	1
1 will contain O. D. paint, 2nd coat.	
1 will contain O. D. Paint, 3rd coat.	
1 will contain Borax.	

1 will contain Cyanide of Potassium.
Cans, paint 2 1/2 gal. capacity ---------- 14
2 will contain paint for camouflage, green.
2 will contain paint for camouflage, yellow.

*Carried in Bench Chest.

2 will contain paint for camouflage, cream.		
1 will contain paint for camouflage, black.		
1 will contain engine oil.		
1 will contain coal oil.		
1 will contain sperm oil.		
1 will contain lard oil.		
1 will contain gasoline.		
1 will contain Pyrene liquid.		
1 will contain turpentine.		
Borax	lb.	1
Cyanide of potassium	lb.	1
Drier, japan	gal.	1
Gasoline	gal.	2½
Oil, engine	gal.	2½
Kerosene	gal.	2½
Oil, lard	gal.	2½
Liquid, Pyrene	gal.	2½
Turpentine	gal.	2½
Paint for camouflage, green	gal.	5
Paint for camouflage, yellow	gal.	5
Paint for camouflage, cream	gal.	5
Paint for camouflage, black	gal.	2½
Paint, olive drab, 2nd coat	gal.	½
Paint, olive drab, 3rd coat	gal.	½
Sal ammoniac, lumps	lb.	1
Sal soda	lb.	5
Tape, friction, 3/4", half pound rolls		5
Tape, rubber 3/4", half pound rolls		5
Chest, forge		1
Containing:		
Punch, fore and creaser		1
Chisel, hot iron		1
Shovel, fire		1
Rake, fire		1
Wrench, screw		1
File, flat bastard		1
Punch, nail		1
Tongs, 12 in.		1
Punch, round		1
Tongs, 1/4" iron		1
Tongs, 1/2" iron		1
Pritchel		1
Chisel, cold, 8"		1
Forge, portable		1
Chisel, cold iron		1
Hammer, riveting		1
Hammer, hand		1
Handle, file		1
Oiler		1
Rule		1
Hardle		1
Square		1

Screw-plate, taps and dies (U. S. S.) with tap wrench, including chest	1
Drill, rachet	1
Drills, .25, .375, .5 (2 each)	6
Anvil	1
Legs, forge	3
Aprons	2
Bags, canvas	2
Flatter	1
Punch, square	1
Punch, round	1
Wheel, forge gear	1
Set, rivet, .625"	1
Set, rivet, .5"	1
Set, rivet, .375"	1
Set, rivet, .25"	1
Set, rivet, .187" (3/16")	1
*Chest for bolts and rivets	1
Containing:	
Rivets (round head)	
3/16" diam., 1/2" long, pounds	1
3/16" diam., 3/4" long, pounds	1
3/16" diam., 1" long, pounds	1
1/4" diam., 1" long, pounds	3
1/4" diam., 3/4" long, pounds	2
1/4" diam., 1 1/4" long, pounds	3
5/16" diam., 3/4" long, pounds	1
5/16" diam., 1" long, pounds	1
5/16" diam., 1 1/2" long, pounds	1
3/8" diam., 1" long, pounds	8
3/8" diam., 1 3/4" long, pounds	8
1/2" diam., 1 1/4" long, pounds	4
1/2" diam., 2" long, pounds	4
5/8" diam., 1 1/2" long, pounds	5
3/4" diam., 2 1/4" long, pounds	8
Rivets (countersunk, 60° head).	
3/8" x 3/4", pounds	5
1/2" x 1 1/2", pounds	5
1/2" x 3", pounds	5
5/8" x 2 1/2", pounds	5
Rivets, brass (button head).	
1/4" diam., 1" long, pounds	2
Bolts, stove with nuts (round head).	
3/16" x 1"	100
3/16" x 1 1/2"	100
1/4" x 1"	100
1/4" x 1 1/2"	100
Bolts, machine, (square head with square nuts).	
3/8" x 1 1/4"	50
3/8" x 2"	50

1/2" x 1 1/4"	25
1/2" x 2"	25
1/2" x 3"	25
5/8 x 3"	25

*Carried in Bench Chest.

3/4" x 2"	25
3/4" x 4"	25
Washers, wrought iron.	
1/4" pounds	2
5/16" pounds	2
7/16" pounds	5
9/16", pounds	4
11/16", pounds	4
13/16", pounds	4
Straps, 34" long	4
Straps, 52" long. (These straps for holding the Spring Chest, the Forge Chest for Bar Stock	1
Chest and the Fluid Chest in Place)	8
Containing:	
Forged steel, (round).	
1/4" diam. x 4 ft. long	1
3/8" diam. x 4 ft. long	1
1/2" diam. x 4 ft. long	1
5/8" diam. x 4 ft. long	1
Forged steel, (flat).	
3/8" x 1" x 4 ft long	1
3/8" x 1 1/4" x 4 ft. long	1
1/2" x 1 1/4" x 4 ft. long	1
5/8" x 2" x 4 ft. long	1
5/8" x 2 1/2" x ft. long	1
3/4" x 1 1/2" x 4 ft. long	1
3/4" x 2 1/2" x 4 ft. long	1
1" x 2" x 4 ft. long	1
1" x 3" x 4 ft. long	1
Steel, cold rolled (round).	
3/16" diam. x 4 ft. long	2
1/4" diam. x 4 ft. long	2
3/8" diam. x 4 ft. long	2
1/2" diam. x 4 ft. long	1
5/8" diam. x 4 ft. long	1
3/4" diam. x 4 ft. long	1
1" diam. x 4 ft. long	1
1 1/4" diam. x 4 ft. long	1
Steel, cold rolled (square).	
1/2" square x 4 ft. long	1
3/4" square x 4 ft. long	1
1" square x 4 ft. long	1
Steel, cold rolled, (hexagon).	
3/4" hexagon x 4 ft. long	1
1" hexagon x 4 ft. long	1
1 1/4" hexagon x 4 ft. long	1

Rod, brass, round (half hard).
- 1/8" diam. x 4 ft. long ---------- 1
- 1/4" diam. x 4 ft. long ---------- 1
- 3/8" diam. x 4 ft. long ---------- 1
- 3/4" diam. x 4 ft. long ---------- 1

Steel, flange.
- 1/16" stock, 2 ft. x 4 ft., sheared plates ---------- 1
- 3/32" stock, 2 ft. x 4 ft., sheared plates ---------- 1
- 1/8" stock, 2 ft. x 4 ft., sheared plates ---------- 1
- 3/16" stock, 2 ft. x 4 ft., sheared plates ---------- 1
- 1/4" stock, 2 ft. x 4 ft., sheared plates ---------- 1

Steel, tool Armstrong Special or equal (round).
- 1/4" daim. x 3 ft. long ---------- 1
- 1/2" diam. x 3 ft. long ---------- 1

Steel, tool, Armstrong Special or equal (square).
- 3/16" square x 3 ft. long ---------- 1
- 1/4" square x 3 ft. long ---------- 1
- 3/8" square x 3 ft. long ---------- 1
- 5/16" square x 3 ft. long ---------- 1
- 7/16" square x 3 ft. long ---------- 1

Steel, tool, Armstrong Special or equal (flat).
- 3/8" x 1/2" x 3 ft. long ---------- 1

Pipe, wrought iron.
- 3/8" pipe, 4 ft. long ---------- 1
- 1/2" pipe, 4 ft. long ---------- 1
- 3/4" pipe, 4 ft. long ---------- 1
- 1" pipe, 4 ft. long ---------- 1

Elbows, mallcable iron.
- 3/8" Standard 1 P Elbow ---------- 3
- 1/2" Standard 1 P Elbow ---------- 3
- 3/4" Standard 1 P Elbow ---------- 3
- 1" Standard 1 P Elbow ---------- 3

CARRIED IN FORGE CHEST.

Bar-bronze for bushings, "Non-Gran" assortment, No. 6-54 ---------- 1

This includes:
- 1 Special reinforced canvas roll, with strap complete and compartment for carrying bars.
- 1 Bar, solid, 7/8" x 12".
- 1 Bar, hollow, 1" x 12", 1/2" hole.
- 1 Bar, hollow, 1 1/4" x 12", 5/8" hole.
- 1 Bar, hollow, 1 3/8" x 12", 3/4" hole.
- 1 Bar, hollow, 1 1/2" x 12", 7/8" hole.
- 1 Bar, hollow 1 5/8" x 12", 1" hole.

CARRIED IN FLOOR LOCKER.

Handles, pick axe ---------- 2
Handles, axe ---------- 2

Handles, long handled shovel	2
Handles, short handled shovel	3
Handles, hatchet	1
Handles, pick mattock	2
Waste, white cotton, pounds	25

TABLE XI.

ANTI-AIRCRAFT MACHINE GUN AND EQUIPMENT OF A REGIMENT OF 8-INCH HOWITZERS.

1	2	3	4	5	6
ARTICLES					REMARKS
Machine guns, anti-aircraft --------	2	. .	. .	12	
Spare barrels ----------	2	. .	. .	12	
Tripod ----------	2	. .	. .	12	
Anti-avion mounts ----------	2	. .	. .	12	
Anti-avion sights ----------	2	. .	. .	12	
Spare part cases, No. 1, complete (1) ----------	1	. .	. .	6	(1) Note No. 14.
Spare part cases, No. 2, complete (2) ----------	1	. .	. .	6	(2) Note No. 15.
Gunners, pouch, complete (3) -------	2	. .	. .	12	(3) Note No. 16.
Cleaning kit, complete (4) ---------	2	. .	. .	12	(4) Note No. 17.
Tables of fire --------) Wind charts ----------) Book form.	1	. .	. .	6	
Temperature charts ----) Barometer charts ------)					
Belts boxes ----------	12	. .	. .	72	
Belt ----------	12	. .	. .	72	
Strip boxes (12-strip) ----------	12	. .	. .	72	
Strips (24 rounds) ----------	144	. .	. .	864	
Ammunition, 8 mm, rounds ----------	6456	. .	. .	38736	

GENERAL NOTES

Note 1.--The surplus kit bag will not be used for service in Europe, and will not be turned in to the nearest quartermaster depot.

Note 2.--When ordered by the army or other independent commander there will be added to the normal mobile equipment, for winter use, 1 or 2 O. D. blankets, special provision to be made for their transportation, 1 pair hand gloves or 1 finger mittens.

Note 3.--COBBLER'S OUTFIT, HAND. Contents of cobbler's kit:

1 Iron stand, with three lasts.	1 Thread, shoe, ball.
1 Hammer, shoemaker's.	5 Nails, cobbler, 4/8 lbs.
1 Nippers, peg.	5 Nails, cobbler, 5/8 lbs.
1 Handle, sewing awl.	3 Nails, heel, 6/8 lbs.
6 Blades, sewing awl.	100 Half soles, assorted sizes, pairs.
1 Handle, pegging awl.	1 Patches for uppers, lbs.
6 Blades, pegging awl.	100 Lifts, heel, pairs.
1 Wrench, for awl.	2 Needles, shoemaker's, packages.
1 Knife, shoemaker's.	(12 to pkg.).
1 Rasp, shoemaker's.	10 Leather, sole, lbs.
1 Wax, shoemaker's, ball.	

Note 4.--FIELD DESK, SMALL. The contents of a field desk include records, manuals, books, and stationery. The stationery for a single desk should not exceed the following, which is prescribed as an allowance for 30 days. The allowance applies also to each field desk not furnished by the Quartermaster Corps:

	If Typewriter is Supplied.	If Typewriter is Not Supplied.
Bands, rubber, No. 18, gross	1	1
Blocks, memo, or scratch note, for pencil	1	1
Books, duplicating, letter size	2	2
Envelopes, official	200	100
Erasers:		
Rubber, ink and pencil	1	2
Rubber, typewriter	1	
Steel	1	1
Fasteners, paper, boxes	1	1
Files, office:		
General order	1	1
Special order	1	1
Ink:		
Black, powdered, tablets, tins	1	1
Red, powdered, tablets, tins	1	1
Mucilage (or paste) bottle or tube	1	1
Paper:		
Blotting, 4 by 9½ inch, sheets	6	6
Blotting, 12 by 19 inch, sheets	2	2
Carbon, letter size, sheets	25	..
Letter, typewriter, quires	5	..
Pencils:		
Indelible	4	4
Lead	2	2
Colored (blue and red)	2	2

Penholders	4	4
Pens, steel	24	24
Pins, office, cones	1	1
Ribbons, typewriter, record	2	..
Ruler, office, 12 inch	1	1
Shears, office	1	1
Tape, office, spool	1	1
Twine, wrapping, ball	1	1
Wax, sealing, ounce	1	1

Note 5.--ISSUE OF CLOTHING TO OFFICERS G. O. No. 7. Par. 3 and 4, H. A. E. F., 1918.

Officers serving in the zone of advance before going into the trenches will be issued all articles of the enlisted men's uniform and equipment that they may require; when the duty in the trenches is completed, officers will return the articles so issued. Fatigue clothing may be issued to an officer attending school to be returned upon completion of the course.

The wearing of enlisted men's woolen O. D. breeches, or trousers, and woolen O. D. coats on occasions other than those mentioned in paragraph 3 is prohibited.

Note 6.--HOUSEWIFE. Contents:

1 Scissors
3 Needles, large
24 Needles, assorted sizes
20 Pins
9 Safety Pins.
1 Card of thread (white, black and olive drab).
24 Buttons, olive drab shirt
48 Buttons, underwear (24 undershirt, 24 drawers).

Note 7.--FIELD RANGE NO. 1 COMPLETE. Components:

1 Field range (1 body, No. 41, and boiling plate No. 42)
1 Alamo attachment (2 pieces, 42a and 42b)
6 Boilers, Nos. 48, 49, 50, 51, 53, and 54.
2 Cans, G. G. large
1 Can, G. I., small
1 Cleaver, 6-inch
1 Dipper, 1-2 gallon, No. 55
1 Dipper, quart, No. 56
2 Forks, small
1 Grinder, meat.
2 Knives, butcher, 8-inch
2 Pins, bake, No. 52.
1 Pipe, smoke, elbow No. 47.
4 Pipe, smoke, joints, Nos. 43, 44, 45 and 46.
4 Rests, pan. No. 57.
1 Saw, meat, 15 inch blade.
1 Skinner, large.
2 Spoons, large
1 Steel, butcher's, 10 inch

Note 8.--FIELD RANGE NO. 2, COMPLETE.

1 Field range (1 body, No. 61 and boiling plate No. 62)
2 Boilers, Nos. 50 and 51
1 Dipper, 1-2 gallon, No 55
2 Forks, meat, small
2 Knives, butcher, 8-inch
2 Pans, bake, No. 52
1 Pipe, smoke, elbow, No. 67
4 Pipe, smoke, joints, Nos. 63, 64, 65 and 66.
2 Rests, pan, No. 57
1 Saw, meat, 15-inch blade
1 Skimmer, small
2 Spoons, small
1 Steel, butcher's, 10-inch

GENERAL NOTES (Continued).

Note 9.--TOILET KIT. Contents:

1	Brush shaving	1	Cake soap, hand.
1	Comb	1	Cake soap, shaving
1	Mirror	1	Tooth brush
1	Razor	1	Towel, face

Note 10.--ROLLING KITCHEN COOKING EQUIPMENT:

2	Buckets, G. I.	1	Needle
6	Cannisters	2	Oven pans and cover
1	Cleaver	1	Poker
1	Cooks' chest	1	Salt box
6	Cook pots	1	Saw, Meat
2	Conveying poles	1	Shovel
1	Dipper, 1 pt.	2	Skimmers
2	Dust covers, large	2	Spoons, large
2	Dust covers, small	1	Steel, butcher's, 10-inch
1	Food chopper	2	Table boards
2	Forks, large	2	Thermos cans
1	Knife, bread	2	Tills
2	Knives, butcher's, 8-inch	1	Tire pump (For trailmobile type only)
2	Knives, slicing	1	Wrench

(The above equipment will be furnished to kitchens not provided with utensils. Existing kitchen equipment will be changed where necessary so as to correspond as nearly as practicabl to the above.)

Note 11.--BUTCHER'S KIT. The following articles from a commissary chest constitute a kit of butcher's tools, prescribed as Mobile Equipment:

1	Cleaver	1	Saw, meat, including two extra blades.
6	Hooks, meat, for racks.	1	Steel, butcher's.
2	Knives, butcher.	1	Steelyard.

Note 12.--SHOE-REPAIRING OUTFIT. A complete shoe-repairing outfit for the use of regiments, and of battalions (or squadrons) not forming part of a regiment, consists of a shoe-stitching machine (or, in lieu thereof, a nailing machine) and shoe findings as follows:
For use with "Crowe" nailer:

1	Narrow sewing awl and handle for repairing uppers.
3	Extra awl blades for above.
1	Peg awl and handle for hand-driven nails.
3	Extra awl and blades for above.
25	Bristles for upper stitching.
½	Pound 3-cord linen thread for stitching.
	Spool cotton for patchwork, No. 2.
4	Ounces of wax for above thread.
2	8-inch double-faced rasps for smoothing edge of soles and heels.
1	Pair cutting nippers, 5-inch size, for cutting off heel slugs.
1	Screw driver for removing worn heel lifts.
1	Pair of 8-inch heel pinchers for removing top heel lifts.
3	Shoe knives for trimming edges, Nos. 1, 2 and 3.

12	Sheets No. 1 emery cloth.
12	Sheets No. 00 emery cloth.
1	Iron cobbling jack, of lap design.
1	Cobbler's hammer, size No. 3.
100	Pounds 5½-8 nails for Crowe nailer.
25	Pounds 6-8 nails for Crowe nailer.
100	Pounds 6-8 No. 13 gauge heel nails.
200	Pairs each, sizes 6, 7, 8, 9, and 10, half soles, best grade, standard weight, per 1000 men.
100	Blocks 8½ by 12½ inch sole leather, best grade for larger size shoes.
200	Pairs each, sizes 6, 7, 8, 9, 10, 11 and 12, top heel lifts, best garde.
3	Pounds cut patches, one-half russet and one-half retanned cowhide.
1	Sheet of oil-felt filler, or filling between welting undersole.
½	pint cement.
1	No. 3 O. E. D. heel shaver.

The shoes findings for use with "Perless" shoe-stitching machine are the same as with "Crowe" nailer, omitting the "100 pounds 5½-8 nails and the 25 pounds 6-8 nails" and substituting therefor the following:

10	Pounds sole thread, 5-cord linen.
10	Pounds sole thread, 7-cord linen.
1	Gallon liquid wax.
100	Stitcher needles.
100	Stitcher awls.
1	Gallon stitcher oil.
5	Pounds 4-8 hold-fast nails.
5	Pounds 4½-8 hold-fast nails.
5	Pounds 5-8 hold-fast nails.

Requisitions should call for repair materials as needed to meet requirements.

Note 13.--ORDNANCE EQUIPMENT FOR OFFICERS. Ordnance Equipment required for use by officers will be procured under the provisions of Par. II, G. O. No. 41, G. H. Q. A. E. F., March 14, 1918.

Note 14.--SPARE PARTS CASE NO. 1 (LEATHER), HOTCHKISS MACHINE GUN.

Contents:

1	Breech block.
1	Ejector.
2	Ejector cushions (rubber).
1	Elevating link.
1	Elevating connection link pin.
2	Extractor springs--2 Extractors.
1	Traversing clamp.
1	Traversing clamp lever.
1	Traversing clamp spring.
1	Barrel, cleaning rod, 2 sections.
1	Gas cylinder cleaning rod, 2 sections.
1	Scraper for gas cylinder.
12	Cleaning brushes (barrel).
1	Copper hammer.
1	Dismounting wrench.
1	Wrench, teat.
1	Screwdriver.
1	File handle.
1	Gauge chamber.
1	Feed ratchet, release pawl.
1	Feed ratchet pin spring.
1	Firing pin.
1	Locking screw gas cylinder.
1	Safety Sear.
1	Safety Sear spring.
1	Box zinc containing spare parts as follows:
1	Arm lock handle spring.
1	Arm lock handle spring locking belt.
10	Pins, assorted.
1	Cotter pin.
5	Rivets.
1	Elevating block trunnion lock.
1	Elevating block trunnion lock spring.
1	Elevating block locking pin.
1	Knee joint lock plunger.
1	Knee joint lock spring.
1	Telescopic elevating screw hook spring.

1 Hand extractor.
1 Oil can.
1 Grease box, full.
1 Breech block case, leather.
1 Manual 1917, for 1914 H. M. G.
1 Zinc box and cover, canvas.
1 Recoil spring.
1 Sear.
1 Sear spring.
1 Sprocket, shaft ratchet spring.
1 Gelescopic elevating screw hook lock.
1 Trunnion cap lock.
1 Trunnion cap lock spring.
1 Trunnion cap lock spring plug screw.
1 Trunnion cap wing nut.
1 Trunnion cap case locking nut.
1 Upper leg head joint pin.
1 Upper leg head joint pin collar.
1 Upper leg head joint pin collar pin.

Note 15.--SPARE PARTS CASE NO. 2 (LEATHER) HOTCHKISS MACHINE GUN.

Contents:
1 Ejector.
2 Ejector cushions (rubber).
1 Elevating connection link pin.
2 Extractors.
1 Feed rachet release pawl.
1 Feed ratchet pin spring.
1 Locking screw.
1 Piston.
1 Piston return spring.
1 Sear.
1 Sear spring.
1 Striker.
1 Cleaning rod, barrel, 2 sections.
1 Cleaning rod gas cylinder, 2 sections.
12 Cleaning brushes (barrel).
1 Scraper for gun cylinder.
1 Copper hammer.
1 Screwdriver.
1 Dismounting wrench.
1 File and handle.
1 Grease box.
1 Oil can.
1 Front sight cover.
2 Extractor springs.
1 Sprocket shaft ratchet spring.
1 Hand extractor.

Note 16.--GUNNER'S POUCH, HOTCHKISS MACHINE GUN.

Contents:
1 Extractor.
1 Extractor spring.
1 Striker.
1 Brush, varnish.
1 Defective cartridge extractor.
1 Hand extractor.
1 Wrench for gun regulator.
1 Oil can.

Note 17.--CONTENTS OF CLEANING KITS, HOTCHKISS MACHINE GUN.

1 Chain mittens, pair.
1 Chain shoulder-strap.
1 Canvas bucket.
1 Oil can.
1 Cleaning rags, package.

A. G. PRINTING DEPARTMENT
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1918

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EXHIBIT B

PRODEEDINGS OF A BOARD CONVENED BY SPECIAL ORDER NO. 10,

HEADQUARTERS, 18TH ARTILLERY AREA, 11 DECEMBER 1918,

TO REVISE "EQUIPMENT MANUALS FOR SERVICE IN EUROPE"

FOR A

REGIMENT OF 9.2-INCH HOWITZERS.

Proceedings of a Board of Officers convened pursuant to the following order:

HEADQUARTERS 18TH ARTILLERY AREA

11 December, 1918

SPECIAL ORDERS)
NO. 10)

* * * *

10. Pursuant to instructions contained in letter of Adjutant General, American Expeditionary Forces, dated December 7, 1918, file No. 15893-A 213, the following board of officers is convened in the 18th Training Area to make a complete study and report on the suitability and adequacy of all personnel and materiel as provided in Equipment Manuals for Service in France and Organization Tables for 9.2" Howitzer Regiment, Army Artillery, (individual equipment of the soldier will not be included in the deliberations of this Board.)

Detail for the Board:

Col. M. A. Cross, C. A. C., 57th Artillery C. A. C.
Lt. Col. T. A. Terry, C. A. C., 58th Artillery C. A. C.
Major James Muirhead, C. A. C., 65th Artillery C. A. C.
Capt. Martin W. Hawkins, C. A. C., 65th Artillery C. A. C.
Capt. J. W. Doolittle, O. D., Hq. 31st Art. Brigade, C. A. C.
Capt J. H. Wilson, C. A. C., Hq. 31st Brigade, C. A. C.
Capt J. M. Harris, C. A. C., 55th Artillery C. A. C.
1st Lt., T. D. Johnson, C. A. C., Hq. 31st Brigade, C. A. C.

It is proposed to revise Equipment Manuals for Service in France and Organization Tables based on experience gained in operations at the front. The board should make its deliberations most thorough so as to cover entirely questions of personnel and materiel. When any changes are recommended full reasons should be given therefor, so that the officers undertaking final revision may have before them full information and reasons for recommendations and recommended changes.

Prior to the initial sitting the president of the above-named Board will report to the Commanding General 18th Artillery Area for further instructions.

Proceedings of this Board shall be submitted in quadruplicate.

By Command of Brigadier General Davis:

R. D. BROWN,
Major, C. A. C.,
Chief of Staff.

OFFICIAL:

R. S. STEWART,
Captain, C.A.C.,
Adjutant.

Doulevant, France
Dec. 15, 1918

Board met at 10:00 A. M.

Present - All members.

The Board then proceeded to make a complete study on the suitability and adequacy of all personnel and materiel as provided in Equipment Manuals for Service in France and Organization Tables for 9.2" Howitzer Regiment, Army Artillery, and finds that:

I. (a) The motor transportation and the personnel connected with it were not organized in such a way as to secure the best use of them, nor to maintain them in the best possible condition. This was principally due to the fact that the control of the materiel was scattered among the organization commanders who were not so situated as to be able to make the necessary inspections of it, nor to supervise the conduct of drivers on the road. It has been demonstrated that a battery commander with his guns to handle must usually be near his P. C. and his battery positions, and that it is not possible for him to exercise proper supervision over trucks on the road or several kilometers to the rear. This is also true of the battalion commander. The need of temporarily transferring trucks to other duty, away from their permanent assignments, was not with on numerous occasions, and when this was done the trucks were likely to be neglected, due to the fact that they were running for people who expected to use them only temporarily. The road discipline was generally poor, due to the lack of supervision.

It is the opinion of the Board that the transportation of a regiment, except the tractors, should be so organized that the maintenance of the materiel, and the instruction and discipline of the personnel should be under one control; also, so that a certain definite part of the transportation would be organized as a unit for each battalion to accompany it in the field, with a fourth unit for regimental headquarters and a regimental reserve for general purposes. To this end it is recommended that a transport battalion be organized in each regiment, consisting of a battalion headquarters and four transport companies as shown in proposed tables of organization attached herto.

This battalion should be commanded by a major, on the staff of the regimental commander, who would be charged with the discipline and instruction of the personnel and the maintenance of the materiel. Each transport company should be commanded by a captain who would be charged with the discipline and instruction of the personnel and the maintenance of the materiel. When a combat battalion takes the field it would be accompanied by one of the transport companies, the company commander of which would be the tranportation officer of the battalion.

The number of trucks in each transport company is based on the number required to transport the accessories, baggage and approximately one days allowance of ammunition for a battalion.

(b) The personnel allowed by the present Table was found insufficient to provide a second relief for the guns in addition to all the other details to be performed by it. It was necessary to man the guns at all times, day and night, and to do this two complete reliefs were required. The proposed organization tables attached hereto (exhibit) show the changes to effect this.

(c) Experience has demonstrated that a battalion should be ready at all times to take the field independently. To this end the proposed table of organization attached hereto, provides a supply officer and an orienteur officer for each battalion.

(d) A great diversity of types of trucks was furnished, some types being well adaped to the work and standing up well in service and others giving much trouble in maintenance. The ammunition body was found ill adapted to service due to its limited cargo space and the lack of protection for the driver and cargo. The four wheel steer was found difficult to handle under conditions existing at the front.

A standard type of truck would simplify the instruction of drivers and the supply of spare parts for maintenance. It is recommended that a uniform type of 3-ton truck with cargo body, four-wheel drive and front wheel steer be provided for both ammunition service and general cargo transport. Also that the rear wheels be provided with dual tires, that the hub caps and cargo bodies flush with the outside of the wheels and that the radiator be protected by an effecitve shield; that all trucks be pe provided with magneto ignition and lighting consisting of a single light pivoted on the dash; with 50 gallon tanks with compartment for emergency reserve; with locker for the storage of drivers personal effects and tools and with racks for picks and shovels.

(e) No adequate means of providing lights for the battery P. C., aiming points, and slight illumination were provided. One battery which captured a gasoline generator set of about 11/2 K. W. used the same for these purposes with satisfactory results. It is recommended that a gasoline motor-generator set of about 3 K. W. capacity be provided on light trailer for each battery. This change is shown in proposed tables annexed hereto (exhibit).

(f) Sights and other angle measuring instruments supplied with the howitzer were graduated in degrees and minutes. With the view of securing uniformity in the artillery service, it is recommended that all instruments for measuring horizontal angles be graudated in mils.

(g) The tables of Orienteur, Fire-Control and Drafting equipment have been compiled with the idea of standardizing this equipment for all types of guns of large calibre and of providing all material of this class actually needed at the front.

Previous tables of equipment call for special designs of fire-control instruments for different types of guns but this is not necessary if a common unit of angular measurement is adopted. Azimuth instruments should be graduated in accordance with this unit. The small transit assigned to each battery in these tables fulfills the purpose of the aiming circle in the 155 m/m equipment and of the directeur of the British Howitzer equipment.

The unit of graduation for tapes and plotting scales is dependent upon this unit of measurement and scale of the maps to be generally used for Artillery purposes.

(h) It is recommended that the Signal Corps equipment to be modified so as to include only the actual needs of a regiment of heavy artillery and to standardize this equipment for all types of mobile heavy artillery used by the American forces with the idea in mind of using equipment of American construction only.

(i) Although the old table called for tractors of 5-ton type, none were supplied. It was apparently contemplated that one tractor should be used for each transport wagon. Instead of the 5-ton type each battery was actually supplied with four 20-ton caterpillar tractors. It is the opinion of the Board that the old type prescribed would not have been able to pull the transport wagons over some of the difficult roads encountered. The type supplied (20-ton) was efficient but slow and awkward and proved cumbersome on the road.

It is proposed to substitute tractors of the 10-ton type for the 20-ton type supplied. It is contemplated to use two of these for each gun, one pulling the trailer carrying firing beams and the bed, and the other pulling the howitzer and the cradle. The reasons for this change are that the differences in weight and size will permit passage over roads and bridges that formerly could not be traversed by the 20-ton type; that the length of the gun trains will be shortened, thereby permitting turns which could not be made with the long trains;

that a gread deal of uncoupling of pieces will be diminished; that the load can be more speedily handled and the pieces be brought to the gun positions in their proper order more readily.

II. With the foregoing considerations in view, the Board recommends the following changes in the Tables or Organization and the Equipment Manual for a regiment of 9.2 inch Howitzers, Motorized (Series C, No. 3):

That table 212 on page 8 of the Equipment Manual be changed as per attached copy. The strength of the battery has been changed from 280 to 217 for reasons set forth later. This change affects the strength of each battalion. Attention is invited to the fact that an additional battalion is added, i.e., a Transport Battalion. It is the purpose to have this battalion handled all of the transportation for the regiment; requisition for all mobile equipment that does notform a requisite part of any separate organization; and train the wagoners and a chauffeurs (except tractor drivers) for the entire regiment; all of the chauffeurs and wagonerers to remain part of the personnel of this Transport Battalion which is divided into four companies. Necessary reasons for the existence of this organization have been stated heretofore. The total strength of the Regiment has been changed from 1981 to 2634 due principally to the addition of this battalion and to the increase in number and size of the gun sections.

Table 213 has been changed principally in that the chauffeurs, assistant chauffeurs, wagoners, (tractor drivers and assistant excepted) and motorcycle drivers have been withdrawn and place in the Transport Battalion and further in the elimination of the platoon as a unit and in the addition of relief sections for manning the guns. Experience on the front has demonstrated that the platoon is an elastic and not a fixed unit, and that the unit as such serves no useful purpose in Heavy Artillery. The firing battery has been divided into eight (8) sections; four (4) regular and 4 (4) reserve, with the same number of gunners in each section. This scheme insures two reliefs for each gun which apparently was not contemplated in the old table but which became a necessity in actual fighting. The combat train which served as a reserve to a very slight extent and as an ammunition section has been replaced by a small reserve of fifteen men, (to be used as ammunition detail, gas guard, police duty, kitchen police duty, in manning the machine guns, to replace casualties and general duties), amply sufficient in view of the fact that the Transport Battalion will handle most of the ammunition.

The gun crew has been increased from fourteen (14) to eighteen (18) men. A telephone operator has been made a part of each section, thereby placing him directly under the control of the gun commander or chief of section. One man has been added to take the place of No. 13 as ammunition detail, leaving No. 13 with the duties of ramming, sponging and caring for the ramers and spongers only, which is a sufficient task. Another has been added to assist No. 14 in fusing projectiles, which is a task too difficult for one man to perform during rapid fire. The fourth man will clean projectiles, thereby relieving the ammunition detail to some extent of this duty which they had time to only partly perform under the present organization.

A tremendous advantage of having the crew consist of eithteen men rather than fourteen men in addition to those above mentioned is that each section will be able to put in its own gun unassisted by members of the other sections.

Slight changes have been made further as follows: A sergeant has been placed in charge of gas defense. Conditions at the front showed this to be necessary. A sergeant is selected rather than a corporal because a person occupying this important position should be clother with sufficient authority to command obedience.

A corporal has been placed in charge of machine guns. These guns were supplied under the old tables and an non-commissioned officer actually placed in charge and schooled in their operation and use although the table made no provision for him.

The privates 1st class shown in the old table under battery headquarters have been withdrawn for the reason taht they were found unndcessary. The agent with battalion headquarters has been eliminated. In experience no use was found for such an agent.

With respect to the materiel; only such part of the motor equipment has been retained as forms a part of the firing battery. The rest has been assigned to the Transport Battalion for the use of the batteries. A water cart has been added. The necessity for its use has been demonstrated with other units. An addition is made of a lighting set so as to insure adequate light in the B. C. station at times became quite a problem and this set serves as a happy colution. The number of motor cars (changed from 3 to 2 and motorcycles (changed from 12 to 4) have been reduced to serve the actual needs of a battery. The amount called for by the old table was never supplied and would not have been necessary.

The number of artillery supply trucks has been cut down from three to one for each battery which will prove ample. This one contains tools and necessary articles and will be supplemented by materials for cleaning and preserving carried on a standard 3-ton truck. This arrangement does away with extra trucks which can be used for no other purpose than that for which they are especially designed and which, as a matter of fact, will not be required with the standard truck on hand to carry these materials.

The artillery repair truck has been assigned one to each Transport Company for use in each battalion. Experience has shown that one per battalion is sufficient with the battalion operating as a unit.

A slight modification has been made in the nature of the arms carried by some of the non-commissioned officers of the battery. It is recommended that all non-commissioned officers be permitted to carry pistols. This directly affects the corporals at headquarters and those of the special detail, who, by virtue of the nature of the work required of them, are rather awkardly armed in being obliged to carry rifles.

Table 221 (Headquarters Company) has also been changed on account of the Transport Battalion. The chauffeurs, assistant chauffeurs and wagoners have been withdrawn, while some of the personnel has been slightly increased due to the requirements of this new organization. The enlisted personnel has been increased from 255 to 257 making the neq total for the Company 273 as against 271 of the old table. A sergeant-major, junior grade, and a personnel sergeant have been assigned to headquarters of the Motor Battalion. It is also recommended that a personnel sergeant be given to each battalion headquarters as shown in proposed table. Radio Sergeants have been cut down to one for each combat battalion, the number actually required. From the old table have been removed three sergeants as follows: the one in charge of the regimental instruments; the one in charge of the wireless station; the sergeant-mechanic. There are no instruments at Regimental headquarters to be cared for by the sergeant supplied. The one in charge of wireless station has been eliminated because the radio sergeants perform his duties. The sergeant-mechanic gives way to a mechanic in the 4th Company of the Transport Battalion which will handle the transportation for the Regimental Headquarters. This table also provides for eight corporals at each of the Battalion Headquarters: 3 scouts; 1 signal corporal; 2 wireless corporals as against 1 of the old table; 1 postman and one telephone corporal. Two wireless corporals are required so as to give the necessary relief. Experience has been that one signal corporal will prove sufficient. The range finder operators have been eliminated as no occasion has been found for their use. The instrument corporals, as such, have also been eliminated and two privates 1st class provided in their stead.

Heretofore the number of privates and privates 1st class supplied to battalion headquarters has proved insufficient for the work required of them. It is therefore proposed that the number of privates 1st class be increased from 6 to 10 with the following duties assigned to them: 1 operator battalions commander's instrument; 4 linemen; 2 wireless operators; 1 signaller; 2 instrument privates. The two latter privates 1st class perform the duty

required of 2 corporals under the old table. The total number of privates assigned to each battalion has been increased by 4 (from 16 to 20), with the following duties: 2 linemen; 3 scouts; 3 telephone operators; 4 orderlies; 3 messengers; 4 panelmen; 1 signaller. The duties assigned to officers have been slightly modified so as to meet the needs actually existing and those that may arise. One officer (a 1st Lieutenant) has been designated as orientour officer for each battalion; a practice which was generally followed in heavy artillery and which proved entirely successful. Radio and telephone duties in the battalion have been combined under one designation, that of signal. and one officer (a 2nd Lieutenant) designated as Signal Officer, has been assigned to each battalion. As a matter of actual practice, this arrangement was followed in recent experiences on the front and proved highly successful; two officers being unnecessary. A regimental gas officer (a 1st Lieutenant) has also been provided. Although the old table provided none, one officer was required by orders to perform duties pertaining to gas warfare and protection against gas.

The materiel has been changed in accordance with the proposed plans mentioned hertofore: Reel trucks and reel carts have been eliminated. None were supplied to heavy artillery units, and as far as can be determined, none could have been used advantageously under the conditions actually encountered. Conditions, in practice, are that telephone lines ordinarily follow terrain over which it woulf be impossible to use a horse or motor drawn reel cart or truck and even when the lines follow roads and routes which could be travelled by such vehicles, care must be exercised to see that the lines are so laid that they will not be cut by moving traffic. It thus follows that even then the cart or truck must travel no faster than the linemen on foot engaged in effecting the proper installation. Therefore the carts and trucks become only a means of transport and an ordinary standard truck meets this need for batter than a special reel cart or truck since wire is provided on standard spools. This together with small hand reels provides construction equipment to lay lines over all kinds of terrain.

The creation of the Transport Battalion required the necessary changes to be made in Table 222 (Supply Company). Although all chauffeurs, assistant chauffeurs, and wagoners have been withdrawn, the total enlisted personnel has been increased by one (1); from 114 to 115 and the number of officer from four (4) to five (5), due to the requirements of the Transport Battalion. One officer, a 1st Lieutenant, should be sent to each separate combat battalion when detached to act as supply officer for that battalion, leaving the Captain and a 2nd Lieutenant to remain with Company Headquarters.

A certain number of enlisted men (6) was added and assigned to each battalion for the purpose of handling rations and battalion supplies. This scheme was actually followed during the recent operations and was justified in all particulars. A corporal has been added to act as non-commissioned gas officer for the organization. The sergeant-mechanic has been elimanated; the mechanic of the 4th Transport Company performing the duties formerly required to to be performed by him. One sergeant-major, junior grade, has been assigned to regimental headquarters to act as supply non-commissioned officer due to the added requirements of the Transport Battalion. The number of motor cars was increased from one to five, allowing one for headquarters and one for each supply officer when working separately. It is also recommended that one be supplied to the Ordnance Officer.

The present signal equipment scheduled for telephone systems includes material for light pole line construction which was never actually used and which is burdensome to transport, such items as 8-pin cross arms and a large number of lance poles for example. This construction is ordinarily cared for by the Signal Corps and there is neither personnel nor other materiel provided an artillery unit to perform this kind of construction.

Ordinary twisted pair insulated wire laind along fences, existing pole lines, and trees forms the lines for the construction by artillery signal details. The number of lance poles has been reduced to that actually necessary.

Three pair cable was used in practice in very few cases and the amount of this materiel, since it is vey burdensome to transport, has been reduced accordingly.

It is considered that the Camp model telephone is better for posts of command than the Type 1375-B since they furnish a better transmission circuit. The button switch of the 1375-B set is very tiresome to operate during a long conversation.

One additional 12 line switchboard is proposed for Regimental Headquarters in order to provide sufficient terminal facilities for the number of lines terminating at such stations.

The outpost twist is too light for line construction and it is proposed to provide heavy twist pair instead. A small amount of outpost twist is recommended for inside station, bell and switchboard wiring.

For visual signalling it is considered that the 24cm. projector with combination flags is ample. The 35 cm. projector is difficult to carry, required a storage battery and is not needed.

The proposed change in radio personnel and equipment enables the Regimental Commander to be, at all times, in direct communication with Battalion commanders. Four panelmen have been added to Regimental Headquarters and also to Battalion headquarters. Old tables make no provision for them and if aeroplane observation is desired, their services are indispensable.

It is further recommended that Table I of Individual Mobile Equipment be amended so as to cover each item for a battery having a total enlisted strength of 212 instead of 255, and so as to eliminate the articles enumerated under "Clothing for Chauffeurs and Motorcyslists" except in so far as these articles are required by tractor drivers and their assistants.

It is also recommended that Table II of Individual Mobile Equipment of a Headquarters Company of a regiment of 9.2 inch Howitzers be amended to meet the requirements of an enlisted strength of 257 as set forth in the proposed amended table No. 221.

It is also recommended that Table III of Individual Mobile Equipment of a Supply Company of a regiment of 9.2-inch Howitzers be amended to meet the requirements of a total enlisted strength of 83 as set as set forth in the proposed amended Table 222.

It is also recommended that Table V of Total Mobile Equipment of a regiment of 9.2-inch Howitzers be amended to meet the requirement of the total strength of same as shown by proposed smended Table 212.

It is recommended that amendment be made to Euipment Manuals for service in Europe (Regiment of 9.2-inch Howitzers, motorized), (series C, No. 3), Table V, total mobile equipment of a Regiment of 9.2-inch Howitzers, at page 28 by eliminating the words "typewriters, Corona" and the words "Ribbon, typewriter, Corona, red and black" and inserting the following notations after the word "Typewriter:"

1	2	3	4	5	6	7
Articles	Btry	Hqrs Co	Supply Co.	Medical Dept	Total Reg	Remarks
Typewriter	1	4n	10b	1	21	(a) 3 Regtl Hqrs; 1 Hqrs.Co. (b) 2 Supply Co.; 4 Battlion Hqrs; 4 Transport Co's.

Reason: Supply of typewriters hitherto furnished entirely inadequate for needs of regiment. The work demanded of a typewriter is of such a nature that a standard typewriter is required.

It is recommended that amendment be made to Equipment Manuals for service in Europe (Regiment of 9.2-inch Howitzers, motorized), (Series C, No. 3) Table VIII of Fire-Control, Drafting materials and supplies for a regiment of 9.2-inch Howitzers, cutting the articles set forth thereunder and substituting therefor the following articles:

1	2	3	4	5	6
Articles	Btry	Supply Co	Hqrs Co	Total Dept	Remarks
Orienteur Equipment					The items shown in column 3 under Supply Company for use of each battalion. To be equally divided among the 3 battalion headquarters of the regimen
Alidado, open sight	1	3		9	
Alidade, telescopic	1	3		9	
Chest, instrument	1	3		9	
Chest, rod and tripod	1	3		9	
Compass, prismatic	1	3	1	10	
Declinator, with screws, for use on plane table	1	3		9	Items shown in column 4 under Headquarters Co for use of Regimental Headquarters.
Engineer Field Manual	1	3	1	10	
Ephemeris		3		3	
Flashlights, with extra batteries,	4	6		30	
Logarithms,table of, in degrees, 5 place.	1	3	1	10	
Logarithms, table of, in mils, 5 place	1	3	1	10	
Magnifying glass, with handle		3	1	4	
Orienteur Officers' Manual	1	3	1	10	
Paint, white, small cans	6	3		39	
Paint, black, small cans	6	3		30	
Planetable, topographic, with tripos and case	1	3		9	
Protractor, small, graduated in degrees	1	6	2	14	

1	2	3	4	5	6
Articles	Btry	Supply Co	Hqrs Co	Total Dept	Remarks
Protractor, large, graduated in degrees	1	6	2	14	
Protractor, small, graduated in mils	1	6	2	14	
Protractro, large graduated in mils	1	6	2	14	
Range poles	2	6		18	
Scale, boxwood	2	6	2	20	
Scale, graduated, one yard	1	3	1	10	
Square, zinc, graduated for plotting coordinates	2	6	2	20	
Stadia, rod, folding		3		3	
Tally pins	6	30		66	
Tape, steel, long		3		3	
Tape, steel, short	1	3		9	
Tape, repair outfit		3		3	
Transit, small, with tripod; graduated in mils	1			6	
Transit, standard, with tripod		3		3	
Traverse tables		3		3	
Fire Control Equipment					
Aming post, circular head	8			48	
Aiming posts, diamond heas	4			24	
Aming posts, square head	8			48	
Azimuth instrument, graduated in mils	2	3		15	
Azimuth instrument, periscopic, graduated in mils	1	3		9	
Board, firing, small	1			6	
Board, firing, large	1	3	1	10	
Flashlights, with extra batteries	6	6		42	
Lamps or lanterns	16	6		102	
Plotting board, range and deflection	1			6	
Protractor, parallax, in mils	1			6	
Range tables	8	24	2	74	
Stop watches	6			36	
Scissors telescope and tripod			1	1	
Drafting Material					
Brushes, water color, 2 each No 1 to 6 inclusive	12	36	12	120	

1	2	3	4	5	6
Articles	Btry	Supply Co	Hqrs Co	Total Dept	Remarks
Bureau of standards, circular No 47	1	3	1	10	
Celluloid, sheets, 20 x 25 inches, transparent half frosted and half clear	12	36	12	120	
Compass, veam, bar or trammel points, micro-meter adjustment	1	3	1	10	
Crayons, lumber, boxes red	1	3	1	10	
Dividers, proportional 8½ inch	1	3	1	10	
Drawing instruments,set	1	3	1	10	
Envelopes, Manila, 10 in x 15 in	24	72	24	240	
Eraser, art gum	6	18	6	60	Eraser, pencil, ruby
No 112	3	16	3	39	
Eraser, ink, typewriter, disc	3	9	3	30	
Eraser, sponge	3	9	3	30	
Eraser, steel	2	6	2	20	
Glue, pint cans	1	3	1	10	
Horn centers, ½ in diameter	1	3	1	10	
Ink, drawing, black, waterproof, bottles	3	9	3	30	
Ink, drawing, blue, waterproof, bottles	1	3	1	10	
Ink, drawing, brick red waterproof bottles	1	3	1	10	
Ink, drawing, brown waterproof bottles	1	3	1	10	
Ink, fountain pen, bottles, in wood case, with filler	2	6	2	20	
Ink, watercolor, burnst Sienna, full pans	2	6	220		
Ink, water color, burnt amber, full pans	2	6	2	20	
Ink, water color, Chinese White, full pans	2	6	2	20	
Ink, water color, Crimson Lake, full pans	2	6	2	20	
Ink, water color, Hoeker's green, full pans	2	6	2	20	
Ink, water color, Prussian blue, full pans	2	6	2	20	

1	2	3	4	5	6
Articles	Btry	Supply Co	Hqrs Co	Total Dept	Remarks
Magnifying glass, pocket	1	3	1	10	
Map tube, galvanized iron, 37 x 6 in	1	3	1	10	
Pencil points, for beam compass	12	36	12	120	
Pencil points, for dividers	12	36	12	120	
Pen holders, crowquill	1	3	1	10	
Pen holders, drawing	2	6	2	20	
Pen holders, writing	2	6	2	20	
Pins, colored, head, cubes, one each black, red, blue, green, yellow and white	6	18	6	60	
Paint boxes, jappanned tin, for 12 full pans and brushes	1	3	1	10	Paper, computation,
pads, ruled 8 in x 10½ in	6	18	6	60	
Paper, computation pads, unruled, 4 in x 6 in	6	18	6	60	
Paper, cross section. 10 meter roll metric graduation, 50 cm wide opaque	1	3	1	10	Paper, cross section,
10 meter roll metric graduation, transparent	1	3	1	10	
Paper, drawing, 35 in x 10 yd roll single mounted	1	3	1	10	
Paper, Paragon drawing, sheets double mounted, 24 x 36 in	12	36	12	120	
Paper, drawing, sheets thin eggshell, 24 x 36 inches	12	36	12	120	
Paper, Manila, sheets, 24 x 36 inches	12	36	12	120	
Paper, vegetable tracing, 30 in x 10 yd roll	1	3	1	10	
Parallel rules, rolling 12 inch	1	3	1	10	
Paste, jar of library	1	3	1	10	
Pens, crowquill	2	6	2	20	
Pens, drawing, Gillott No 170	24	72	24	240	
Pens, drawing Gillott No 290	24	72	24	240	
Pens, drawing, Gillott, No 303	24	72	24	240	

1	2	3	4	5	6
Pencils, blue	3	9	3	30	
Pencils, brown	3	9	3	30	
Pencils, green	3	9	3	30	
Pencils, red	3	9	3	30	
Pencils, drawing, Venus 6 H	12	36	12	120	
Pencils, drawing, Venus 3-4	12	36	12	120	
Pencils, drawing, Venus 9 H	12	36	12	120	
Reconnaissance sets, US Engineer Corps	1	3	1	10	
Rubber bands (box), 1 size 19 and 1 size 32	2	6	2	20	
Sandpaper pads, pencil sharpeners	1	3	1	10	
Sealing wax, stidk	1	3	1	10	
Shears, 12 inches long	1	3	1	10	
Sponge cup with sponge	1	3	1	10	
Straightedge	1	3	1	10	
Tables, vertical angle, stadia, degrees and meters	1	6	2	20	
Tapes, steel map	2	6	2	20	
Tapes, steel, pocket, inches and millimeters, 72 inches long	4	12	4	40	
Thumb tacks, solid head, long point	144	442	144	1440	Tracing lines, 36 in
x 10 yard roll	1	3	1	10	
Transit books, US Engineers Corps Standard	6	18	6	60	
Triangles, 6 inch celluloid, 30 and 60 degrees	1	3	1	10	Triangles, 6 inch
celluloid, 45 deg	1	3	1	10	
Triangles, 12 inch celluloid, 30 and 60 degrees	1	3	1	10	
Triangles, 12 inch celluloid, 45 degree	1	3	1	10	
"T" Square, 36 inch	1	3	1	10	

It is recommended that amendment be made to Equipment Manuals for Service in Europe (Regiment of 9.2-inch Howitzer, motorized), (Series C, No 3) Table V at page 29 thereof by changing the table of "Vehicles, Ordnance Department" to read as follows:

1	2	3	4	5	6	7
Articles	Btry	Transport Company	HQ Co	Supply Company	Medical Dept	Total Reg Remarks
Cars, motor, staff, obsr			4			4
Cars, reconnaissance			4			4

1	2	3	4	5	6	7	
Articles	Btry	Transport Company	HQ Co	Supply Company	Medical Dept	Total Reg	Remarks
Tractors, 10-ton, caterpillar	8					44	
Trucks, arty, repair		1				4	
Lighting set, trail mobile	1					6	
Trailer, wireless			1			1	

It is recommended that amendment be made to Equipment Manuals for service in Europe (Regiment of 9.2-inch Howitzer, motorized), (Series C, No 3) Table V, at page 30 thereof by changing the tables of "Motor Transport Service" and "Quartermaster Corps" to read as follows:

Motor Transport Service

1	2	3	4	5	6	7		
Articles	Btry	Transport Company	HQ Co	Supply Company	Medical Dept	Ord Dept	Total Reg	Remarks
Cars, motor, 5-pass	2	1	9	4	1	1	31	
Motorcysles with side-cars	4	6	23	8	4		83	
Trucks, cargo, 3-ton		48					193	
Trucks, tank		2					8	
Trucks, wrecking		1					4	
Trucks, light delivery 1-ton			5				5	

Quartermaster Corps

1	2	3	4	5	6	7		
Articles	Btry	Transport Company	HQ Co	Supply Company	Medical Dept	Ord Dept	Total Reg	Remarks
Carts, water, trail, mobile				12			12	
Kitchen, rolling, trail				12			12	

It is recommended that amendment be made to Equipment Manuals for service in Europe (Regiment of 9.2-inch howitzers, motorized). (Series C, No 3) Table VII of Signal Corps equipment for a regiment of 9.2inch Howitzers thereof, by cutting out the articles set forth thereunder and substituting therefor the following articles:

1	2	3	4	5	6
Articles	Battery	HQ Company	Supply Company	Total Reg	Remarks
Axes, Hand	4	6	18	48	Articles shown under Supply Co in column 4 for use in Battalion Headquarters. Divide equally among the Battalion Headquarters of the regiment.
Bags, tool, service complete	1	1	3	10	
Barometer, aneroid, graduated in milli meters and inches	1			6	
Barometer, mercurial,					
Bars, digging, standard		2	6	8	
Batteries, dry for flashlight	10	20	60	140	
Batteries, dry, tungsten, for telephones	26	28	84	268	Articles shown under the headquarters Co in 3 for the use of Regimental Headquarters
Batteries, No 6, for for vibrating bells	8	12	24	84	
Bells, electric, vibrating	2	4	9	25	
Belts, linemen's tool, with ring and safety strap	2	2	6	20	
Books, message, field, form 217-A	10	10	30	100	
Cable, 3 pair, lead covered ft		300	12000	15000	
Clips, testing	8	6	18	72	
Climbers, linemen, complete with straps and pads, pairs	6	2	6	20	Note: Identification panels, 4 x (47) 9
Chronometers, Marine	1	1	3	10	yds.
Electrolyte, 5 gal. cans		1	3	4	1 set black and white, with diamond shape. 1
Envelopes, field message form 144-A		500	1500	2000	set black and white, square panels rectan-
Flashlights, electric, hand	5	10	30	70	ular, 2x9 yds black
and					
Fuzes, lamp for 4 and 12 line switchboards	10	20	60	140	white complete
Glasses, field, prism binocular, 8 power	5	9	21	60	
Hammers, sledge	2	2	6	20	
Hammers, carpenter's, claw	2	1	3	16	
Headsets, telephone	6	6	18	60	
Headsets, radio		4		4	
Hydrometers, Baume		2	6	8	
Insulators, clamp	16	12	36	144	
Kits, inspector's pocker	2	3	9	24	
Kits, flag, combination, standard	2	6	12	30	

1	2	3	4	5	6
Knives, electrician	8	4	12	64	
Knobs, wooden	860	600	2430	8190	
Ladders	1	2	6	14	
Lamps for flashlight, extra	5	10	30	70	
Marlin, lbs	5	5	15	50	
Megaphones	2		3	15	
Nails, wire, 20d, lb	23	23	69	230	
Panels, heavy artillery, identification, large, sets		1	3	4	Note: Radio Trailer equipped with a radio set capable of receiving damped waves 250 to 500 meters and caoable of sending and receiving a distance of 25 miles undamped waves. 500 meters to 1000 meters. All electric energy to be supplied by a generator connected to a gasoline motor mounted on trailer. The above generator to be capabl and equipped to charge storage batteries.
Panels, heavy artillery, signal large, sets		1	3	4	
Pliers, side cut tin, 8"	8	10	30	88	
Poles, lance		50	150	200	
Poles, bamboo with tips fitted		3	9	12	
Projectors, 24cm without spare batteries	2	3	6	26	
Reel carts, hand	2	2	6	20	
Sapinettes				1000	
Saw, hand, cross-cut	1	1	3	10	
Screws, 8 x 1½-inch	100	200	600	1400	
Sets, radio (a)		1	3	4	
Screwdrivers, 6-inch	4	4	12	40	
Screwdrivers, 3-inch	4	4	12	40	
Shovels, short-handled, roundd point	2	2	6	20	
Staples, Blake, insulated No 5	400	600	1980	5040	
Switch, push button type	1	4	6	16	
Switchboard, telephone, 4-line monocord type	4	1	3	28	
Switchboard, telephone, 12-line monocord type		2	3	5	(a) Receiving and sending damped waves 250 meters to 500 meters. Receive 5 miles. Energy from storage batteries.
Tags, cable, heavy artillery	75	100	300	850	
Tape, friction, lbs	4	3	9	36	
Tape, rubber, lbs	2	2	6	20	
Telephones, W.E. 1375 B	12	12	36	120	
Telephones, Camp model	1	2	6	14	
Terminal strips, 10 per strip	2	4	6	22	
Thermometers, weather, graduated in Centigrade and Fahrenheit	2			12	
Voltameters, western Model 280		1	3	4	
Watches, wrist, luminous dial, with wristlets	2	2	6	20	
Wave meter		1	3	4	
Wire, insulated, heavy, twisted pair, miles	7½	9½	31½	86	

1	2	3	4	5	6
Wire, G.I. No 12, B.W.G. 109 mils mils				2	
Wire, light twist pair, inside writing, miles	2	4	6	22	

It is recommended that amendment be made to Equipment Manuals for service in Europe (Regiment of 9.2-inch Howitzers, motorized), (Series C No 3) Table IX at page 47 thereof by inserting under the title "Tools and Materials for Repair", "(a) (Artillery Repair Truck)", the figure 4 in column 5.

Further amend by cutting out the note on same page which reads as follows: "One artillery repair truck (from Supply Company), with standard equipment and load, complete, accompanies each battery."

Further amend by changing note (b), same page to read as follows: "(b) (Artillery supply truck, load "D"). One artillery supply truck with standard equipment and load "D"). One artillery supply truck with standard equipment and load "D" of small tools and repair materials accompinies each battery.

Further amend Equipment Manuals for service in Europe (Regiment of 9.2-inch Howitzers, motorized). (Series C, No 3) Table IX, Artilce VI (Materials for cleaning and preserving) on page 48 and the first three lines of page 49 thereof, by cutting out all of the articles specified thereunder.

Amend further line 4 on page 49 thereof by cutting out the word "Temporary" from the title "Temporary list of materials for cleaning and preserving," and omit the two lines reading "To replace Section VI of the Tables until the Artillery Supply Trucks with Load "A" are available."

The Board having no further business before it adjourned sine die Dec. 31, 1918.

(Sgd) M. A. Cross,
Colonel, C. A. C.,
President

(Sgd) T. D. Johnson,
1st Lieut., C. A. C.,
Recorder.

Headquarters 18th Training Area,
January 12, 1919

Approved:

(Sgd) Wm. C. Davis,
Brigadier General, U.S.A.
Commanding.

HEADQUARTERS
31ST HEAVY ARTILLERY BRIGADE
(C. A. A.)

29th December, 1918

From: James W. Doolittle, Captain, Ordnance Department.

To: The Board of Officers appointed to revise Table of Organization and Material, Coast Artillery Corps.

Subject: Changes to be made on Holt 10 ton Tractor.

1. In reference to the tractor for hauling guns I would recommend the Holt Caterpillar, 10 ton 55 H. P., with the changes as follows:

(a) A very strong fender or guard to protect the radiator.

(b) Radiator to be braced firmly on each side, doing away with brace to motor.

(c) Track shoes to be made stronger and in such a way as to be more secure to tracks.

(d) Magneto should be entirely covered and pins in impulse starter made stronger and larger.

(e) Valve springs to be made 1/4 inch shorter.

(f) Pintle hook to be made larger and of the best of material.

(g) Fan belts should be either made heavier or the construction of pullies changed.

(h) Gasoline tank to be made larger.

(i) Place to be made on tractor to carry reserve oil tank for both engine and tracks.

(Sgd) JAMES W. DOOLITTLE.

CONFIDENTIAL.
SERIES C.

TABLE 212-REGIMENT OF 9.2-INCH HOWITZERS, MARK I OR II, MOTORIZED, (ARMY ARTILLERY)
(Personnel from Coast Artillery Corps)
MAXIMUM AND MINIMUM STRENGTH

EXHIBIT "A"

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
		Battalion			Transport	Battalion			Regiment							
1 Units	1 Btry (a)	HQ	2 Btrys	Total	Trans-port Co	HQ	4 Co (b)	Total	HQ	HQ Co (b)	Supply Co (f)	4 Bn	Total	Medical Det & Chaplain	Ordnance Department (g)	Aggregate
2 Colonel	..	..	..	..	..	..	..	..	1	..	..	..	1	..	..	1
3 Lieutenant Colonel	..	..	..	..	..	..	..	..	1	..	..	..	1	..	..	1
4 Major	..	1	..	1	..	1	..	1	..	..	..	4	4	1	1	5
5 Captain	1	1	2	3	1	1	4	5	2a	1	1	14	18)	3	1	53
6 1st Lieutenant	2	..	4	4	2	..	8	8	..	8	3	20	31)	..	..	..
7 2nd Lieutenant	2	3i	4	4	2	..	8	8	..	6	1	20	27	..	..	27
8 Chaplain and Band Leader	..	..	..	..	..	..	..	..	..	1	..	..	1	1	..	2
9 Total Commissioned	5	2	10	12	5	2	20	22	4	16	5	58	83	5	1	89
10 Sgt Maj, Sr Gr (e)	..	..	..	..	..	..	..	..	..	2	..	..	2	..	..	2
11 Ordnance Sergeant	..	..	..	..	..	..	..	..	..	..	..	..	..	..	4	4
12 Sgt Maj, Jr Gr (j)	..	1k	..	..	..	1k	..	..	..	..	4	..	4	..	..	4
13 Sgt Maj, Jr Gr (s)	..	1i	..	..	..	1i	..	..	..	4	..	..	4	..	..	4
14 1st Sergeant	1	..	2	2	1	..	4	4	..	1	1	10	12	..	..	12
15 Sergeant, 1st Class	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	1
16 Master Gunner	..	1i	..	..	..	..	..	..	1i	4	..	..	4	..	..	4
17 Electrician Sergeant	..	1i	..	..	..	..	..	..	1i	4	..	.	4	..	..	4
18 Mess Sergeant	1	..	2	2	1	..	4	4	..	1	1	10	12	..	..	12
19 Radio Sergeant	..	1i	..	..	..	..	..	..	2i	5	..	..	5	..	..	5
20 Supply Sergeant	1	..	2	2	1	..	4	4	..	1	1	10	12	..	..	12
21 Sergeant	13	1i	26	26	8	1i	32	32	..	17t	2	110	129	3	4	136
22 Corporal	24	..	48	48	15	..	60	60	..	34	5	204	243	..	8	251
23 Cook	..	..	8	8	4	..	16	16	..	4	6	40	50	..	..	50
24 Mechanic	4	..	8	8	2	..	8	8	..	4	5	32	41	..	..	41
25 Wagoner (o)	8	..	16	16	54	..	216	216	..	..	..	264	264	..	..	264
26 Bugler	3	1i	6	6	2	..	8	8	..	4	..	26	30	..	..	30
27 Private, 1st Class	50	..	100	100	55	..	220	220	..	41	10	520	571)	29	12)	
28 Private	103	..	206	206	74	..	296	296	..	82	48	914	1044)	..	4)	1660
29 Band (all grades)	..	..	..	..	..	..	..	..	..	49	..	..	49	..	..	49
30 Total Enlisted	212	..	424	424	217	..	868	868	..	257	83	2140	2480	33	32	2545
31 Aggregate	217	2	434	436	222	2	888	890	4	273	88	2198	2563	38	33	2634

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
		Battalion			Transport Battalion				Regiment							
	1 Btry (a)	HQ	2 Btrys	Total	Trans-port 1 Co	HQ	4 Co (b)	Total	HQ	HQ Co (b)	Supply Co (f)	4 Bn	Total	Medical Det & Chaplain	Ordnance Department (g)	Aggregate
32 Ambulance	..	..	..	..	..	..	..	..	..	49	..	..	49	..	..	49
33 Cars, motor, 5-pass	2	1i	4	4	1	1i	4	4	1i	9	4	16	29	1	1	31
34 Cars, motor, staff, observation	..	1i	..	..	..	..	..	..	1i	4	..	3i	4	..	..	4
35 Cars, reconnaissance	..	1i	..	..	..	..	..	..	1i	4	..	3i	4	..	..	4
36 Carts, water, trail, mobile	1k	..	2k	2k	1k	..	4k	4k	..	1k	12	10k	12	..	..	12
37 Kitchens, rolling, trail	1k	..	2k	2k	1k	..	4k	4k	..	1k	12	10k	12	..	..	12
38 Lighting set, trail mobile	1	..	2	2	..	..	..	..	..	..	..	6	6	..	..	6
39 Motorcycles, side-car	4	3i	8	8	6	2i	24	24	..	23	8	48	79	4m	..	83
40 Tractors, 10-ton, caterpillar	8	..	16	16	..	..	..	..	..	..	..	48	..	..	..	48
41 Trailers, 4-ton	4	..	8	8	..	..	..	..	..	..	..	24	..	..	..	24
42 Trailer, wireless, S. C.	..	..	..	..	..	..	..	..	1i	1	..	..	1	..	..	1
43 Trucks, cargo, 3-ton	..	..	..	..	48	..	192	192	..	..	..	..	192	..	..	192
44 Trucks, Arty, Sup.	1	..	2	2	..	..	..	..	..	..	..	6	6	..	..	6
45 Trucks, Arty, Repair	..	..	..	..	1	..	4	4	..	..	..	4	4	..	..	4
46 Trucks, tank	..	..	..	..	2	..	8	8	..	..	..	8	8	..	..	8
47 Trucks, light, Daly, 1-ton	..	1i	..	..	..	1i	..	..	1i	5	..	5	5	..	..	5
48 Trucks, wrecking	..	..	..	..	1	..	4	4	..	..	..	4	4	..	..	4
49 Wagons, cradle, transport	4	..	8	8	..	..	..	..	..	..	..	24	24	..	..	24
50 Wagons, howitzer, transport	4	..	8	8	..	..	..	..	..	..	..	24	24	..	..	24
51 Wagons, platform, transport	4	..	8	8	..	..	..	..	..	..	..	24	24	..	..	24
52 Howitzers	4	..	8	8	..	..	..	..	..	..	..	24	24	..	..	24
53 Pistols	52	2	104	106	54	2	216	218	4	150	25	536	715	..	33	748
54 Rifles	165	..	330	330	168	..	672	672	.	123	63	1662	1848	..	..	1848
55 Guns, Antiaircraft, machine	2	..	4	4	..	..	..	..	..	..	..	12	12	..	..	12

REMARKS

(a) See Table 213.
(b) See Table 221.
(c) Chauffeur.
(d) Assistant chauffeurs.
(e) One performs duties of regiment sergeant major, one personnel sergeant.
(f) See Table 222.
(g) See Table 222.
(i) From headquarters company--not totaled.
(j) Performs duties of regiment supply sergeant, field artillery.
(k) From supply company--not totaled.
(m) Furnished by medical department.
(s) Performs duties of battalion sergeant major, field artillery.
(t) Two perform duties of color sergeants, field artillery.
(o) Paragraph V. G, O, 150, W. D. 1917.
(A) One adjutant; one personnel officer.

TABLE 213-BATTERY OF 9.2-INCH HOWITZERS, MOTORIZED

EXHIBIT "B"

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
			1 Battery -- 4 Howitzers											
			Special Detail		Firing Battery									
									Relief Sections					
1 Units	Btry HQ	Instrument	Signal	Scouts	1st Section	2d Section	3d Section	4th Section	5th Section	6th Section	7th Section	8th Section	Reserve Section	Total 1 Battery
2 Captain	1	..	..	..	..	..	..	..	..	..	..	..	..	1
3 1st Lieutenant	2	..	..	..	..	..	..	..	..	..	..	..	..	2
4 2d Lieutenant	2	..	..	..	..	..	..	..	..	..	..	..	..	2
5 Total Comm.	5													5
6 First Sergeant	1	..	..	..	..	..	..	..	..	..	..	..	..	1
7 Mess Sergeant	1	..	..	..	..	..	..	..	..	..	..	..	..	1
8 Supply Sergeant	1	..	..	..	..	..	..	..	..	..	..	..	..	1
9 Sergeant	k2e	1	1	..	1m	1m	1m	1m	1	1	1	1	1	13
10 Corporal	1f	2	2	1	2	2	2	2	2	2	2	2	2 1a	24
11 Cook	4	..	..	..	..	..	..	..	..	..	..	..	..	4
12 Mechanic	..	..	..	..	1r	1r	1r	1r	..	..	..	..	..	4
13 Wagoner	..	..	..	..	hj2r	hj2r	hj2r	hj2r	..	..	..	..	..	8
14 Bugler	3(n)	..	..	..	..	..	..	..	..	..	..	..	..	3
15 Private, 1st Cl	..	b2r	d4r	2r	o5r	o5r	o5r	o5r	o5r	o5r	o5r	o5r	2r	50
16 Private	..	..	c5r	..	11r	11r	11r	11r	11r	11r	11r	11r	10r	103
17 Total Enlisted	13	5	12	3	22	22	22	22	19	19	19	19	15	212
18 Aggregate	18	5	12	3	22	22	22	22	19	19	19	19	15	217
19 Cars, motor, 5 passenger	2	..	..	..	..	..	..	..	..	..	..	..	..	2
20 Carts, water, trail mobile	s1	..	..	..	..	..	..	..	..	..	..	..	..	..
21 Kitchen, rolling, trail	s1	..	..	..	..	..	..	..	..	..	..	..	..	..
22 Lighting set, trail, mobile	1	..	..	..	..	..	..	..	..	..	..	..	..	1
23 Motorcycles, w/side-cars	4	..	..	..	..	..	..	..	..	..	..	..	..	4
24 Tractors, 10-ton caterpillar	..	..	..	..	2	2	2	2	..	..	..	..	..	8
25 Trailers, 4-ton	..	..	..	..	1	1	1	1	..	..	..	..	..	4(p)
26 Truck, arty, supply	1	..	..	..	..	..	..	..	..	..	..	..	..	1

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
			1 Battery -- 4 Howitzers											
			Special Detail		Firing Battery				Relief Sections					
1 Units	Btry HQ	Instrument	Signal	Scouts	1st Section	2d Section	3d Section	4th Section	5th Section	6th Section	7th Section	8th Section	Reserve Section	Total 1 Battery
27 Wagon, cradle, transport	..	..	..	..	1	1	1	1	..	..	..	..	..	4
28 Wagon, howitzer transport	..	..	..	..	1	1	1	1	..	..	..	..	..	4
29 Wagon, platform transport	..	..	..	..	1	1	1	1	..	..	..	..	..	4
30 Howitzer	..	..	..	..	1	1	1	1	..	..	..	..	..	4
31 Pistols	18	3	3	1	3	3	3	3	3	3	3	3	3	52
32 Rifles	..	2	9	2	19	19	19	19	16	16	16	16	12	165
33 Gun, Antiaircraft, machine	2	..	..	..	..	..	..	..	..	..	..	..	..	2

REMARKS

(a) In charge machine guns.
(b) Orienteur and fire control.
(c) 3 telephone operators; 1 signaler; 1 lineman.
(d) 1 signaler; 3 linemen.
(e) Performs duties of chief mechanic.
(f) Battery clerk.
(h) Tractor driver.
(j) Assistant tractor driver.
(k) In charge of gas defense.
(m) Gun commander.
(n) Bugler 1 Cl.
(o) Telephone operator.
(p) Transporting firing beams.
(s) From supply company, not totaled.
(r) Armed with rifle.

Note: Reserve section: ammunition details, gas guard, police duty, K. P. duty, machine gun.

TRANSPORT COMPANY TABLE

155-MM GUN AND 8-INCH, 9.2 MARK I OR II HOWITZER REGIMENTS, MOTORIZED, (ARMY ARTILLERY)

EXHIBIT "C"

1	2	3	4	5	6	7	8	9	10	11
1 Units	CO HQ	1st Section	2d Section	3d Section	4th Section	5th Section	6th (Ammo Serv)	7th Section (motor car & motorcycle drivers, detached)	Aggregate	Remarks
2 Captain	1	..	..	..	..	..	..	..	1	(a) 1 Mechanical off.; 1 convoy officer. (b) Expert Mech. (c) Chiefs of Section. (d) In charge of gasoline & oil supply. (e) Company clerk. (f) Asst expert mechs. (g) Squad leaders; 1 mounted on motorcycle. (h) Drivers for Btry Arty Sup truck. (j) Co Cmdr's chauffeur. (k) Drivers, cargo trucks. (m) Asst drivers of cargo trucks. (o) Five drivers, motor cars, 5-pass.;1 driver or motor car, staff observation; 1 driver motor car, reconnaissance 1 driver, truck light, delivery 1-ton; 11 drivers, motorcycles with side cars. (p) 1 driver, truck, wrecking; 1 driver truck, repair, artillery. (s) From supply company, not totaled (t) 2 drivers, truck tank.
3 1st Lieut.	2a	..	..	..	..	..	..	..	2	
4 2d Lieut.	2	..	..	..	..	..	..	..	2	
5 Total Comm	5								5	
6 1st Sgt	1	..	..	..	..	..	..	..	1	
7 Mess Sgt	1	..	..	..	..	..	..	..	1	
8 Supply Sgt	1	..	..	..	..	..	..	..	1	
9 Sergeant	2b	1c	1c	1c	1c	1c	1d	..	8	
10 Corporal 1e	3 2f	2g	2g	2g	2g	2g	2g	..	18	
11 Cook	4	..	..	..	..	..	..	..	4	
12 Mechanic	2r	..	..	..	..	..	..	..	2	
13 Wagoner	2pr	10kr	10kr	10kr	10kr	8kr	2tr	2hr	54	
14 Bugler	2	..	..	..	..	..	..	..	2	
15 Pvt. 1 Cl.	1j	7mr	7mr	7mr	7mr	7mr	..	19o	55	
16 Private	4r	3m5r	3m5r	3m5r	3m5r	3m5r	45r	..	74	
17 Total Enl	23	25	25	25	25	23	50	21	217	
18 Aggregate	28	25	25	25	25	23	50	21	222	
19 Cars, motor 5-passenger	1	..	..	..	..	..	..	1	..	
20 Cart, water, trail, mobile	1s	..	..	..	..	..	..	..	..	
21 Kitchens, rolling, trail, mobile	1s	..	..	..	..	..	..	..	..	
22 Motorcycle, side-car	..	1	1	1	1	1	1	..	6	
23 Trucks, cargo, 3-ton	..	10	10	10	10	8	..	..	48	
24 Trucks, tank	..	..	..	..	..	..	2	..	2	
25 Trucks, wrecking	1	..	..	..	..	..	..	..	1	
26 Trucks, repair, arty	1	..	..	..	..	..	..	..	1	
27 Pistols	20	3	3	3	3	3	3	19	57	
28 Rifles	8	22	22	22	22	20	47	2	165	

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CONFIDENTIAL
SERIES C.

TABLE 221-HEADQUARTERS COMPANY (ARMY ARTILLERY)
(Personnel from Coast Artillery Corps)
MAXIMUM AND MINIMUM STRENGTH

EXHIBIT "D"

1	2	3	4	5	6	7	8	9
1 Units	Regt Sec & Co HQ	Band Section	1st Bn	2d Bn	3d Bn	Transport Bn	Total	Remarks
2 Captain	1	..	..	..	..	..	1	(a) 1 gas officer; 1
3 1st Lieutenant	5a	..	1o	1o	1o	..	8	munition officer; 1 tele-
4 2d Lieutenant	..	..	2k	2k	2k	..	6	phone officer; 1 intelli-
5 Total Commissioned	6	1	3	3	3	..	16	gence officer; 1 radio
6 Sgt Maj, Sr Gp	2	..	..	..	..	..	2	officer. (b) 1 in charge
7 Sgt Maj, Jr Gp	..	..	1	1	1	1	4	Ret'l scouts; 1 in charge
8 1st Sergeant	1	..	..	..	..	..	1	Regt'l signal detail; 1
9 Master Gunner	1	..	1	1	1	..	4	in charge postal service;
10 Electrician Sgt	1	..	1	1	1	..	4	2 personnel sergeants.
11 Mess Sergeant	1	..	..	..	..	..	1	(c) 1 agent Regt'l HQ, 1
12 Radio Sergeant	2	..	1	1	1	..	5	scout; 1 personnel. (d) 1
13 Supply Sergeant	1	..	..	..	..	..	1	Cpl., 2 instrument Cpls.,
14 Sergeant	2h7b	..	3c	3c	3c	1n	17	3 scouts; 2 wireless oprs;
15 Corporals	10d	..	8e	8e	8e	..	34	1 company clerk; 1 tele-
16 Cook	4	..	..	..	..	..	4	phone. (e) 3 scouts; 1
17 Mechanics	1	..	1	1	1	..	4	signal Cpl; 2 wireless
18 Bugler	1p	..	1q	1q	1q	..	4	cpls; 1 postman; 1 tele-
19 Private, 1st Class	11f	..	10g	10g	10g	..	41	phone cpl. (f) 1 Regt'l
20 Private	22i	..	20j	20j	20j	..	82	Cmdr instrument; 1 sig-
21 Band (all grades)	..	49	..	..	..	..	49	naller; 4 linemen; 2
22 Total Enlisted	65	49	47	47	47	2	257	wireless oprs. (g) 1
23 Aggregate	71	50	50	50	50	2	273	operator Bn Cmdr's
24 Car, motor, 5-passenger, Q. M. C.	5	..	1	1	1	1	9	instrument; 4 linemen; 2 wireless operators; 1
25 Car, motor, staff, observation, O.D.	1	..	1	1	1	..	4	signaller; 2 instrument Pvts 1st Cl. (h) Performs
26 Car, reconnaissance	1	..	1	1	1	..	4	duties of color sergeant.
27 Motorcycle and sidecar	12	..	3	3	3	2	23	(i) Includes 1 wireman; 3 telephone opr's; 4 order-
28 Kitchen, rolling, trail, mobile	1s	..	..	..	..	..	..	lies; 3 messengers; 4 panelmen; 1 signaller; 2
29 Trailer, wireless, (S. C.)	1m	..	..	..	..	..	1	linemen; 3 scouts. (j) 2 linemen; 3 scouts; 3 tele-
30 Truck, light, delivery, 1-ton	1	..	1	1	1	1	5	phone oprs; 4 orderlies; 3 messengers; 4 panelmen;
31 Pistol	38	50	20	20	20	2	150	1 signaller. (k) 1 signal
32 Rifle	33	..	30	30	30	..	123	officer; 1 liaison officer (l) Includes additional pistols for all officers of Regtl HQ. (m) See note with tables for telephone, visual signalling and radio equipment. (n) Personnel Sgt. (o) Orienteur officer. (p) Bugler, 1st Class. (q) Bugler, Corporal

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TABLE 222-SUPPLY COMPANY

155-MM, GUN AND 8-INCH, 9.2 MARK I OR II HOWITZER REGIMENT, MOTORIZED (ARMY ARTILLERY)

CONFIDENTIAL (Personnel from Coast Artillery Corps) EXHIBIT "E"

SERIES C. MAXIMUM AND MINIMUM STRENGTH

1	2	3	4	5	6	7	8	9	10
1 Units	CO HQ	Regt Sec	1st Bn Sec	2d Bn Sec	3d Bn Sec	To-tal CO	Ord Dept Attached	Total	Remarks
2 Captain	1	..	..	..	..	1	..	1	(a) Performs duties
3 1st Lieutenants	..	..	1	1	1	3	1	4	of Regt Sup Sgt. (b)
4 2d Lieutenants	1	..	..	..	..	1	..	1	1 accompanies each
5 Total Commissioned	2	..	1	1	1	5	1	6	battalion when de-
6 Ordnance Sergeant	..	..	..	..	..	..	4	4	tached. (c) Includes
7 Sgt Major Jr Gr (a)	..	1	1(b)	1(b)	1(b)	4	..	4	1 company clerk and
8 First Sergeant	1	..	..	..	..	1	..	1	1 gas Cpl. (d) For
9 Mess Sergeant	1	..	..	..	..	1	..	1	Regtl & Bn officers'
10 Supply Sergeant	1	..	..	..	..	1	..	1	messes. (e) Cobbler.
11 Sergeant	2	..	..	..	..	2	4	6	(f) 1 rolling kit-
12 Corporal	5c	..	..	..	..	5	8	13	chen, motor, trail
13 Cook	2	1d	1d	1d	1d	6	..	6	for transport Co
14 Mechanics	1r	1er	1er	1er	1er	5	..	5	attached. (g) 1 for
15 Private, 1st Class	10	..	..	..	..	10	12	22	transport Co attach-
16 Private	26	1d	7 1d	7 1d	7 1d	48	4	52	ed. (r) Armed with
17 Total Enlisted	49	4	10	10	10	83	32	115	rifles.
18 Aggregate	51	4	11	11	11	88	33	121	
19 Car, motor, 5-pass, Q. M. C.	1	..	1	1	1	4	1	5	Note: Ord Det to
20 Kitchen, rolling, trail, mobile	1	2f	3f	3f	3f	12	..	12	man 4 arty repair trucks, each truck
21 Motorcycle with sidecar	5	..	1	1	1	8	..	8	to have 1 Ord Sgt, 1 Sgt expert mach-
22 Cart, water, trail	1	2g	3g	3g	3g	12	..	12	inists; 2 Cpl mach-
23 Pistol	14	2	3	3	3	25	33	58	inists; 1 Pvt 1 Cl
24 Rifle	37	2	8	8	8	63	..	63	acetylene welder; 1 Pvt 1 Cl electri- cian, 1 Pvt 1 Cl blacksmith; 1 Pvt machinist helper.

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EQUIPMENT MANUALS

FOR SERVICE IN EUROPE

Series C-No. 3

Regiment of 9.2 Inch Howitzers

(Motorized)

GENERAL HEADQUARTERS

AMERICAN EXPEDITIONARY FORCES

General Staff: First Section
September, 1918

A. G. PRINTING DEPARTMENT

GENERAL HEADQUARTERS

AMERICAN E. F.

Change as noted on page 8 of this report.

TABLE II

SETS OF INDIVIDUAL MOBILE EQUIPMENT OF A HEADQUARTERS COMPANY OF A REGIMENT OF 9.2-INCH HOWITIZERS (MOTORIZED)

1	2	3	4	5
ARTICLES	2 Sgt Maj, Sr Gr 3 Sgt Maj, Jr Gr 1 1st Sgt 4 Master Gunners 4 Elect Sgt 1 Mess Sgt 8 Radio Sgts 1 Sup Sgt 16 Sgts 40 Corporals 4 Clerks 4 Buglers 63 Privates 49 Bandmen	3 Mechanics 7 Wagoners 40 Private 1st Class 5 Private	Total Company	REMARKS
Number in each group	200p	55r	255	(p) Armed with pistol. (r) Armed with rifle.
QUARTERMASTER PROPERTY				
Belt, waist	1	1	255	
Blankets, O. D. (1)	1	1	255	(1) See Note No 1.
Breeches, service wool	1	1	255	
Bugle with sling (2)	..	..	4	(2) Carried by bugler only.
Cap, overseas	1	1	255	
Coat, fatigue	1	1	255	
Coat, service wool	1	1	255	
Chevrons and sleeve insignia (3)				(3) See Note No 2.
Drawers, prs.	2	2	510	
Dubbin, 4oz. can (4)	1	1	287	(4) Includes officers.
Gloves, heavy leather, pairs	1	1	255	
Gloves, wool, O. D. pairs, (1)	1	1	255	
Hat, fatigue	1	1	255	
Laces, shoe, pairs	2	2	510	
Ornament, bronze	2	2	510	
Ornament, bronze, letters	1	1	255	
Overcoat (1)	1	1	255	
Pin, shelter tent (4)	5	5	1595	
Pole, shelter tent (4)	1	1	319	
Puttees, spiral, wool, pairs	1	1	255	
Rations, reserve (4)	2	2	574	
Shirt, O. D. wool	2	2	510	
Shoes, pairs	2	2	510	
Slickers	1	1	255	
Socks, wool, pairs	4	4	1020	
Tag, identification	2	2	510	

TABLE II (Continued)
SETS OF INDIVIDUAL MOBILE EQUIPMENT OF A HEADQUARTERS
COMPANY OF A REGIMENT OF 9.2-INCH HOWITZERS (MOTORIZED)

1	2	3	4	5
Tape for identification tags, yards	1	1	255	
Tent, shelter half (4)	1	1	319	
Toilet kit (5)	1	1	255	(5) See Note No 5.
Trousers, fatigue	1	1	255	
Undershirt	2	2	510	
Whistle and chain (6)	..	..	17	(6) Whistle and chain wil be worn by the 1st Sgt an sergeants.
ORDNANCE PROPERTY				
Bayonet	..	1	55	
Bayonet scabbard	..	1	55	
Breech cover	..	1	55	
Breech stick	..	1	55	
Brush and thong (7)	..	1	55	(7) If any rifles are pro
Can, condiment	1	1	255	vided with spare part con
Can, meat	1	1	255	tainers, this number will
Canteen	1	1	255	be reduced accordingly.
Canteen cover, dismounted	1		255	
Cartridge, ball, cal .30	..	100	5500	
Cartridges, cal .45 (4)	35	..	8120	
Cartridge belt, cal .30, dismounted	..	1	55	
Cup	1	1	255	
Fork	1	1	255	
Front sight cover		1	55	
Gun sling	..	1	55	
Haversack	1	1	255	
Helmet, steel (4)	1	1	287	
Knife	1	1	255	
Magazine, pistol, extra (4)	4	..	928	
Magazine pocket, web, double (4)	2		464	
Oiler and thong case (7)	..	1	55	
Pack carrier	1	1	255	
Pistol belt (4)	1	..	232	
Pistol, cal .45 (4)	1	..	232	
Pistol holder (4)	1	..	232	
Pouch for 1st aid packet	1	1	255	
Rifle, US cal 30	..	1	55	
Rifle scabbard	..	1	55	
Spoon	1	1	255	
MEDICAL PROPERTY				
Foot powder or grease box (4)	1	1	287	
Packet, 1st aid (4)	1	1	287	

TABLE II (Continued)
SETS OF INDIVIDUAL MOBILE EQUIPMENT OF A HEADQUARTERS COMPANY OF A REGIMENT OF 9.2-INCH HOWITZERS (MOTORIZED)

1	2	3	4	5
CHEMICAL WARFARE SERVICE PROPERTY				
Respirator, British, S. B. or equal (4)	1	1	287	

ARTICLES OF A HEADQUARTERS COMPANY OF A REGIMENT OF 9.2-INCH HOWITZER DISTRIBUTED WITHIN THE ORGANIZATION.

1	2	3
QUARTERMASTER PROPERTY		Distributed as directed by the organization commander.
Brassards: (8)		
Blues: Agents and Signelmen	..	
Green: Guides and Scouts	..	(8) See G. O. 59, H. A. E. F., 1917.
Red: Orderlies and Messengers		
Housewife	32	
CLOTHING FOR CHAUFFEURS AND MOTORCYCLES		
Boots, hip, rubber, prs	74	
Coat, oilskin	74	
Gauntlets, winter, prs. (9)	74	(9) For winter use.
Gloves, heavy leather, prs	74	
Goggles, mica or compound	74	
Helmet, wool or toque (9)	74	
Mackinaw or jerkin (9)	74	
Overshoes, arctic, prs. (9)	74	
Socks, extra heavy, prs. (9)	148	
Trousers, oilskin (10)	24	(10) For motorcyclists only.
ORDNANCE PROPERTY		
Cleaning rod, barrack	7	
Screwdriver (rifle)	7	

TABLE III.
SETS OF INDIVIDUAL MOBILE EQUIPMENT OF A SUPPLY COMPANY OF A REGIMENT OF 9.2-INCH HOWITZERS (MOTORIZED).

1	1	2	3	4	5
ARTICLES.	3 Sgt Maj Jr. Gr. 1 1st Sgt 1 Mess Sgt 1 Sup Sgt 3 Sgts 6 Cooks	5 Cpls 4 Mechanics 2 Wagoners 28 Pvts 1st Class 32 Pvts	4 Ord. Sgts 3 Sgts 6 Cpls 7 Pvts 1st Class 8 Pvts Ordnance attached.	Total Company	REMARKS.
Number in each group .	15p	71r	28p	114	(p) Armed with pistols. (r) Armed with rif
QUARTERMASTER PROPERTY					
Belt, waist	1	1	1	114	
Blanket, O. D. (1) . .	1	1	1	114	(1) See Note #1.
Breeches, service, wool	1	1	1	114	
Cap, overseas	1	1	1	114	
Chevrons and sleeve insignia (2)	. .	. .	. .	. .	(2) See Note #2.
Coat, fatigue	1	1	1	114	
Coat, service, wool .	1	1	1	114	
Drawers	2	2	2	228	
Dubbin, 4 oz. can (3)	1	1	1	118	(3) Incl officers
Gloves, heavy leather, prs.	1	1	1	114	
Gloves, wool, O. D., prs.	1	1	1	114	
Hat, fatigue	1	1	1	114	
Laces, shoe, extra, prs	2	2	2	228	
Ornament, bronze . . .	2	2	2	228	
Ornament, bronze, letters	1	1	1	114	
Overcoat (1)	1	1	1	114	
Pin, shelter tent (3)	5	5	5	610	
Pole, shelter tent (3)	1	1	1	114	
Puttees, spiral, wool, prs	1	1	1	114	
Rations, reserve (3)	2	2	2	236	
Shirt, O. D.	2	2	2	228	
Shoes, prs.	2	2	2	228	
Slicker	1	1	1	114	
Socks, wool, prs . . .	4	4	4	456	
Tag, identification	2	2	2	228	(4) See Note #5
Tape, identification tag, yds	1	1	1	114	

TABLE III. (continued)
SETS OF INDIVIDUAL MOBILE EQUIPMENT OF A SUPPLY COMPANY OF A REGIMENT OF 9.2-INCH HOWITZERS (MOTORIZED).

1	1	2	3	4	5
Tent, shelter half (3)	1	1	1	122	(5) Whistle and chain will be carried by the 1st Sgt and Sgts.
Toilet kit (4)					
Trousers, fatigue	1	1	1	114	
Undershirt	2	2	2	228	
Whistle and chain (5)	..	..	..	3	
ORDNANCE PROPERTY					
Bayonet	..	1	..	71	
Bayonet scabbard	..	1	..	71	
Breech cover	..	1	..	71	
Breech stick	..	1	..	71	
Brush and thong (6)	..	1	..	71	(6) If any rifles are provided with spare part containers this number will be reduced accordingly
Can, condiment	1	1	1	114	
Can, meat	1	1	1	114	
Canteen	1	1	1	114	
Canteen cover, dismounted	1	1	1	114	
Cartridge, ball, cal. .30	..	100	..	7100	
Cartridges, pistol, cal. .45 (3)	35	..	35	1645	
Cartridge, belt, cal. .30, dismtd.	..	1	..	71	
Cup	1	1	1	114	
Fork	1	1	1	114	
Front sight cover	..	1	..	71	
Gun sling	..	1	..	71	
Haversack	1	1	1	114	
Helmet, steel (3)	1	1	1	114	
Knife	1	1	1	114	
Magazine, pistol, extra (3)	4	..	4	188	
Magazine pocket, web, double (3)	2		2	94	
Oiler and thong case (6)		1	..	71	
Pack carrier	1	1	1	114	
Pistol belt	1	..	1	47	
Pistol, cal. .45	1	..	1	47	
Pistol holster	1	..	1	47	
Pouch, 1st aid packet	1	1	1	114	
Rifles, U. S., cal. .30	..	1	..	71	
Rifle scabbard	..	1	..	71	
Spoon	1	1	1	114	
MEDICAL PROPERTY					
Foot powder or grease box (3)	1	1	1	118	
Packet, 1st aid (3)	1	1	1	118	

TABLE III. (continued)
SETS OF INDIVIDUAL MOBILE EQUIPMENT OF A SUPPLY COMPANY OF A REGIMENT OF 9.2-INCH HOWITZERS (MOTORIZED).

1	1	2	3	4	5
CHEMICAL WARFARE SERVICE PROPERTY					
Respirator, British, S. B. or equal (3)	1	1	1	118	

TABLE III (continued)

ARTICLES OF A SUPPLY COMPANY OF A REGIMENT OF 9.2 INCH HOWITZERS DISTRIBUTED WITHIN THE ORGANIZATION.

1	2	3
QUARTERMASTER PROPERTY		HOW DISTRIBUTED
Brassards: (7) Blue: Agents and signalmen. Green: Guides and scouts. Red: Orderlies and messengers.		(7) See G. O. No. 59. H. A. E. F., 1917.
Housewife	14	
CLOTHING FOR CHUFFEURS AND MOTORCYCLISTS		
Boots, hip, rubber, prs	58	
Coat, oilskin	58	
Gauntlet, winter, prs (8)	58	(8) For winter use.
Gloves, heavy leather, prs	58	
Goggles, mica or compound	58	
Helmet, wool, or toque (8)	58	
Mackinaw or jerking (8)	58	
Overshoes, arctic, prs. (8)	58	
Socks, wool, extra heavy, prs. (8)	116	
Trousers, oilskin (9)	8	(9) For motorcyclists only.
ORDNANCE PROPERTY		
Cleaning rod, barrack	9	
Screwdriver (rifle)	9	

TABLE IV.

SETS OF INDIVIDUAL MOBILE EQUIPMENT OF MEDICAL DEPARTMENT PERSONNEL ATTACHED TO A REGIMENT OF 9.2-INCH HOWITZERS (MOTORIZED).

1	2	3	4
ARTICLES	1 Sgt 1st Cl, 3 Sgts, 29 1st Cl, and Pvts	Total Detachment	REMARKS
Worn or carried on the person.			
Number in each group	33	33	
QUARTERMASTER PROPERTY			
Belt, waist	1	33	
Blankets, O. D. (1)	1	33	(1) See Note No. 1.
Breeches, service wool	1	33	
Cap, overseas	1	33	
Chevrons and sleeve insignia (2)			(2) See Note No. 2.
Drawers	2	66	
Dubbin, 4 oz. can (3)	1	38	(3) Includes Officers
Gloves, heavy leather, prs	1	33	
Gloves, wool, O. D. prs. (1)	1	33	
Laces, shoe, extra, prs	2	66	
Ornament, bronze	2	66	
Ornament, bronze, letters	1	33	
Overcoat (1)	1	33	
Pin, shelter tent (3)	5	215	
Pole, shelter tent (3)	1	42	
Puttees, spiral, wool, prs	1	33	
Rations, reserve (3)	2	76	
Shirt, O. D.	2	66	
Shoes, prs	2	66	
Socks, wool, prs	4	132	
Tag, identification	2	66	
Tape, identification tag, yds	1	33	
Tent, shelter tent, (3)	1	43	
Toilet kit (4)	1	33	
Undershirt	2	66	(4) See Note No. 5.
ORDNANCE PROPERTY			
Can, condiment	1	33	
Can, meat	1	33	
Canteen	1	33	
Canteen cover, dismounted	1	33	
Cup	1	33	
Fork	1	33	
Hand axe and carrier	1	33	
Haversacks	1	33	
Helmet, steel (3)	1	33	
Knife	1	33	

TABLE IV. (continued)

SETS OF INDIVIDUAL MOBILE EQUIPMENT OF MEDICAL DEPARTMENT PERSONNEL ATTACHED TO A REGIMENT OF 9.2-INCH HOWITZERS (MOTORIZED).

1	2	3	4
Pack carrier	1	33	
Pouch for 1st aid packet	1	33	
Spoon	1	33	
MEDICAL PROPERTY			
Belt, web, with pouch for diagnosis tags and instruments, with contents, complete (3)	1	37	
Brassards, red cross (3)	1	38	
Diagnosis tags, book of (3)	1	37	
Foot powder or grease box (3)	1	38	
Packet, 1st aid (3)	1	38	
CHEMICAL WARFARE SERVICE PROPERTY			
Respirator, British, S. B. or equal (3)	1	38	

ARTICLES DISTRIBUTED WITHIN THE DETACHMENT OF MEDICAL PERSONNEL ATTACHED TO A REGIMENT OF 9.3-INCH HOWITZERS.

1	2	3
QUARTERMASTER PROPERTY		How distributed.
Housewife	4	As directed by the Detachment Commander.
CLOTHING FOR CHAUFFEURS AND MOTORCYCLISTS		
Boots, hip, rubber, pairs	10	
Coat, oilskin	10	
Gauntlets, winter, pairs (5)	10	(5) For winter use.
Gloves, heavy leather, pairs	10	
Goggles, mica or compound	10	
Helmet, wool or toque (5)	10	
Mackinaw or jerkin (5)	10	
Overshoes, arctic, pairs (5)	10	
Socks, extra heavy, pairs (5)	20	
Trousers, oilskin (6)	4	(6) For motorcyclists only.

TABLE V.

TOTAL MOBILE EQUIPMENT OF A REGIMENT OF 9.2-INCH HOWITZERS.

1	2	3	4	5	6	7
ARTICLES	Battery	Headquarters Company	Supply Company	Medical Department	Total Regiment	REMARKS
QUARTERMASTER PROPERTY						
Ax and helve	4	5	4	3	37	
Bag, water, sterlizer and cover	3	3	2	..	28	
Bedsack (1)	..	..	..	..	..	(1) 1 Bedsack
Blankets, O. D.	255	255	114	33	1932	and 1 or 2 ad
Belt, waist	255	255	114	33	1932	tional O. D.
Brassards--						blankets will
Blue: Agents and Signalmen	..	..	..	..	..	be issued as needed in
Green: Guides and Scouts.	..	..	..	..	..	training area
Red: Orderlies and messengers	..	..	..	..	..	
Breeches, service, wool	255	255	114	33	1932	
Brush, typewriter	..	5	..	..	5	
Bucket, G. I.	4	4	4	3	35	
Bugle with sling	3	4	..	..	22	
Can, oil, typewriter	..	5	..	..	5	
Cap, overseas	255	255	114	33	1832	
Carborundum wheel	..	..	1	..	1	
Chevrons and sleeve insignia	..	..	..	..		
Coat, fatigue	255	255	114	..	1899	
Coat, service, wool	255	255	114	33	1932	
Cobbler's outfit, hand (2)	1	1	3	..	10	(2) See Note
Containers, mineral oil	2	2	2	..	16	No. 6.
Desk, field, small, complete (3)	1	7	1	..	14	
Drawers	510	510	228	66	3864	
Dubbin, 4 oz. cans	260	287	118	38	2003	
Gloves, heavy leather, prs	255	255	114	33	1932	
Gloves, O. D. wool, prs	255	255	114	33	1932	
Hats, fatigue	255	255	114	..	1899	
Housewife (4)	32	32	14	4	242	(4) Note No.
Instrument, band, sets	..	1	..	..	1	
Iron, bar, asstd., lbs	..	..	60	..	60	
Laces, shoe, extra prs	510	510	228	66	3864	
Lanterns, combination, complete	4	4	6	3	37	
Ornament, bronze	510	510	228	66	3864	
Ornament, bronze, letters	255	255	114	33	1932	
Overcoat	255	255	114	33	1932	
Paulin, large	1	1	1	..	8	
Pickaxe and helve	4	12	6	3	45	

TABLE V. (continued)

TOTAL MOBILE EQUIPMENT OF A REGIMENT OF 9.2-INCH HOWITZERS.

1	2	3	4	5	6	7
Pin, shelter tent	1530	1595	610	215	11600	(5) Notes Nos 9 and 10--Usually none will be issued; may be issued to detachments and organizations when necessary and available.
Pole, shelter tent . . .	265	319	122	43	2074	
Puttees, spiral, wool, prs	255	255	114	33	1932	
Range, field, No. 1 or 2, complete (5)	. .	. .	. .	. .	. .	
Rations, field	520	574	236	76	4006	
Rations, reserve	780	861	354	114	6009	
Ribbon, typewriter, (Corona) red and black (6) . . .	. .	9	. .	. .	9	(6) 3 for each Bn Hdqrs
Shirt, O. D.	510	510	228	66	3864	
Shoes, prs.	510	510	228	66	3864	
Slicker	255	255	114	33	1932	
Sling, color	. .	2	. .	. .	2	
Socks, wool, prs	1020	1020	456	132	7728	
Spade	4	12	6	3	45	
Colors, Coast Artillery Corps Regimental with case, staff, cord and tassel, silk	. .	1	. .	. .	1	
Colors, National, service with case, staff, cord and tassels	. .	1	. .	. .	1	
Colors, National, silk, with case, staff, cord and tassels	. .	1	. .	. .	1	
Stretcher, shoe	1	1	1	. .	1	
Tag, identification . . .	510	510	228	66	3864	
Tape, identification tag, yds	225	255	114	33	1832	
Tent, shelter half	265	319	122	43	2074	
Toilet kit (7)	255	255	114	33	1932	(7) Note No 5.
Tools, butcher's kit (8) .	. .	. .	1	. .	1	
Trouser's, fatigue	255	255	114	. .	1899	(8) Note No. 11
Typewriter	. .	5	. .	. .	5	
Typewriter, (Corona) standard keyboard, but replace c with degree sign and exclamation sign with plus sign (9)	. .	3	. .	. .	3	(9) 1 for each Bn Hdqrs.
Undershirt	510	510	228	66	3864	
Whistle and chain	13	17	3	. .	98	
CLOTHING FOR CHAUFFEURS AND MOTORCYCLISTS						
Boots, hip, rubber, prs .	85	74	58	10	652	
Coat, oilskin	85	74	58	10	652	
Gauntlets, winter, prs . .	85	74	58	10	652	
Gloves, heavy leather, prs	85	74	58	10	652	
Goggles, mica or compound	85	74	58	10	652	

TABLE V. (continued)

TOTAL MOBILE EQUIPMENT OF A REGIMENT OF 9.2-INCH HOWITZERS.

1	2	3	4	5	6	7
Helmet, wool or toque . .	85	74	58	10	652	
Mackinaws or jerkin . . .	85	74	58	10	652	
Overshoes, arctic, prs . .	85	74	58	10	652	
Socks, extra heavy, prs .	170	148	116	20	1304	
Trousers, oilskin	10	24	8	4	96	
NOTE. For issue of expendable Quartermaster supplies, see A. R., F. S. R. and current General Orders, G. H. Q., A. E. F.						
ORDNANCE PROPERTY						
Bayonet	217	55	71	. .	1428	
Bayonet scabbard	217	55	71	. .	1428	
Breach cover	217	55	71	. .	1428	
Breach stick	217	55	71	. .	1428	
Brush and thong	217	55	71	. .	1428	
Can, condiment	255	255	114	33	1932	
Can, meat	255	255	114	33	1932	
Canteen	255	255	114	33	1932	
Canteen cover, dismounted	255	255	114	33	1932	
Cartridge, ball, cal. .30	21700	5500	7100	. .	142800	
Cartridge, pistol, cal. .45	1505	8120	1645	. .	18795	
Cartridge, belt, cal. .30 dismounted	217	55	71	. .	1428	
Cleaning rod, barrack . .	27	7	9	. .	178	
Cup	255	255	114	33	1932	
Fork	255	255	114	33	1932	
Front sight cover	217	55	71	. .	1428	
Gun sling	217	55	71	. .	1428	
Handaxe and carrier . . .	. .	. .	. .	33	33	
Haversack	255	255	114	33	1932	
Helmet, steel	260	287	118	38	2003	
Knife	255	255	114	33	1932	
Magazine, pistol, extra .	172	928	188	. .	2148	
Magazine, pocket, web, double	86	464	94	. .	1074	
Marking outfit, M. 1910, for stamping metal . . .	1	1	1	. .	8	
Oiler and thong case . . .	217	55	71	. .	1428	
Pack carrier	255	255	114	33	1932	
Pistol belt	43	232	47	. .	537	
Pistol, cal. .45	43	232	47	. .	537	
Pistol holster	43	232	47	. .	537	
Pistol cleaning kit . . .	1	1	1	. .	8	
Pouch, 1st aid packet . .	255	255	114	33	1932	
Rifle, U. S., cal. .30 . .	217	55	71	. .	1428	
Rifle scabbard	217	55	71	. .	1428	
Screwdriver, rifle	27	7	9	. .	178	
Spoon	255	255	114	33	1932	

TABLE V. (continued)

TOTAL MOBILE EQUIPMENT OF A REGIMENT OF 9.2-INCH HOWITZERS.

1	2	3	4	5	6	7
MEDICAL PROPERTY						
Belt, web, with pouch for diagnosis tags and instruments and contents complete (10)	. .	. .	. .	37	37	(10) For contents, see para 907, Manual Medical Dept. 1916.
Brassards, Red Cross . . .	. .	. .	. .	38	38	
Camp infirmary	. .	. .	. .	. .	1	
Combat equipment (11) . .	. .	. .	. .	. .	3	
Diagnosis tags, book of .	. .	. .	. .	37	37	(11) One for each battalion
Foot powder or grease box	260	287	118	38	1932	
Litters	5	5	2	. .	37	See Par 866 and 867, Manual Medical Dept 1916.
Packet, first aid	260	287	118	38	1932	
CHEMICAL WARFARE SERVICE PROPERTY						
Respirator, British, S. B. or equal	260	287	118	38	1932	
VEHICLES ORDNANCE DEPARTMENT						
Cars, motor, staff observation	. .	4	. .	. .	4	
Cars, reconnaissance . . .	1	. .	. .	. .	6	
Carts, reel, regimental and battalion	. .	4	. .	. .	4	
Tractors, artillery, 2 1/2-ton	. .	4	. .	. .	4	
Tractor, artillery, 5-ton	16	. .	. .	. .	96	
Trucks, artillery, repair	. .	. .	7	. .	7	
Trucks, artillery, supply	2	1	8	. .	21	
Trucks, repair, light . .	. .	. .	1	. .	1	
Trucks, reel and fire control	1	. .	. .	. .	6	
Trucks, telephone switchboard, 2-ton	. .	1	. .	. .	1	
Trucks, wireless	. .	1	. .	. .	1	
MEDICAL DEPARTMENT						
Ambulance, motor	. .	. .	. .	3	3	

TABLE V. (continued)

TOTAL MOBILE EQUIPMENT OF A REGIMENT OF 9.2-INCH HOWITZERS.

1	2	3	4	5	6	7
MOTOR TRANSPORT SERVICE						
Cars, motor, 5-passenger	3	5	1	1	25	
Motorcycles with side cars	10	24	8	4	96	
Trucks, 3-ton	3	9	16	2	45	
Trucks, ammunition	15	. .	. .	. .	90	
Trucks, tank	1	. .	1	. .	7	
QUARTERMASTER CORPS						
Kitchens, rolling, trail (12)	. .	. .	8	. .	8	(12) See Note No. 12.

TABLE VI.

SPECIAL QUARTERMASTER, ENGINEER, AND CHEMICAL WARFARE SERVICE PROPERTY FOR ORGANIZATION OF 9.2-INCH HOWITZERS, FOR USE WHEN IN THE LINE.

TO BE DRAWN UPON ARRIVAL IN THE SECTOR.

1	2	3	4	5	6	7
ARTICLES	Battery	Headquarters Company	Supply Company	Medical Dept.	Total Regiment	REMARKS
QUARTERMASTER PROPERTY						
Alcohol, solidified, cans (1)	150	150	75	25	1150	(1) To be used in the discretion of the Organization Commander in emergency.
Overshoes, Arctic, pairs (2)	..	..	..	..	..	
Cans, Marmite	10	10	6	3	79	
Jerkins (3)	..	..	..	..	..	
Rations, reserve (4)	..	..	..	..	..	
Stoves, trench (5)	..	..	..	..	..	
ENGINEER PROPERTY						(2) For use in cold weather, 1 pair to each man on duty in emplacements.
Augers, earth (5)	..	..	..	..	..	
Picks and helves (5)	..	..	..	..	..	
Saws, cross-cut, 2-man 6 ft. (5)	..	..	..	..	..	(3) 1 for each man on duty in emplacements.
Shovels, short handled (5)	..	..	..	..	..	
Spades (5)	..	..	..	..	..	
Suction pump, with 12 feet or more rubber hose (5)	..	..	..	..	..	(4) 4 days reserve to be held in reserv see G. O. 38, H. A. E. F. 19
CHEMICAL WARFARE SERVICE PROPERTY						(5) To be issu as required.
Gloves, oilskin (5)	..	..	..	..	..	
Bellsar triangle	4	4	2	..	30	
Chloride of lime, kegs	4	4	2	..	30	
Fire tins	3	3	2	..	23	
Suits, oilskin (5)	..	..	..	..	..	
Respirator, British, S. B. or equal (6)	..	..	..	..	..	(6) 5 percent to be kept in reserve.
Klaxon horns	1	1	1	1	9	

TABLE VII.

SIGNAL CORPS EQUIPMENT FOR A REGIMENT OF 9.2-INCH HOWITZERS.

1	ARTICLES	2 Battery	3 Headquarters Company	4 Supply Company	5 Total Regiment	6 REMARKS
(b)	Axes, hand	8	3	12	63	Articles shown under Headquarters Company in column 3 for use of Regimental Headquarte
(b)	Bags, tool, service, complete	1	1	3	10	
(a)	Barometer, aneroid, graduated in milimeters and inches	1	. .	. .	6	
(a)	Barometer, mecurial, graduated in milimeters and inches	. .	. .	3	3	Articles shown under Supply Company in column 4 for use of Battalion Headquarters. Divide equally among the Bn Headquarters of the Regiment.
(b)	Bars, digging, standard	2	2	6	20	
(b)	Batteries, dry, tungsten, Type A . .	9	8	24	86	
(b)	Batteries, dry, tungsten, No. 703	24	24	72	240	
(a)	Bells, electric, vibrating	4	6	12	42	(a) Obtained in France.
(b)	Belts, linemen's, tool with ring and safety strap	1	1	3	10	(b) Obtained in the United States.
(b)	Binding posts	15	10	30	130	
(b)	Blocks, 2 sheave (W. E. No. 760330) .	1	2	3	11	
(b)	Books, message, field, Form 217-A	10	10	30	100	
(a)	Cable, 3 pair, lead covered, ft. . .	. .	1700	5100	6800	
(a)	Charging sets	. .	1	. .	1	
(b)	Clips, testing . . .	8	6	18	72	
(b)	Climbers, linesmen, complete with straps and pads, pair . . .	1	2	3	11	
(a)	Cross Arms, light wood, 8-pin	. .	500	. .	500	
(a)	Electrolyte, (10-litre carboys)	. .	1	3	4	
(b)	Envelopes, field message, Form 144 A	. .	500	1500	2000	
(b)	Flashlights, electric, hand	5	5	15	50	
(a)	Fuzes, 1 amp., for 4 and 12-line switchboards	40	40	120	400	
(a)	Glasses, field, prism binocular, 8-power French	5	5	15	50	
(b)	Grips, Buffalo, No. 2	1	1	3	10	
(b)	Hammers, sledge . . .	2	2	6	20	

TABLE VII. (continued)

SIGNAL CORPS EQUIPMENT FOR A REGIMENT OF 9.2-INCH HOWITZERS.

1		2	3	4	5	6
(b)	Hammers, carpenters, claw	2	1	3	16	
(a)	Headsets, telephone	6	6	18	60	
(a)	Hydrometers, Baume	. .	2	6	8	
(b)	Insulators, clamp . .	16	12	36	144	
(b)	Insulators with lag screws, Repp. type	123	77	231	1046	
(b)	Kits, inspectors, pocket	2	3	9	24	
(b)	Kits, flag, combination, standard	2	6	12	30	
(b)	Knives, electricians	8	4	12	64	
(a)	Knobs, wood French type	860	600	2430	8190	
(a)	Ladders	1	2	6	14	
(b)	Lamps for flashlights	4	4	12	40	
(b)	Marlin, lbs	5	5	15	50	
(b)	Megaphones	2	1	3	16	
(b)	Nails, wire, 20d lbs	23	23	69	230	
(a)	Panels, heavy artillery, identification, large, sets	. .	1	3	4	
(a)	Panels, heavy artillery, rectangular, large, sets	. .	1	3	4	
(b)	Pliers, side cutting, 8"	8	10	30	88	(1) Not to be supplied troops at training centers, but shipped to mobilization points when troops go to the front
(b)	Poles, lance (1) . .	100	100	300	1000	
(a)	Poles, bamboo with tips fitted	. .	3	9	12	
(a)	Projectors, 24 cm., without spare batteries	. .	3	6	9	
(a)	Projectors, 35 cm . .	. .	1	3	4	
(a)	Reels, barrow	2	2	6	20	
(a)	Sapinettes (1) . . .	. .	. .	. .	1000	
(b)	Saws, hand, cross cut	1	1	3	10	
(a)	Screws, lag, 3/8 x 4"	. .	. .	. .	1200	
(a)	Sets, radio type E-10	. .	1	3	4	
(b)	Screwdrivers, 6" . .	4	4	12	40	
(b)	Screwdrivers, 3" . .	4	4	12	40	
(b)	Shovels, long handled, round point	2	2	6	20	
(b)	Shovels, spoon . . .	1	1	3	10	
(b)	Staples, Blake insulated, No. 5	400	660	1980	5040	
(a)	Switchboard, telephone 4 line, monocord type	4	1	3	28	
(a)	Switchboard, telephone, 12 line, monocord type	. .	1	3	4	
(a)	Tags, cable, heavy artillery	75	100	300	850	
(b)	Tape, friction, lbs .	4	3	9	36	

TABLE VII. (continued)

SIGNAL CORPS EQUIPMENT FOR A REGIMENT OF 9.2-INCH HOWITZERS.

1		2	3	4	5	6
(b)	Tape, rubber, lbs . .	2	2	6	20	
(b)	Telephones, W.E. 1375B	12	12	36	120	
(a)	Thermometers, weather graduated in Centigrade and Fahrenheit . . .	2	. .	. .	12	
(a)	Voltammeters, Weston Model, 280	. .	1	3	4	
(b)	Watches, wrist, luminous dial, with wristlets	2	2	6	20	
(a)	Wave meter, type No. 2, French	. .	1	3	4	
(b)	Wire G. I. No. 12, B. W. G., 109 mils. miles	. .	. .	. .	2	
(b)	Wire, outpost, twisted pair, miles	7 1/2	9 1/2	31 1/2	86	

TABLE VIII.

FIRE CONTROL, DRAFTING MATERIALS AND SUPPLIES FOR A REGIMENT OF 9.2-INCH HOWITZERS (MOTORIZED).

1	2	3	4	5	6
ARTICLES	Battery	Headquarters Company	Supply Company	Total Regiment	REMARKS
ORDNANCE PROPERTY FIRE CONTROL EQUIPMENT					
Arms, metal, 1 meter, scale 1/20000	3	6	1	25	Articles shown in column 3 under Headquarters Company for use of Battalion Headquarters to be divided equally among the 3 Battalion Headquarters of the regiment.
Batteries, flashlight, spare	18	48	16	172	
Board, deviation	1	3	. .	9	
Board, range and deflection (Wilson)	1	3	. .	9	
Boxes, lamp, siege (each to hold 4)	4	. .	. .	24	
Bulbs, flashlight, spare	4	12	4	40	
Candles, siege lamp (1)	. .	. .	. .	. .	
Director No. 5 (British) with tripod	4	6	. .	30	Articles shown in column 4 under Supply Company for use of Regimental Headquarters.
Flashlights, electric	4	6	. .	30	
Lamps, siege	16	. .	. .	30	
Periscopes, British No. 14	6	3	. .	39	
Plotters, aircraft, Observation, British Mk. 1	1	. .	. .	6	(1) Supplied by Quartermaster Corps as required.
Posts, aiming, circular head	8	. .	. .	48	
Posts, aiming, diamond head (or flag)	4	. .	. .	24	(2) For use only until Wilson Range and Deflection Board is available.
Posts, aiming, square head	8	. .	. .	48	
Range table	8	24	2	74	
Range tables, abridged	8	24	2	74	
Rules, Howitzer correction 9.2" Howitzer (2)	4	. .	. .	24	
Telescope, steroscopic (British) with case and tripod	1	3	. .	9	
Telescope, variable power No. 1 (British) with tripod and case	2	3	. .	15	
Watches, stop	6	18	2	56	

TABLE VIII. (continued)

FIRE CONTROL, DRAFTING MATERIALS AND SUPPLIES FOR
A REGIMENT OF 9.2-INCH HOWITZERS (MOTORIZED).

1	2	3	4	5	6
ORIENTEUR AND TYPOGRAPHICAL EQUIPMENT					
Alidade, open sight . . .	1	3	1	10	
Alidade, telescopic . . .	1	3	1	10	
Artillery board, with cover 30" x 40"	1	6	2	14	
Chest, instrument	1	3	1	10	
Chest, rod	1	3	1	10	
Clinometer, hand	1	3	1	10	
Compass, prsimatic	2	6	2	20	
Leval rod	1	3	1	10	
Plane table 24" x 31", with cover	1	3	1	10	

TABLE OF CONTENTS

REGIMENT OF 9.2-INCH HOWITZERS.

		Page
Table 1	Individual Mobile Equipment of a Battery	16
Table 2	Individual Mobile Equipment of a Headquarters Company	19
Table 3	Individual Mobile Equipment of a Supply Company	20
Table 4	Individual Mobile Equipment of Medical Detachment Attached	25
Table 5	Total Mobile Equipment of a Regiment	27
Table 6	Special Quartermaster, Engineer and Chemical Warfare Service of a Regiment	31
Table 7	Total Signal Corps Equipment of a Regiment	32
Table 8	Total Fire Control, Drafting Material and Supplies for a Regiment	32
Table 9	Composition of Artillery Equipment of a Regiment of 9.2-inch Howitzers	38
Table 10	Anti-Aircraft Machine Gun Equipment for a Regiment of 9.2-inch Howitzers	64

GENERAL HEADQUARTERS

AMERICAN EXPEDITIONARY FORCES
OFFICE OF THE CHIEF OF STAFF

September 1918

1. Hereafter all property in the hands of combatant troops in service in Europe will be divided into classes as follows:

2. Mobile equipment is the equipment prescribed for use in troop movements, temporary billets and open warfare. It is limited to the vehicles and articles of equipment prescribed in Tables of Organization, the equipment and clothing worn on the person, and the articles carried in pack or transported in the field.

3. The Mobile Equipment will be carried in all classes of service.

4. Special Equipment shown in Table 6 herein is the equipment which, in addition to the mobile equipment, is prescribed for use at the front.

5. The special equipment prescribed is designed to meet the necessities growing out of actual conditions as exist on the Western front.

6. The tables given herewith cover all property in the hands of combatant troops and include Quartermaster, Ordnance, Medical, Chemical Warfare Service, Engineer and Signal property. This equipment manual modifies for European service the allowances specified as equipment A, B, and C, described in paragraph 319, Compilation of Orders, War Department, 1881-1915, and all equipment in excess of the allowance specified in this manual will be turned in at once to the Salvage Service, S O. S.

7. This manual modifies existing tables of allowance and equipment only in so far as is considered necessary to meet conditions of service in Europe. Due to the fact that different types of equipment are being issued to our troops and that other changes are to take place in the future, the names of articles and figures given herein will not be strictly applicable in all cases. Where such differences arise, the provisions of the manual will be considered to apply in so far as practicable to the corresponding articles of other types.

8. The manual is intended as a guide for organization commanders in determining amounts of equipment and supplies to be kept on had, and it is authority to supply officers for issues in accordance with its provisions. IT IS NOT INTENDED TO REGULATE OR LIMIT IN ANY WAY CALLS FOR SUPPLIES NECESSARY TO THE EFFICIENT CONDUCT OF OPERATIONS, NOR TO INTERFERE WITH THE DISTRIBUTION OF SUCH ARTICLES AS ARE DICTATED BY THESE CONSIDERATIONS.

9. Mistakes in this manual should be brought promptly to the attention of General Headquarters, A. E. F., G-1.

By command of General Pershing:

JAMES W. McANDREW
Major General
Chief of Staff

(CONFIDENTIAL.)

WAR DEPARTMENT.

Washington, July 29, 1918

CIRCULAR.

The following changes are made in Tables of Organization. Series C and D:

TABLE 212.

(1) Line 8, column 1, change to read Chaplain and Band Leader.
(2) Line 8, column 7, insert 1.
(3) Line 8, column 10, insert 1.
(4) Line 8, column 13, change 1 to 2.
(5) Line 9, column 7, change 21 to 22.
(6) Line 9, column 10, change 84 to 65.
(7) Line 9, column 13, change 70 to 71.
(8) Line 29, column 7, change 28 to 49.
(9) Line 29, column 10, change 28 to read 49.
(10) Line 29, column 13, change 28 to 49.
(11) Line 30, column 7, change 234 to 255.
(12) Line 30, column 10, change 1050 to 1071.
(13) Line 30, column 13, change 1911 to 1932.
(14) Line 31, column 7, change 255 to 277.
(15) Line 31, column 10, change 1914 to 1936.
(16) Line 31, column 13, change 1981 to 2003.
(17) Line 55, column 7, change 200 to 222.
(18) Line 55, column 10, change 486 to 508.
(19) Line 55, column 13, change 515 to 537.

TABLE 221.

(1) Lines 3 and 4, column 3, consolidate and insert 1.
(2) Lines 3 and 4, column 7, consolidate and change to read 21.
(3) Line 5, column 3, insert 1.
(4) Line 5, column 7, change 21 to 22.
(5) Line 22, column 3, change 28 to 49.
(6) Line 22, column 7, change 28 to 49.
(7) Line 23, column 3, change 28 to 49.
(8) Line 23, column 7, change 234 to 255.
(9) Line 24, column 3, change 28 to 50.
(10) Line 24, column 7, change 255 to 277.
(11) Line 36, column 3, change 28 to 50.
(12) Line 36, column 7, change 200 to 222.
(13) Column 8, under remarks, change (u) to read:
1 band leader, 1 assistant band leader, 1 sergeant bugler, 4 band sergeants, 6 band corporals, 6 musicians 1st class, 10 musicians 2nd class, 20 musicians 3rd class.

(320.2 A. G. O.)

By Order of The Secretary of War:

PEYTON C. MARCH
General, Chief of Staff

OFFICIAL:

H. P. McCAIN,
The Adjutant General

CONFIDENTIAL.
SERIES C.

TABLE 212 - REGIMENT OF 9.2-INCH HOWITZERS, MARK I OR II, MOTORIZED.
(ARMY ARTILLERY.)
(Personnel from Coast Artillery Corps)
MAXIMUM AND MINIMUM STRENGTH

Corrected to April 12, 1918

1	2	3	4	5	6	7	8	9	10	11	12	13
		Battalion			Regiment					Medical		
1 Units	1 Battery (a)	HQ	2 Batteries	Total	HQ	HQ Company (b)	Supply Company (f)	3 Battalions	Total	Department and Chaplains	Ordnance Dept (g)	Aggregate
2 Colonel	..	..	..	..	1	..	..	..	1	..	..	1
3 Lieutenant Colonel	..	..	..	..	1	..	..	..	1	..	..	1
4 Major	..	1	..	1	..	..	..	3	3	1	..	4
5 Captain	1	1	2	3	2A	1	1	9	13			
6 1st Lieutenant	2	..	4	4	..	11	1	12	24	3	1	41
7 2nd Lieutenant	2	i3	4	4	..	9	1	12	22	..	..	22
8 Chaplain	..	..	..	..	..	..	..	..	..	1	..	1
9 Total Commissioned	5	2	10	12	4	21	3	36	64	5	1	70
10 Sgt Maj, Sr Gr (e)	..	..	..	..	..	2	..	..	2	..	..	2
11 Ordnance Sergeant	..	..	..	..	..	..	..	..	..	..	4	4
12 Sgt Maj, Jr Gr (j)	..	k1	..	..	..	..	3	..	3	..	..	3
13 Sgt Maj, Jr Gr (s)	..	i1	..	..	..	3	..	..	3	..	..	3
14 1st Sergeant	1	..	2	2	..	1	1	6	8	..	..	8
15 Sergeant, 1st Class	..	..	..	..	..	..	..	..	..	1	..	1
16 Master Gunner	..	i1	..	..	i1	4	..	..	4	..	..	4
17 Electrician Sergeant	..	i1	..	..	i1	4	..	..	4	..	..	4
18 Mess Sergeant	1	..	2	2	..	1	1	6	8	..	..	8
19 Radio Sergeant	..	i2	..	..	i2	8	..	..	8	..	..	8
20 Supply Sergeant	1	..	2	2	..	1	1	6	8	..	..	8
21 Sergeant	12	..	24	24	..	16t	3	72	91	3	3	97
22 Corporal	24	..	48	48	..	40	5	144	189	..	6	195
23 Cook	4	..	8	8	..	4	6	24	34	..	..	34
24 Mechanic	4	..	8	8	..	3	4	24	31	..	..	31
25 Wagoner (o)	33	i1c	66	66	..	7	2	198	207	..	..	207
26 Bugler	3	..	6	6	..	4	..	18	22	..	..	22
27 Private, 1st Class	60	i2cd	120	120	..	18c40	2818c	360	428	29	7)	1244
28 Private	112	i1d	224	224	..	7d68	2d32	672	772		8)	
29 Band (all grades)(y)	..	..	..	..	..	28	..	..	28	..	..	28
30 Total Enlisted	255	..	510	510	..	234	86	1530	1850	33	28	1911
31 Aggregate	260	2	520	522	4	255	89	1566	1914	38	29	1981

1	2	3	4	5	6	7	8	9	10	11	12	13
		Battalion			Regiment					Medical		
Units	1 Battery (a)	HQ	2 Batteries	Total	HQ	HQ Company (b)	Supply Company (f)	3 Battalions	Total	Department and Chaplains	Ordnance Dept (g)	Aggregate
32 Ambulances (M. D.)	..	..	..	..	..	..	..	..	..	3	..	3
33 Car, Motor, 5-Passenger (Q.M.C.)	3	..	6	6	..	5	1	18	24	1	..	25
34 Car, Motor, Staff Observation (O.D.)	..	il	..	..	il	4	..	i3	4	..	..	4
35 Car, Reconnaissance (O.D.)	1	..	..	2	2	..	..	6	6	..	..	6
36 Cart, Reel, Regimental and Battalion (O.D.)	..	il	..	..	il	4	..	i3	4	..	..	4w
37 Kitchen, Rolling, Trail (Q.M.C.)	k1	..	k2	..	..	k1	8		8	..	..	8
38 Motorcycle with Side Car (Q.M.C.)	10	..	20	20	..	24	8	60	92	4m	..	96
39 Tractor, Artillery, 2½-ton (O.D.)	..	il	..	..	il	4	..	i3	4	..	..	4
40 Tractor, Artillery, 5-ton (O.D.)	16	..	32	32	..	..	..	96	96	..	..	96
41 Trailers, 4-ton (O.D.)	4	..	8	8	..	..	..	24	24	..	..	24y
42 Trucks, 3-ton (O.D.)	3	..	6	6	..	9	16	18	43	2	..	45z
43 Truck, Ammunition (O.D.)	15	..	30	30	..	..	..	90	90	..	..	90
44 Truck, Artillery, Repair (O.D.)	1k	..	2k	..	..	..	7	6k	7	..	..	90
45 Truck, Artillery Supply (O.D.)	3[k1]	..	6[k2]	4	..	1	8	18[k5]	21	..	..	21
46 Truck, Repair, Light (O.D.)	..	..	..	..	..	..	1	..	1	..	..	1
47 Truck, Reel and Fire Control (O.D.)	1	..	2	2	..	..	..	6	6	..	..	6
48 Truck, Tank (O.D.)	1	..	2	2	..	..	1	6	7	..	..	7
49 Truck, Telephone, Switchboard, 2-ton (O.D.)	..	..	..	..	..	1	..	..	1	..	..	1
50 Truck, Wireless (O.D.)	..	..	..	..	..	1	..	..	1	..	..	1

1	2	3	4	5	6	7	8	9	10	11	12	13
		Battalion			Regiment					Medical		
1 Units	1 Battery (a)	HQ	2 Batteries	Total	HQ	HQ Company (b)	Supply Company (f)	3 Battalions	Total	Department and Chaplains	Ordnance Dept (g)	Aggregate
51 Wagons, Cradle, Transport (O.D.)	4	..	8	8	..	..	..	24	24	..	..	24
52 Wagons, Howitzer, Transport (O.D.)	4	..	8	8	..	..	..	24	24	..	..	24
53 Wagons, Platform Transport (O.D.)	4	..	8	8	..	..	..	24	24	..	..	24
54 Howitzers	4	..	8	8	..	..	..	24	24	..	..	24
55 Pistol	43	2	86	88	4	200	18	264	486	..	29	515
56 Rifle	217	..	434	434	..	55	71	1302	1428	..	..	1428
57 Gun, Anti-Aircraft, Machine	2	..	4	4	..	..	..	12	12	..	..	12

(a) See Table 213. (b) See Table 221. (c) Chauffeur. (d) Assistant chauffeur. (e) 1 performs duties of regimental sergeant major, 1 personnel sergeant. (f) See Table 222. (g) See Table 222. (i) From Headquarters Company; not totaled. (j) Performs duties of regimental supply sergeant, Field Artillery. (k) From Supply Company; not totaled. (m) Furnished by Medical Department. (s) Performs duties of battalion sergeant major, Field Artillery. (t) 2 perform duties of color sergenats, Field Artillery. (o) Par. V, G. O. No. 150, War Department, 1917. (w) Pulled by 2 1/2-ton artillery tractor. (y) Carry tools and crane; pulled by 5-ton tractor. (z) May carry ammunition, rations, baggage and apssengers (ammunition type body). (A) 1 adjutant, 1 personnel officer.

Note.--For ammunition supply, wireless, telephone and tank trucks, 1 wagoner as chauffeur and 1 private as assistant chauffer, and necessary number of privates. For reel and fire control truck, 1 private 1st class as chauffeur and 1 private as assistant chauffeur. For 3-ton and light repair trucks, reconnaissance cars and motor cars, 1 private 1st class as chauffer. For tractors, 2 1/2-ton, 1 wagoner as chauffeur, 1 private as assistant chauffeur. For tractors, 5-ton, 1 wagoner as chauffeur and 1 private 1st class as assistant chauffeur. For tractors, 10 or 20-ton, 1 wagoner as chauffeur, 1 private 1st class and 1 private as assistant chauffeurs.

TABLE 213 - BATTERY OF 9.2-INCH, MARK I OR II, HOWITZERS, MOTORIZED.
(ARMY ARTILLERY.)
(Personnel from Coast Artillery Corps)
MAXIMUM AND MINIMUM STRENGTH

SERIES C
CONFIDENTIAL

Corrected to April 12, 1918

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
		ONE BATTERY - FOUR HOWITZERS												
		Special Detail			Firing Battery							Combat Train		
					1st Platoon		2nd Platoon		3rd Platoon		4th Platoon			
1 Unit	HQ	Instrument Detail	Signal Detail	Scouts	1st Section	2nd Section	3rd Section	4th Section	5th Section	6th Section	7th Section	8th Section	9th Section	Total One Battery
2 Captain	1	..	..	..	..	..	..	..	..	..	..	..	..	1
3 1st Lieutenants	1	..	..	..	1	..	..	..	..	..	..	..	..	2
4 2nd Lieutenants	..	..	..	..	..	..	1	..	..	1	..	..	..	2
5 Total Commissioned	2	..	..	..	1	..	1	..	..	1	..	..	..	5
6 1st Sergeant	1	..	..	..	..	..	..	..	..	..	..	..	..	1
7 Mess Sergeant	1	..	..	..	..	..	..	..	..	..	..	..	..	1
8 Supply Sergeant	..	..	..	..	..	..	..	..	..	..	..	..	1[i]	1
9 Sergeants	..	1	1	..	2[1i]	1	1	1	1	1	1	1	1[i]	12
10 Corporals	aj2r	1d2r	2r	x2r	2	2	2	2	2	2	2	2	..	24
11 Cooks	4	..	..	..	..	..	..	..	..	..	..	..	..	4
12 Mechanics	..	..	..	..	1r	..	1r	..	..	1r	..	..	1r	4
13 Wagoners (o)	..	..	..	..	c5r	c5r	c5r	c5r	c2r	c2r	c2r	c2r	c5r	33
14 Buglers	1	..	..	..	1	..	..	..	..	1	..	..	..	3
15 Privates, 1st Class	b4r1c	2e4r2c	g5r1c	x2r	2c7r4k	7r4k	1c7r4k	7r4k	1c5r	4r	4r	4r	..	60
16 Privates	..	..	f5r1k	..	1k14r	1k14r	1k14r	1k14r	2k13r	2k9r	2k9r	2k8r	5k12r	112
17 Total Enlisted	13	7	13	4	32	29	30	29	23	20	18	17	20	255
18 Aggregate	15	7	13	4	33	29	31	29	23	21	18	17	20	260

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
	ONE BATTERY - FOUR GUNS													
		Special Detail			Firing Battery						Combat Train			
					1st Platoon		2nd Platoon		3rd Platoon		4th Platoon			
1 Unit	HQ	Instrument Detail	Signal Detail	Scouts	1st Section	2nd Section	3rd Section	4th Section	5th Section	6th Section	7th Section	8th Section	9th Section	Total One Battery
19 Car, Motor, 5-passenger, (Q.M.C.)	1	1	..	..	1	..	..	..	..	..	..	..	..	3
20 Car, Reconnaissance (O.D.)	..	1	..	..	..	..	..	..	..	..	..	..	..	1
21 Kitchen, Rolling Trail (Q.M.C.)	1s	..	..	..	..	..	..	..	..	..	..	..	..	..
22 Motorcycles with Side Cars (Q.M.C.)	1	1	1	2	1	..	1	..	1	..	1	..	1	10
23 Tractor, Artillery, 5-ton (O.D.)	..	..	..	..	4	4	4	4	..	..	..	..	..	16
24 Trailers, 4-ton (O.C.)	..	..	..	..	1	1	1	1	..	..	..	..	..	4z
25 Trucks, 3-ton (O.D.)	..	..	..	..	1	..	1	..	1	..	..	..	..	3v
26 Truck, Ammunition (O.D.)	..	..	..	..	1	1	1	1	2	2	2	2	2	15t
27 Truck, Artillery Repair (O.D.)	1s	..	..	..	..	..	..	..	..	..	..	..	..	..
28 Truck, Artillery, Supply (O.D.)	1s	..	..	..	..	..	..	..	..	..	..	..	2	2w
29 Truck, Reel & Fire Control (O.D.)	..	..	1	..	..	..	..	..	..	..	..	..	..	1
30 Truck, Tank (O.D.)	..	..	..	..	..	..	..	..	..	..	..	..	1	1
31 Wagons, Cradle, Transport (O.D.)	..	..	..	..	1	1	1	1	..	..	..	..	..	4y
32 Wagons, Howitzer, Transport (O.D.)	..	..	..	..	1	1	1	1	..	..	..	..	..	4y
33 Wagon, Platform, Transport (O.D.)	..	..	..	..	1	1	1	1	..	..	..	..	..	4y
34 Howitzers	.	..	..	..	1	1	1	1	..	..	..	..	..	4
35 Pistols	9	1	1	..	6	3	4	3	3	5	3	3	2	43
36 Rifles	6	6	12	4	27	26	27	26	20	16	15	14	8	217
37 Gun, Anti-Aircraft, Machine	..	..	..	..	..	..	..	..	..	1	..	1	..	2

REMARKS

(a) Agent with Battalion Headquarters.
(b) One agent with Supply Company.
(c) Chauffeur.
(d) Range finder.
(e) Fire control instruments.
(f) Three telephone operators, one signaller, one lineman.
(g) Two telephone operators, one signaller, one lineman.
(i) Performs duties of chief mechanic, Field Artillery.
(j) One battery clerk.
(k) Assistant chauffeur.
(r) Armed with rifle; all others with pistols.
(s) From Supply Company; not included in total.
(t) For transportation of passengers, fuel, oil (and ration, water, and ammunition, baggage).
(v) Cleaning and preserving materials and spare parts.
(w) For transportation of cannoneers.
(x) One driver, Scouts' motorcycles.
(Y) Pulled by 5-ton tractor.
(z) Carry tools and cranes.

NOTE.--For ammunition, supply, wireless, telephone and tank trucks, 1 wagoner as chauffeur and 1 private as assistant chauffer, and necessary number of privates. For reel and fire control truck, 1 private 1st class as chauffeur and 1 private as assistnat chauffeur. For 3-ton and light repair trucks, reconnaissance cars and motor cars, 1 private 1st class as chauffeur. For tractors, 5-ton, 1 wagoner as chauffeur and 1 private 1st class as assistant chauffeur.

(o) Par. V, G. O. No. 150, W. D., 1917.

	Units	Regimental Section & Co Hq	Band Section	1st Battalion	2d Battalion	3d Battalion	Total	Remarks
2	Captain	1	. .	. .	. .	. .	1	(a) One reconnaissance offer, one telephone officer, one radio officer four aeroplane observers, four balloon observers; ten 1st Lts, attached to Regimental Headquarters.
3	1st Leiutenants	11a	. .	. .	. .	. .	11	
4	2d Lieutenants	. .	3t	3t	3t	3t	9	
5	Total Commissioned	12	. .	3	3	3	21	
6	Sergeant Major, Sr Gr	2h	. .	. .	. .	. .	2	
7	Sergeant Major, Jr Gr	. .	. .	. .	. .	. .	3	
8	1st Sgt	1	. .	. .	. .	. .	1	
9	Master Sgts	1	. .	1	1	1	4	
10	Electrician Sgts	1	. .	1	1	1	4	(b) One in charge regimental scouts, one in charge regimental signal detail, one is charge regimental instruments, one in charge postal service, one in charge wireless station, two personnel sergeants.
11	Mess Sergeant	1	. .	1	1	1	1	
12	Radio Sergeants	2	. .	2	2	2	8	
13	Supply Sergeant	1	. .	2	2	2	1	
14	Sergeants	10b	. .	2g	2g	2g	16	
15	Corporals	10d	. .	10i	10i	10i	40	
16	Cooks	4	. .	. .	. .	. .	4	
17	Mechanics	. .	1r	1r	1r	1r	3	
18	Wagoners (Y)	c4r	. .	c1r	c1r	c1r	7	(c) Chauffeurs.
19	Buglers	1	. .	1	1	1	4	(d) One range-finder operator, one signal corporal, two instrument corporals, three scouts, one wireless operator, one company clerk.
20	Privates, 1st Class	er2215c	. .	r6Lc	r6Lc	r61c	40	
21	Privates	4k20f2r	. .	1kr16m	1kr16m	1kr16m	68	
22	Band (all grades) (u)	. .	28	. .	. .	. .	. .	
23	Total Enlisted	80	28	42	42	42	234	
24	Aggregate	92	28	45	45	45	255	
25	Cars, Motor, 5-pass, (QMC)	5	. .	. .	. .	. .	5	(h) One performs duties of regimental sergeant major. Field Artillery; one personnel sergeant.
26	Cars, Motor, Staff Observation (O.D.)	1	. .	1	1	1	4	
27	Carts, Reel, Regtl, and Bn (O.D.)	1	. .	1	1	1	4	(e) Includes one in charge regimental commanders' one telephone operator, two wireless operators.
28	Kitchens, Rolling, Trail (Q.M.C)	1s	. .	. .	. .	. .	. . .	
29	Motorcycles, with Side Cars (Q. M. C.)	24	. .	. .	. .	. .	24	(f) One wire man, four telephone operators, four orderlies, three messengers, three
30	Tractors, Artillery, 2½T (O.D.)	1	. .	1	1	1	4w	
31	Trucks, 3-ton (O.D.)	11s2	. .	. .	. .	. .	9	

Units	Regimental Section & Co Hq	Band Section	1st Battalion	2d Battalion	3d Battalion	Total	Remarks

(t) Three 2nd Lieutenants attached, one liaison officer, one telephone officer, one radio officer.
(s) From Supply Company; totaled.
(w) Tow reel carts.
(x) Performs duties of chief mechanic, Field Artillery
(Y) Par. V, G. O. No 150, W. D., 1917.
(z) Perform duties of color sergeant, Field Artillery.

NOTE--For tractors, 10 or 20-ton, 1 wagoner as chauffeur and 1 private 1st class and 1 private 1st class and 1 private as assistant chauffeurs. For ammunition, supply, wireless, telephone and tank trucks, 1 wagoner as chauffeur and 1 private as assistant chauffeur, and necessary number of privates. For reel and fire control trucks, 1 private 1st class as chauffeur and 1 private as assistant chauffeur. For 3-ton light repair and personnel trucks, reconnaissance cars and motor cars, 1 private 1st class as chauffeur. For tractors, 2 1-2 ton, 1 wagoner as chauffeur, 1 private as assistant chauffeur. For tractors, 5-ton, 1 wagoner as chauffeur and 1 private 1st class as assistant chauffeur.

TABLE 222-SUPPLY COMPANY

6-inch Gun and 8-inch, 9.2 Mark 1 or II, 240 mm., Model 1918, Howitzer Regiments, Motorized (Army Artillery)
(Personnel from Coast Artillery Corps)

CONFIDENTIAL
SERIES C.

MAXIMUM AND MINIMUM STRENGTH

1	2	3	4	5	6	7	8	9	10
1 Units	Company HQ	Regiment Section	1st Battalion Section	2nd Battalion Section	3rd Battalion Section	Total Company	Ordnance Department Attached	Aggregate	Remarks
2 Captain	1	.	.	.	.	1			(a) One accompanies each battalion when detached.
3 1st Lieutenant	1	.	.	.	.	1	1	3	
4 2nd Lieutenant	1	.	.	.	.	1	. .	1	
5 Total Commissioned	3	.	.	.	.	3	1	4	(b) For regimental and battalion officers' messes.
6 Ordnance Sergeants	. .	.	.	.	.	. .	4	4	
7 Sergeants Major, Jr Gr (i)	. .	.	alt	alt	alt	3	. .	3	(c) Chauffeur.
8 1st Sergeant	1t	.	.	.	.	1	. .	1	(d) Includes one company clerk.
9 Mess Sergeant	1t	.	.	.	.	1	. .	1	
10 Supply Sergeant	1t	.	.	.	.	1	. .	1	(e) Cobbler.
11 Sergeants	1x31t	.	.	.	.	3	3	6	(f) 25 in 6-inch gun regiments; 6 in supply company; 1 in each battery; 1 in headquarters company.
12 Corporals	r5d1t	.	.	.	.	5	6	11	
13 Cooks	2	1b	1b	1b	1b	6	. .	6	
14 Mechanics	r1	.	r1e	r1e	r1e	4	. .	4	
15 Wagoners (y)	r2c	.	.	.	.	2	. .	2	
16 Privates, 1st Class	r144c	r2c	r4c	r4c	r4c	28	7	35	
17 Privates	r282k	r1b	r1b	r1b	r1b	32	8	40	(i) Performs duties of Regimental Supply Sergeant.
18 Total Enlisted	58	4	8	8	8	86	28	114	
19 Aggregate	61	4	8	8	8	89	29	118	
20 Car, Motor, 5-passenger (Q. M. C.)	1	.	.	.	.	1	. .	1	(k) Assistant chauffeur.
21 Kitches, Rolling Trail (Q. M. C.)	1	1	2	2	2	8	. .	8	(r) Armed with rifle; all others armed with pistols.
22 Motorcycles with Side Cars (Q. M. C.)	5	.	1	1	1	8	. .	8	(s) Only 3 in 6-inch gun regiments; 1 for each battalion.
23 Trucks, 3-ton (O. D.), Rat. and Baggage (o) (Q. M. C.)	2	2	4	4	4	16	. .	16	(t) Motorcyclist.
									(w) Manned by Ordnance

TABLE 222-SUPPLY COMPANY

6-inch Gun and 8-inch, 9.2 Mark 1 or II, 240 mm., Model 1918, Howitzer Regiments, Motorized (Army Artillery)
(Personnel from Coast Artillery Corps)

CONFIDENTIAL
SERIES C.

MAXIMUM AND MINIMUM STRENGTH

1 Units	2 Company HQ	3 Regiment Section	4 1st Battalion Section	5 2nd Battalion Section	6 3rd Battalion Section	7 Total Company	8 Ordnance Department Attached	9 Aggregate	10 Remarks
24 Trucks, Artillery Repair, (O. D.)	1ws	.	2ws	2ws	2ws	7s	. .	7	(x) Dept., personnel. Performs duties of chief mechanic, Field Artillery.
25 Trucks, Artillery Supply, (O. D.)	2zf	.	2w	2w	2w	8f	. .	8f	
26 Trucks, Repair, Light (O. D.)	1	.	.	.	.	1	. .	1	(y) Par. V, G. O. No. 150, W. D., 1917.
27 Truck, Tank (O. D.)	1	.	.	.	.	1	. .	1	(z) One of these manned by company personnel; other by ordnance personnel.
28 Pistol	11	1	2	2	2	18	29	47	
29 Rifle	50	3	6	6	6	71	. .	71	

NOTE - For tractors, 2½-ton, 1 wagoner as chauffeur, 1 private as assistant chauffeur. For 3-ton light, repair and personnel trucks, reconnaissance cars and motor cars, 1 private 1st class as chauffeur. For tractors, 10 or 20-ton, 1 wagoner as chauffeur and 1 private 1st class and 1 private as assistant chauffeurs. For ammunition, supply, wireless, telephone and tank trucks, 1 wagoner as chauffeur and 1 private as assistant chauffeur, and necessary number of privates. For reel and fire control trucks, 1 private 1st class as chauffeur and 1 private as assistnat chauffeur.

(o) Trucks, Ration and Baggage, (Q. M. C.) for 6-inch gun and regiments only; other regiments have trucks, 3-ton (O. D.)

TABLE I.

SETS OF INDIVIDUAL MOBILE EQUIPMENT OF A BATTERY
OF 9.2-INCH HOWITZERS.

1	2	3	4	5
ARTICLES	1 1st Sgt., 1 Mess Sgt., 1 Supply Sgt., 12 Sgts., 16 Corporals, 4 Cooks, 3 Buglers.	8 Corporals, 4 Mechanics, 33 Wagoners, 60 Pvts 1st class 112 Pvts.	Total Battery:	REMARKS
Number in each group	38p	217r	255	(p) Armed with pistol. (r) Armed with rifle.
QUARTERMASTER PROPERTY				
Belt, waist	1	1	255	
Blanket, O. D. (1)	1	1	255	(1) See Note No. 1.
Breeches, service, wool	1	1	255	
Bugle with sling (2)	. .	. .	3	(2) Carried by buglers only.
Cap. overseas	1	1	255	
Coat, fatigue	1	1	255	
Coat, service, wool	1	1	255	
Chevrons and sleeve insignia (3)				(3) See No. No. 2.
Drawers	2	2	510	
Dubbin, 4 oz. can (4)	1	1	260	(4) Includes officers.
Gloves, heavy leather	1	1	255	
Gloves, wool, O. D. prs.	1	1	255	
Hat, fatigue	1	1	255	
Laces, shoe, extra, prs.	2	2	510	
Ornament, bronze	2	2	510	
Ornament, bronze, letters	1	1	255	
Overcoat (1)	1	1	255	
Pin, shelter tent (4)	5	5	1325	
Pole, shelter tent (4)	1	1	265	
Puttees, spiral, wool, prs.	1	1	255	
Rations, reserve (4)	2	2	520	
Shirt, O. D. wool	2	2	510	
Shoes, prs.	2	2	510	
Slickers	1	1	255	
Socks, wool, prs.	4	4	1020	

TABLE 1 (Continuted)

SETS OF INDIVIDUAL MOBILE EQUIPMENT OF A BATTERY OF 9.2 INCH HOWITZERS

1	2	3	4	5
Tag, Identification	2	2	510	
Tape, Identification tag, yds	1	1	255	
Tent, shelter half (4)	1	1	255	
Toilet kit (5)	1	1	255	(5) See Note No. 5.
Trousers, fatigue	1	1	255	
Undershirts	2	2	510	
Whistle and chain (6)			13	(6) Whistle and chain carried by 1st Sergeant and Sergeants.
ORDNANCE PROPERTY				
Bayonet	. .	1	217	
Bayonet scabbard	. .	1	217	
Breech cover	. .	1	217	
Breech Stick	. .	1	217	
Brush and thong (7)	. .	1	217	(7) If any rifles are provided with spare part tainer this number will be reduced accordingly.
Can, condiment	1	1	255	
Can meat	1	1	255	
Canteen	1	1	255	
Canteen cover, dismounted	1	1	255	
Cartridge, ball, ca. 30.	. .	100	21700	
Cartridge, pistol, cal. .45 (4)	35	. .	1505	
Cartridge, belt, cal, dismounted	. .	1	217	
Cup	1	1	255	
Fork	1	1	255	
Front sight cover	. .	1	217	
Gun slings	. .	1	217	
Haversack	1	1	255	
Helmet, steel (4)	1	1	260	
Knife	1	1	255	
Magazine, pistol, extra (4)	4	. .	172	
double (4)	2	. .	86	
Oiler and thong case (7)	. .	1	217	
Pack carrier	1	1	255	
Pistol belt (4)	1	. .	43	
Pistol, cal. .45 (4)	1	. .	43	
Pistol holster (4)	1	. .	43	
Pouch for 1st aid packet	1	. .	255	
Rifle, U.S., cal. .30	. .	1	217	
Rifle scabbard	. .	1	217	
Spoon	1	1	255	

TABLE 1 (Continuted)

SETS OF INDIVIDUAL MOBILE EQUIPMENT OF A BATTERY OF 9.2 INCH HOWITZERS

1	2		3	4
MEDICAL PROPERTY				
Foot powder or grease box (4)	1	1	260	
Packet, 1st aid (4)	1	1	260	
CHEMICAL WARFARE SERVICE PROPERTY				
Respirator, British, S. B. or equal (4)	1	1	260	

TABLE 1 (Continuted)

SETS OF INDIVIDUAL MOBILE EQUIPMENT OF A BATTERY OF 9.2 INCH HOWITZERS

1	2	3
QUARTERMASTER PROPERTY		Distributed as directed by the organization commamder.
Brassards: (8)		
Blue: Agents and Signalmen	. .	
Green: Guides and Scouts	. .	(8) See G. O. No. 59, H. A.
Red: Orderlies and Messengers	. .	
Housewife	32	
CLOTHING FOR CHAUFFEURS AND MOTORCYCLISTS		
Boots, hip, rubber prs	85	
Coat, oilskin	85	
Gauntlets, winter, prs. (9)	85	(9) For winter use.
Gloves, heavy leather, prs	85	
Goggles, mica or compound	85	
Helmet, wool or toque (9)	85	
Mackinaw or jerkin (9)	85	
Overshoos, artic, prs. (9)	85	
Socks, extra heavy, prs. (9)	170	
Trousers, oilskin (10)	10	(10) For motorcyclists only.
ORDNANCE PROPERTY		
Cleaning rod, barracks	27	
Screwdrivers (rifle)	27	

Compressor, attachment and accessories:

Hammer, 3BK Boyer riveting and chipping		1
Sets for button head rivets, one each sizes 3/16, 1/4, 5/16, 3/8 7/16, and 1/2 (to suit 3KB hammers)		6
Tools, chipping set of 12		1
Wrenches, for type 35KB hammers, set		1
Nipple, hose 1/2" x 3/8"		1
Tank, air receiver, 14" dia. x 48" long		1
Gauge, air pressure		1
Hose, metal, in 10 ft lengths		1
Valve, check 3/4" horizontal, brass body		1
Cock, drain brass, for 3/8" pipe tap		1
Hose, 5 ply 1/2" armored "Quarry" 25 ft. lengths		2
Couplings, female half, extra		2
Couplings, male half, extra		2
Nipples, gas pipe, 3/4" x 2"		3
Tee, malleable iron, 3/4"		1
Valves glove, brass body, No. 12 soft disc		2
Nipples, gas pipe, 3/4" x 4" long		2
Union, malleable; 3/4" with round valve settings, No. 519		1

Apparatus, oxy-acetylene welding and cutting, complete, with the following accessories, (carried in apparatus case) 1

No. 3000 Standard Two-Hose Cutting Torch with five tips, Nos. 1, 2, 3, 4 and 5		1
No. 2 oxygen regulator, gauges 400 to 3000 lbs		1
No. 2 acetylene regulator, new style, gauges 30 to 400 lbs		1
No. 146 Standard Velding Torch with five tips, Nos. 6, 7, 8, 9, & 10		1
Decarbonizing Torch		1
25 ft. Standard Black Hose		
25 ft. Standard Red Hose		
Spark Lighter		1
Pair Canvas Gloves		1
Bunson Burner (Acetylene)		1
Atlas Goggles	pair	2
Torch Wrenches		2
Steel Carrying Case		1
Regulating Wrench		1

Carried in Supply Cabinet:

3/16" Davis-Bournonville Welding Rods	lbs.	6 1/2
1/4" Davis Bounronville Welding Rods	lbs.	6 1/2
1/8" Davis-Bournonville Welding Rods	lbs.	5 1/2
3/16" Atlas Cast Iron Welding Rods	lbs.	4 1/2
1/4" Vanadium Steel Rods	lbs.	9
3/16" Nickel Steel Rods	lbs.	11 1/2
1/4" Gem Welding Rods	lbs.	4
1/4" Marvel Welding Rods	lbs.	5 1/2
1/4" Aluminum Welding	lbs.	2 1/2
Peerless Aluminum Flux	lb.	1
Marvel Flux	lb.	1
Cast Iron Sealing Powder	lb.	1
Extra set tips for cutting torch (Nos. 1, 2, 3, 4, and 5)		1
Set Tips for Standard Welding Torch (Nos. 6, 7, 8, 9, 10)		1
Set Special Tips for Welding Torch for use with light gauge metal Nos. 0, 1, 2, 3, and 4		1
Set Special Brushes for cleaning, welding and cutting tips		1
Extra Set Atlas Goggles		1

Extra Pair Canvas Gloves			2
Half Dozen Renewals for Spark Lighter			1
Steel Carrying Case			1
Book of Instructions			1
Grinder, tool post			1
This includes:			
Norton Alundum wheel 4 1/2" x 3/8" Grain 3860, grade N			1
Norton Alundum wheel 1 1/2" x 3/8" Grain 3860, grade N			1
Extension Mandrel, 4 1/2" long, 3/8" dia			1
Tooth rest			1
Shank 5/8" x 1" x 4 1/2" and to have 7' lengths of two conductor cables with fused attachment plug and two extra focus ready for use			1
	No. per Car.	Location	
(c) Load			
Ameter No. 1002 Ever-ready 0-35 Amp. range	1	Drawer No.	12
Attachment, milling and gear cutting	1	Drawer No.	17
Bushings, expansion (sizes 1/2" to 1 7/8") advancing by 16th (in wooden box)	23	Drawer No.	8
Blades, hacksaw, 10" -24 teeth	12	Drawer No.	10
Blades, hacksaw, 10" -14 teech	12	Drawer No.	10
Batteries, tungsten, American Ever-ready	2	Drawer No.	12
Bulb, lamp, Mazda, American Ever-ready	1	Drawer No.	12
Blocks, drill with clamps, set complete	1	Drawer No.	12
Book "American Machinists' Hand Book"	1	Drawer No.	12
Book, "Audel's Automobile Questions and Answers for Operators and Repairmen"	1	Drawer No.	7
Calipers, lock-joint transfer, inside 10 Inch	1	Drawer No.	1
Calipers, hermaphrodite, 6 inch, firm joint with adjustable point	1	Drawer No.	1
Calipers, spring, 6 inch, outside	1	Drawer No.	1
Calipers, spring, 6 inch, inside	1	Drawer No.	1
Calipers, spring, 3 inch, outside	1	Drawer No.	1
Calipers, spring, 3 inch, inside	1	Drawer No.	1
Calipers, micrometer outside, graduated 1/1000 of an inch, set	1	Drawer No.	1
Including: One 1", one 2", one 3" micrometers with ratchet stop, one 1", one 2" test gauge, and two adjustable wrenches-all in leather case.			
Calipers, inside micrometer, set B containing 10 rods and one 1/2" gauge in case	1	Drawer No.	2
Calipers, micrometer, metric, 0 to 75 mm, set	1	Drawer No.	2
Chisels, cold, 3/8"	2	Drawer No.	10
Chisels, cold, 3/4"	2	Drawer No.	10
Chisels, cold, 1/2"	2	Drawer No.	10
Chisels, cold, 1/4"	2	Drawer No.	10
Copper, soldering, 1 1/2 lbs.	1	Drawer No.	10
Copper, soldering 3/4 lbs	1	Drawer No.	10
Clippers, bolt, 5/16" capacity	1	Drawer No.	10
Cutters, side milling, 1/4"	1	Drawer No.	10
Cutters, side milling, 5/16"	1	Drawer No.	12
Cutters, side milling, 3/8"	1	Drawer No.	12
Cutters, side milling, 7/16"	1	Drawer No.	12

Cutters, side milling 1/2"	1	Drawer No.	12
Cutters, milling angular, 45 deg., 1/2" x 2 1/2" R. H.	1	Drawer No.	12
L. H.	1	Drawer No.	12
Cutters, milling, convex, 1/8"	1	Drawer No.	12
Cutters, milling, convex 1/4"	1	Drawer No.	12
Cutters, milling, convex, 3/8"	1	Drawer No.	12
Cutters, milling, convex, 1/2"	1	Drawer No.	12
Cutters, milling, double angle, 60 deg., 1/2" x 2 1/2"	1	Drawer No.	12
Cutters, metal slitting, 1/32" x 2 1/2"	1	Drawer No.	12
Cutters, metal slitting, 3/64" x 2 1/2"	1	Drawer No.	12
Cutters, metal slitting, 1/16" x 2 1/2"	1	Drawer No.	12
Cutters, metal slitting, 3/32" x 2 1/2"	1	Drawer No.	12
Cutters, metal alitting, 1/8" x 2 1/2"	1	Drawer No.	12
Cutters, metal slitting, 5/32" x 2 1/2"	1	Drawer No.	12
Cutters, threading tools, for U. S. S. Threads	1	Drawer No.	8
Cutter, circular, glass, capacity, 3" to 22"	1	Drawer No.	12
Chuck drill gear No. 0 to 1/2"	2	Drawer No.	12
Chuck, combination geared screw, 3 jaw, rated size 6"	1	Drawer No.	17
This includes: 10 split collets for draw in check sizes 1/8", 5/32", 3/16", 7/32", 1/4", 9/32", 5/16", 3/8" 7/16", 1/2"		Drawer No.	3
Clamps, tool makers, 1 3/4"	2	Drawer No.	12
Clamps, tool makers, 3 1/2"	2	Drawer No.	12
Clamps, "C" 2 1/4"	2	Floor box	
Clamps, "C" 6 1/2"	2	Floor box	
Clamps, "C" 4 1/2"	2	Floor box	
Countersink, round shank, 82°, 5/9" diam.	1	Drawer No.	12
Countersink, 90°, 1/2" diam., 2 1/4" long, body 1" diam.	1	Drawer No.	12
Countersink, 82°, style No. 5	1	Drawer No.	12
Covers, canvas for books	3		
Cylinder, oxygen, 200 cu. ft, capacity (filled)	1	On Truck	
Cylinder, acetylene, 200 cu. ft. capacity (filled)	1	On Truck	
Compound, "Duplex" valve grinding, 7 oz. boxes	2	Drawer No.	13
Dividers, spring, 6 inch	1	Drawer No.	1
Dividers, spring, 3 inch	1	Drawer No.	1
Drills, set of taper shank, 1/2" to 1 1/4" advancing by 64ths from 1/2" to 1" and by 16ths from 1" to 1 1/4"	37	Drawer No.	3
Drill, drift	1	Drawer No.	3
Drill, holder, Morse taper	1	Drawer No.	16
Drills, straight shank carbon steel, as follows:			
14 sizes, 6 of each 1/16 to 17/64, by 64ths	84	Drawer No.	4
7 sizes, 3 of each 9/32 to 3/8 by 64ths	21	Drawer No.	4
8 sizes, 2 of each 25/64 to 1/2 inch, by 64ths	16	Drawer No.	4
Drills and countersinks, diam. of drill 1/16", diam of body 13/64"	2	Drawer No.	12
Drills and countersinks, diam. of drill 3/32" and 1/8" diam. of body .302"	1	Drawer No.	12
Drill, portable, electric	1	Floor box	
Die-stock set complete, U. S. Form Thread	1	Drawer No.	2
This to include 13 sizes of tape, dies and collets. Each set of tape to include taper, plug and bottom all in hardwood case. No. 0-80, No. 4-48, No. 8-36,			

No. 14-24, No. 1-72, No. 5-44, No. 9-32, No. 2-64, No. 6-40, No. 10-30, No. 3-56, No. 7-36, No. 12-28.			
Drill, hand and breast, with chuck	1	Drawer No.	15
Dresser, emery wheel	1	Drawer No.	10
Dogs, clamp, lathe, 1 3/4" capacity	1	Drawer No.	16
Dogs, clamp, lathe, 2 3/4" capacity	1	Drawer No.	16
Files:			
Handsaw taper, single cut, 2nd cut, 5/8" taper, 8"	2		
Mill bastard, single cut, 8"	2		
Mill bastard, single cut, 10"	2		
Mill bastard, single cut, 12"	2		
Mill bastard, single cut, 6"	4		
Half round, second cut, double cut 6", 8", 10", 12"	4		
Mill smooth, single cut, 8"	1		
Mill smooth, single cut, 10"	2		
Mill smooth, single cut, 12"	1		
Round, bastard, double cut, 12"	2		
Round, second cut, double cut, 6"	1		
Round, second cut, double cut, 8"	1		
Round, second cut, double cut, 10"	1		
Round, second cut, double cut, 12"	1		
Square, bastard, double cut, 12"	2		
Square, bastard, double cut, 14"	1		
Flat, bastard, double cut 10"	2		
Flat, bastard, double cut, 12"	3		
Flat, bastard, double cut, 14"	1		
Flat, second cut, 10"	2		
Flat, second cut, 12"	3		
Half round, bastard, double cut, 10"	1		
Half round, double cut, 12"	1		
Square, second cut, double cut, 6"	1		
Square, second cut, double cut, 8"	1		
Square, second cut, double cut, 10"	1		
Square, second cut, double cut, 12"	1		
Taper saw, single cut, 4"	4		
Taper saw, single cut, 6"	2		
3 sq. slim, double cut, second cut, 6"	2		
Flashlight, without rubber hood	1	Drawer No.	12
Fuses, 5 amp. union, 250 V	20	Drawer No.	12
Fuses, 10 amp. N. E. C. union, 250 V	20	Drawer No.	12
Fuses, 20 amp. N. E. C. union, 250 V	40	Drawer No.	12
Fuses, 50 amp. N. E. C. union, 250V	20	Drawer No.	12
Funnels, filtering, set	1	Bench cabinet	
Including:			
Small special funnel (carried in floor box)	1		
Extra filtering rings for No. 2 funnel	2		
No. 2 Schuyler filtering funnel	1		
Container box	1		
Frame, hacksaw, adjustable	1	Drawer No.	10
Gauge, center	1	Drawer No.	1
Gauge, micrometerdepth with 2 extra rods	1	Drawer No.	1
Gauge, 29 degrees, screw thread	1	Drawer No.	1
Gauge, worm thread	1	Drawer No.	1
Gauge, Drill	1	Drawer No.	1

Gauge, screw pitch, V thread	1	Drawer No.	1
Gauge, thickness, 9 blades	1	Drawer No.	1
Gauge, universal surface, with 9" spindle	1	DrawerNo.	12
Grinder, automobile valve	1	Drawer No.	13
Gears, metric transposing, for lathe set	1	Drawer No.	17
Holder, tool "Agrippa" No. 30-L 3/8" x 15/16: x 5-1/8" with 3/32" x 5/8" tool	1	Drawer No.	8
Holder, tool "Agrippa" No. 30-L 3/8" x 15/16" x 5-1/8" with 5/32" x 5/8" tool	1	Drawer No.	8
Holder, tool "Agrippa" No. O-L 3/8" x 7/8" x 1-1/2" offset turning	1	Drawer No.	8
Holder, tool "Agrippa" No. 30-R 3/8" x 15/16" x 5-1/8" with 3/32" x 5/8" tool	1	Drawer No.	8
Holder, tool "Agrippa" No. 30-R 3/8: x 15/16" x 5-1/2" with 5/32" x 5/8" tool	1	Drawer No.	8
Holder, tool "Agrippa" No. O-R 3/8" x 7/8" x 5-1/2" with 2 high speed 1/4" cutters	1	Drawer No.	8
Holder, tool "Agrippa" No. O-3/8 x 7/8" x 5" with 2 high speed 1/4" cutters	1	Drawer No.	8
Holder, tool "Agrippa" No. 20-R 3/8" x 15/16" x 5-1/4" with 3/32" x 5/8" high speed steel cutter	1	Drawer No.	8
Holder, tool 3/8" x 7/8" x 5", U. S. thread	1	Drawer No.	8
Holder, bar boring tool, "Agrippa" No. 80	1	Drawer No.	8
Hammer, claw, bell face	1	Drawer No.	10
Hammer, rounding 2 lb.	1	Drawer No.	10
Hammer, machine, ball pein, 12 oz.	1	Drawer No.	10
Hammer, machine, oct. shape, ball pein, 1 lb.	1	Drawer No.	10
Indicator, test	1	Drawer No.	1
Ladle, melting, 1 1/4 pint capacity	1	Bench cabinet	
Lamps, carbon, 40 Watt, 110 Volt	20	Bench cabinet	
Lamps, adjustable, floor	3	Bench cabinet	
Cord, extension, complete	1	Floor box	
Including:			
No. 18 P. K. W. P. Cord	20		
Lamp guard	1		
Swivel attachment	1		
Aluminum shell socket with wood handl	1		
Mills, end, spiral, No. 1 Morse Taper 1/4", 5/16", 3/8", 7/16", right 1/4", 5/16", 3/8", 7/16", left hand	8	Drawer No.	8
Mills, end, spiral, No. 2 More Taper 1/2", 9/16", 5/8", 3/4", right 1/2", 9/16", 5/8", 3/4", left	8	Drawer No.	8
Mandrels, taper, Nos. 3 to 9 inclusive (in wooden box)	7	Drawer No.	8
Pliers, long round nose 5-1/2"	1	Drawer No.	1
Pliers, curved nose 5-1/2"	1	Drawer No.	1
Punches, center	3	Drawer No.	1
Parallels, 3/8" x 3/4" x 6"	2	Drawer No.	1
Parallels, 1/2" x 1" x 6"	2	Drawer No.	1
Plate, automobile screw, No. 1463 S. A. E Standard in a hardwood case (each set to contain stock 22" long, plug taps, dies and guides, from 1/4" to 1" advancing by 16ths)	1	Drawer No.	5
Reamer, hand, "Alvord", set of 25	1	Drawer No.	4

Reamer, taper pin, "Alvords", Nos. 0 to 5, set	1	Drawer No.	4
Rule 6", graduation No. 7	1	Drawer No.	1
Rule 6", graduation No. 10	1	Drawer No.	1
Rule 3", graduation No. 7	1	Drawer No.	1
Rulers, folding 1 meter	4	Drawer No.	2
Rule, 36" English graduation No. 205	1	Drawer No.	17
Square, try, 6" solid steel	1	Drawer No.	1
Square, try, 3" solid steel	1	Drawer No.	1
Square, set, combination, 12 inch	1	Drawer No.	1
Square, patent double, 4 inch (2 blades and stock)	1	Drawer No.	1
Scriber, improved adjustable sleeve	1	Drawer No.	1
Sleeves, Collet No. 1 taper inside, No. 2 outside	2	Drawer No.	10
Screwdriver, 4", Smith's "Perfect Handle"	1	Drawer No.	10
Screwdriver, 6", Smith's "Perfect Handle"	2	Drawer No.	10
Screwdriver 8", Smith's "Perfect Handle"	1	Drawer No.	10
Voltmeter, Ever-ready No. 1005, 0-10 Volt range	1	Drawer No.	12
Vise, machinist, swivel jaw and base 3-1/2"	1	On Truck	
Vise, machinist, swivel jaw and base 4"	1	On Truck	
Wrench, adjustable tap, length, 7" for 1/16" to 1/4"	1	Drawer No.	4
Wrench, adjustable tap, length, 11" for 3/16" to 1/2"	1	Drawer No.	4
Wrench, adjustable tap, length, 15" for 1/4" to 3/4"	1	Drawer No.	4
Wrench, adjustable tap, length, 20" for 1/4" to 1"	1	Drawer No.	4
Wrench, screw, 10" solid bar	1	Drawer No.	10
Wrench, screw, 12", solid bar	1	Drawer No.	10
Wrenches, double end auto, Armstrong Bros. Tool Co. No. 5A semi-finished for A. L. A. M. Std. nuts and cap screws in canvas. Nos. 23-B, 27-B, 31-B, 33-B, 37-A	5	Drawer No.	10
Wrench, "Trimo", pipe, Metal handle 14", capacity 1/4" to 1-1/2" pipe	1	Drawer No.	10
Wrench, 6" adjustable, Model D. B. & S. Co.	1	Drawer No.	10
Wrench, 22 1/2 degree angle, 6" Cresent adjustable	1	Drawer No.	15
Wrench, 8", 22-1/2 degree angle	1	Drawer No.	10
Wrench, socket, set	1	Drawer No.	13
Wheel, Norton Alundum, 4-1/2" x 3/8", grain 3860, grade "N" (Extra for tool post grinder)	1	Drawer No.	15
Wheel, Norton Alundum, 1-1/2" x 3/8", grain 3860, grade "N" (Extra for tool post grinder)	1	Drawer No.	15
Wheels, Norton Alundum, 10" x 1", grain 46, grade "N" (Extra for bench grinder)	2	Drawer No.	6

APPENDIX II.

ARTILLERY SUPPLY TRUCK.

(a) (Body Equipment).	No. Per Car
Chest, bench	1
Cover canvas for Supply Body	1
Pole, ridge wood	1
Axe	1
Straps, 12" long (1or axe handle, 1 for pickaxe handle, 2 for hatchet handles	4
Lantern, complete, including globe and wick	1
Pads, lantern bracket, complete	2
Can, safety, 1 gal.	1
Straps, lantern bracket	2
Buckets, water, canvas	2
Strap, 22.75" long (for water bucket)	1
Vise, swivel, jaw (with bolts, nuts, and washers)	1
Shovels, short handle	2
Straps, 15" long (for short handled shovel)	2
Hatchets	2
Pickaxe	1
Oil, medium, gasoline engine, gal.	1
(b) (Load "A")	
Chest, spring	1
Chest, supply (ton contain spare parts for guns, gun carriages, and limbers)	1
Chest, supply, containing	1
Bolos, Model 1917	20
Scabbards, bolo, Model 1917	20
Brush, varnish, No. 4-0	1
Brushes, varnish, No. 5-0	2
Cable, high tension, S. A. E. Ignition, feet	25
Leather, bridle, back	1
Leather, collar, back	1
Leather, latigo, side	1
Leather, harness, back	1
Magneto, Eisemann G-4 Second Edition complete with impulse starter, clockwise rotation or Nask Trucks; counterclockwise rotation for F. W. D Trucks	1
Pliers, wire cutting 8"	6
Plugs, spark 7/8" S. A. E. Standard "Titan"	24
Tape, friction, 3/4", half-pound rolls	4
Tape, rubber, 3/4", half-pound rolls	4
Wire, copper, No. 16 gauge, B. & S., spool	4
Wire, soft steel, No. 16 gauge, B. & S., spool	1
*Chest, Fluid "A" containing	1
Brushes, varnish, No. 6-0	2
Brushes, paint, 4" flat (commercial)	4
Cans, 2 1/2 gallon capacity	20
6 will contain lubricating oil.	
6 will contain recoil cylinder oil.	
2 will contain camouflage paint, green, 2 cream.	
2 will contain camouflage paint, yellow, 2 black.	
1 will contain kerosene.	

*Carried on top of Supply Chest

Oil, lubricating, gals	15
Oil, recoil cylinder, gals	15
Paint for camouflage, green, gals	5
Paint for camouflage, yellow, gals	5
Paint for camouflage, cream, gals	5
Paint for camouflage, black, gals	2 1/2
Kerosene, gals	2 1/2
Paste, stencil, black, box	1
Paste, stencil, white, box	1
Straps, 34" long	4
Straps, 52" long (The above straps are for use on the Spring Chest, the Fluid Chest, and the two Supply Chests)	8
*Chest, grindstone, containing	1
Grindstone with frame complete	1
Wrench, grindstone spanner	1
*Chest, Carpenters', with tools complete	1

This includes

1 Carperter's Chest.
1 Axe bench.
2 Bags, canvas for small stores.
1 Bevel, 8".
6 Bits, augur, sizes, .25", .5", .75", 1", 1.25", and 1.5".
1 Bit, expansive, two cutters, .875" to 3".
3 Bits, screwdriver, sizes, .375", .625" and .75".
1 Bit, wood contersink, .625" dia.
1 Brace, ratchet, 10" sweep.
3 Chisels, socket, framing, sizes .75", 1" and 1.5".
1 Divider, wing 10".
4 Drills, twist, sizes .187" (3/16"), .218" (7/32"), .25" and .281" (9/32").
1 File, 10", flat bastard.
6 Files, saw, sizes 4" and 6".
1 Gauge, marking.
2 Gouges, socket, firmer, sizes .5" and 1".
1 Hammer, claw.
2 Handles, file.
1 Handle, tool, containing 10 tools.
1 Knife, drawing, 9" blade.
1 Mallet.
1 Nail set.
1 Oiler.
1 Stone, oil unmounted.
1 Pincers, small, 6".
1 Plane, jack, 16".
1 Plane, smoothing, 8".
1 Plate, augur handle.
1 Rasp, wood, 10".
1 Reamer, half round.
1 Rule, boxwood, 2 ft., four fold.
1 Saw, cross cut, 24", 7 point.
1 Saw, rip, 24", 5 point.
1 Set, saw.
1 Screwdriver, 5" blade.
1 Spoke shave.
1 Square, steel.
1 Tape, linen, 100 ft.
1 Vise, table, 2.5" jaw.

1 Wrench, screw, 12".	
*Chest for cleaning material and small stores, containing	1
Brushes, sash No. 3	3
Brushes, sash, No. 5	3
Brush, camel's hair	1
Burners, lantern	2
Chamois skins	2
Cloth, ciocus, quire	1
Cloth, emery, No. 0, quire	1
Cloth, emery, No. 00, quire	1
Cloth, emery, No. 1/2 quire	1
Globes, lantern	2
Dressing, leather, russet box	3
Oil, clock, 1-ounce bottle	1
Oil, raw, linseed, 1-pint can	1
Petroleum (in tin box) ounce	5 1/2
Cans, 1-gal capacity, for sal soda	3
Sal Soda, pounds	20
Sandpaper, No. 00, quire	1
Sandpaper, No. 2 1/2 quire	1
Wicks, lantern	1
Chest, Miscellaneous (Carried in Bench Chest)	1
Chest, for testing level (Carried in Miscellaneous Chest)	1
Level, testing, complete (Carried in testing level chest)	1
Box, Oil (Carried in Miscellaneous Chest)	1
Can, one gallon capacity (to contain light slushing oil)	5
Oil, light, slushing, gals	5
Cans, 1/2 gallon capacity	6
1 will contain sperm oil.	
1 will contain neatfoot oil.	
1 will contain O. D paint 2nd coat.	
1 will contain O. D paint 3rd coat.	
1 will contain Japan drier.	
1 will contain cosmic No. 80, coat.	

Oil sperm, gallon	1/2
Oil, neatsfoot, gallon	1/2
Paint, olive drab, 2nd coat, gal.	1/2
Paint, olive drab, 3rd coat, gal.	1/2
Dier, Japan, gal.	1/2
Cosmic, No. 80 soft, gal	1/2
*Tool kit, saddler's sheepskin with tools, complete	1
This includes:	
1 Sadler's sheepskin tool kit.	
12 Blades, awl, harness, Nos. 43 to 48 incl.	
1 Awl, pegging.	
1 Awl, seat, handled.	
1 Bag, canvas, for small stores.	
1 Carriage, pricking, 3 wheels.	
1 Compass, 6".	
1 Creaser, double, lignum vitae.	
1 Tool, edge, No. 1.	
1 Tool, edge, No. 2.	
2 Blades, extra, with followers for draw gauge.	
1 Gauge, draw, brass without guard.	
1 handle, peg awl, with wrench.	
1 Hammer, No. 3 riveting.	

2 Hafts, patent awl with wrench.
1 Knife, round.
1 Knife, splitting, 6".
1 Needle case, leather.
1 Needle, glover's No. 3 paper.
2 Needles, harness, No. 4 paper.
2 Needles, harness, No. 5 paper.
2 Needles, harness, No. 6 paper.
12 Needles, sacking, assorted.
1 Nippers, cutting, 10".
1 Oilstone, unmounted.
1 Pliers, 6".
4 Punches, round, assorted.
1 Punch revolving tubes, 4 tubes.
1 Rivet, set.
1 Rule, boxwood, 2 ft., 4 fold.
1 Palm, sewing, leather.
1 Slicker, steel.
1 Shears, 10" bent trimmers.
1 Knife, shoe, broad point.
1 Knife, shoe, square point.
1 Clamp, stitching.
1 Screwdriver, 3" blade.
1 Tool, claw.
2 Thimbles, best aluminum lined, 2 sizes.

CARRIED IN FLOOR LOCKERS.

Handles, axe	4
Handles, hatchet	4
Handles, pickaxe	4
Handles, shovel, short	3
Handles, sledge, model 1913	2
Sponges, 4"	20
Waste, white cotton, lbs.	25

CARRIED WHERE MOST EXPEDIENT.

Crowbar, 60"	2
Rope, manilla, 1" diam., 150 ft. long	1
Rivets and burrs, brass .5", No. 10, lb.	1
Rivets and burrs, brass, .625", No. 10, lb.	1
Handles, shovel, long	2
Blades, awl, arness, assorted, No. 43-48 incl.	6
Hafts, awl, patent, with wrench	1
Buckles, bar, tonguless, 5/8", brass	10
Buckles, bar, tonguless, 1", brass	15
Buckles, roller bar, 5/8" bronze.	10
Buckles, roller, 1 1/4" bronze.	50
Buckles, satchel, 5/8", bronze	20
Buckles, wire, 3/4", brass	25
Button, style No. 1, with washer	10
Duck, cotton olive drab, 22", No. 1, yds.	23
Clips, end, 5/8", brass	25
Clips, end, 1", brass	5
Clips, end, 1 1/2", brass	25

Fastening, Carr durable, ma' · and female	10
Hook, side strap wheel	2
Fastening, mills military	10
Needles, glover's, No. 3, papers	1
Needles, harness, No. 4, papers	1
Needles, harness, No. 5, papers	1
Needles, harness, No. 6, papers	1
Rope, 3/8" manila hemp, ft.	100
Screws, wood, 1", brass, No. 6, 1 gross pkgs.	2
Sheepskin with wool on	2
Tacks, copper, No. 12, 1/2 lbs., paper	1
Tacks, copper, No. 20, 1/2 lbs., paper	1
Thimble, aluminum lined steel, size 3"	1
Thread, carpet, No. 18, olive drab, lb.	1
Thread, shoe, No. 3, brown, lb	1
Thread, shoe, No. 10, brown, lb	1
Wax, stitching, brown, winter, lb	1
Webbing, olive drab, heavy cotton, 5/8", yd.	20
Webbing, olive drab, heavy cotton, 1", yds.	30
Sledge, model 1907	1
Block, snatch, for 1.25" rope	1
Soap, castile, cakes	12
Block, tackle, double, 8"	1
Bucket, water, galv. steel	2
(c) (Load "D")	
Crowbar, 60"	1
Sledge, model 1907	1
Rope, manila, 1" diam., 150 ft. long	1
Buckets water, galvanized steel	2
Bag for forge coal containing:	1
Coal, blacksmith's, pounds	50
Chest, supply	1
Chest, "Spring," containing:	1
Bolos, model of 1917	2
Scabbards, bolo, model 1917	2
Metal, babbit (for medium pressure and high speed; tin, 30%; antimony, 20%; lead, 50%) lbs.	12
Bottle for acid, 16 oz.	1
Buckles, roller, 1.25", bronze	30
Box, wooden, labeled "Acid"	1
Burner, lantern	2
Calcium Carbide, 1 lb. cans	15
Cloth, crocus, quire	1
Cable, high tension, S. A. E. Ignition, feet	25
Cloth, emergy, No. 1/2, quires	2
Carburetor, complete, for Nash or F. W. D. trucks, according to type employed in organization (Stromberg, Model L-2, 1 1/4" for Nash.) (Strombert, Type G, 1 1/2", for F. W. D.)	1
Cloth, emery, No. 00, quires	2
Globes, lantern	2
Magneto, complete for Nash or F. W. D. trucks, according to type employed in organization (Eisemann type G-4, Second Series, with impulse starter complete; clockwise rotation for Nash; counterclockwise rotation for F. W. D.)	1

	1	
Acid, Muriatic (18° to 20° acidity)	1	
Measure, copper, 1 qt. capacity, graduated in pints and litres	1	
Sandpaper, 2 1/2 quires	24	
Plug, spark, 7/8", S. A. E. ("Titan")	1	
Wire, copper, No. 16 gauge, B. & S. spool	1	
Shellac, orange, 1 pt. can	1	
Wire, soft steel, No. 16 gauge, B. & S. spool	1	
Extractor, screw, "Ezy Out" set	12	
Clamp, Cooper adjustable (in carton)	6	
Wicks, lantern	1	
Chest, grindstone, containing	1	
Grindstone and frame complete, with wrench	1	
*Chest, Carpenter's, with tools, complete		
For contents see Load "A".	2	
*Chest, miscellaneous	1	
Chest, Fluid "D," containing:	4	
Brushes, paint 4" flat (commercial)	1	
Brush, varnish, No. 6-0	1	
Box, labelled "Sal Soda"	1	
Box, labelled "Sal Ammoniac"	1	
Can, screw top, one gal. capacity (for Japan dryer)	4	
Can, screw top, 1/2 gal. capacity		
1 will contain O. D. paint, 2nd coat.		
1 will contain O. D. paint, 3rd coat.		
1 will contain borax.		
1 will contain Cyanide of Potassium.	14	
Cans, paint, 2 1/2 gal. capacity		
2 will contain paint for camouflage, green.		
2 will contain paint for camouflage, yellow.		
2 will contain paint for camouflage, cream.		
1 will contain paint for camouflage, black.		
1 will contain engine oil.		
1 will contain coal oil.		
1 will contain sperm oil.		
1 will contain lard oil.		
1 will contain gasoline.		
1 will contain pyrene liquid.		
1 will contain turpentine.	1	
Borax, lb.	1	
Cyanide of potassium, lb.	1	
Drier, Japan, gal.	2	1/2
Gasoline, gal.	2	1/2
Oil, engine, gal.	2	1/2
Kerosene, gal.	2	1/2
Oil, sperm, gal.	2	1/2
Oil, lard, gal.	2	1/2
Liquid, Pyrene, gal.	2	1/2
Turpentine, gal.	5	
Paint for camouflage, green, gal.	5	
Paint for camouflage, yellow, gal.	5	
Paint for camouflage, cream, gal.	2	1/2
Paint for camouflage, black, gal.	1	
Paste, black stencil, box	1	
Paste, with stencil, box		1/2
Paint, olive drab, 2nd coat, gal.		1/2
Paint, olive drab, 3rd coat, gal.	1	
Sal ammoniac, lumps, lb.		

Sal Soda, lb.	5
Tape, friction, 3/4", half-pound rolls	5
Tape, rubber, 3/4", half-pound rolls	5
Chest, forge containing:	1
Punch, fore and creaser	1
Chisel, hot iron	1
Shovel, fire	1
Rake, fire	1
Wrench, screw	1
File, flat bastard	1
Punch, nail	1
Tongs, 12 in.	1
Punch, round	1
Tongs, 1/4" iron	1
Tongs, 1/2" iron	1
Pritchel	1
Chisel, Cold, 8"	1
Forge, portable	1
Chisel, cold iron	1
Hammer, riveting	1
Hammer, hand	1
Handle, file	1
Oiler	1
Rule	1
Hardie	1
Square	1
Screw-plate, taps and dies (U. S. S.) with tap wrench, including chest	1
Drills, ratchet	1
Drills, .25, .375, .5 (2 each)	6
Anvil	1
Legs, forge	3
Aprons	2
Bags, canvas	1
Flatter	1
Punch, square	1
Punch, round	1
Wheel forge gear	1
Set, rivet, 625"	1
Set, rivet, .5"	1
Set, rivet, .25"	1
Set, rivet, .187" (3/16")	1
*Chest for bolts and rivets, containing:	1
Rivets (round head):	
3/16" diam., 1/2" long, pounds	1
3/16" diam., 3/4" long, pounds	1
3/16" diam., 1" long, pounds	1
1/4" diam., 1" long, pounds	3
1/4" diam., 3/4" long, pounds	2
1/4" diam., 1 1/4" long, pounds	3
5/16" diam., 3/4" long, pounds	1
5/16" diam., 1" long, pounds	8
5/16" diam., 1 1/2" long, pounds	1
3/8" diam., 1" long, pounds	8
3/8" diam., 1 3/4" long, pounds	8
1/2" diam., 1 1/4" long, pounds	4

	4
1/2" diam., 2" long, pounds	5
5/8" diam., 1 1/2" long, pounds	8
3/4" diam., 2 1/4" long, pounds	
Rivets (countersunk, 60° head).	5
3/8" x 3/4", pounds	5
1/2" x 2 1/2", pounds	5
1/2" x 3", pounds	5
5/8" x 2 1/2", pounds	
Rivets, brass (button head).	2
1/4" diam., 1" long, pounds	
Bolts, stove, with nuts (round head).	100
3/16" x 1"	100
3/16" x 1 1/2"	100
1/4" x 1"	100
1/4" x 1 1/2"	
Bolts, machine (square head with square nuts).	50
3/8" x 1 1/4"	50
3/8" x 2"	25
1/2" x 1 1/4"	25
1/2" x 2"	25
1/2" x 3"	25
5/8" x 3"	25
3/4" x 2"	25
3/4" x 4"	
Washers, wrought iron.	2
1/4", pounds	2
5/16", pounds	5
7/16", pounds	3
9/16", pounds	4
11/16", pounds	4
13/16", pounds	
	4
Straps, 34" long	
Straps, 52" long. (These straps for holding the spring chest, the forge check and the fluid chest in place)	8
	1
Chest for Bar Stock, containing:	
Forged steel (round)	1
1/4" diam. x 4 ft. long	1
3/8" diam. x 4 ft. long	1
1/2" diam. x 4 ft. long	1
5/8" diam. x 4 ft long	
Forged steel (flat).	1
3/8" x 1" x 4 ft. long	1
3/8" x 1 1/4" x 4 ft. long	1
1/2" x 1 1/4" x 4 ft. long	1
5/8" x 2" x 4 ft. long	1
5/8" x 2 1/2" x 4 ft. long	1
3/4" x 1 1/2" x 4 ft. long	1
3/4" x 1 1/2" x 4 ft. long	1
1" x 2" x 4 ft. long	1
1" x 3" x 4 ft. long	

Steel, cold rolled (round).	
3/16" diam. x 4 ft. long	2
1/4" diam. x 4 ft. long	2
3/8" diam. x 4 ft. long	2
1/2" diam. x 4 ft long	1
5/8" diam. x 4 ft. long	1
3/4" diam. x 4 ft long	1
1" diam. 4 ft long	1
1 1/4" diam. x 4 ft. long	1
Steel, cold rolled (Square).	
1/2" square x 4 ft. long	1
3/4" square x 4 ft. long	1
1" square x 4 ft. long	1
Steel, cold rolled (hexagon).	
3/4" hexagon x 4 ft. long	1
1" hexagon x 4 ft long	1
1 1/4" hexagon x 4 ft. long	1
Red, brass, round (half hard).	
1/8" diam. x 4 ft. long	1
1/4" diam. x 4 ft long	1
3/8" diam. x 4 ft. long	1
3/4" diam. x 4 ft long	1
Steel, flange.	
1/16" stock, 2 ft. x 4 ft., sheared plate	1
3/32" stock, 2 ft. x 4 ft. sheared plate	1
1/8" stock, 2 ft. x 4 ft., sheared plate	1
3/16" stock, 2 ft. x 4 ft. sheared plate	1
1/4" stock, 2 ft. x 4 ft. sheared plate	1
Steel, tool, Armstrong Special, or equal (round).	
1/4" diam. x 3 ft. long	1
1/2" diam. x 3 ft. long	1
Steel, tool, Armstrong Special, or equal (square).	
3/16" square x 3 ft. long	1
1/4" square x 3 ft. long	1
3/8" square x 3 ft long	1
5/16" square x 3 ft. long	1
7/16" square x 3 ft. long	1
Steel, tool, Armstrong Special, or equal (flat).	
3/8" x 1/2" x 3 ft. long	1
Pipe, wrought iron.	
3/8" pipe, 4 ft. long	1
1/2" pipe, 4 ft. long	1
3/4" pipe, 4 ft. long	1
1" pipe, 4 ft. long	1
Elbows, malleable iron.	
3/8" Standard 1 P elbow	3
1/2" Standard 1 P elbow	3
3/4" Standard 1 P elbow	3
1" Standard 1 P elbow	3

CARRIES IN FORBE CHEST

Bar-Bronze for buildings, "Non-Gran" assortment No. 6-54	1

This includes:
- 1 Special reinforced canvas roll, with strap complete and compartment for carrying bars.
- 1 Bar, solid, 7/8" x 12".
- 1 Bar, hollow, 1" x 12", 1/2" hole.
- 1 Bar, hollow, 1 1/4" x 12", 5/8" hole.
- 1 Bar, hollow, 1 3/8" x 12", 3/4" hole.
- 1 Bar, hollow, 1 5/8" x 12", 1" hole.

CARRIED IN FLOOR LOCKER

Handles, pick axe	2
Handles, axe	2
Handles, long handled shovels	2
Handles, short handled shovels	3
Handles, hatchet	4
Handle, pick mattox	2
Waste, white cotton, pounds	25

*Carried in Bench Chest.

*For 8-inch Howitzers, the oil, recoil cylinder, is to be oiled, buffered (British) as specified in Section V (b) of Equipment Tables.

TABLE X.

ANTI-AIRCRAFT MACHINE GUN AND EQUIPMENT OF A REGIMENT OF 9.2-INCH HOWITZERS.

1	2	3	4	5	6
ARTICLES	Battery	Headquarters Company	Supply Company	Total Regiment	REMARKS
ORDNANCE PROPERTY					
Machine guns, anti-aircraft	2	. .	. .	12	
Spare barrels	2	. .	. .	12	
Tripod	2	. .	. .	12	
Anti-Avion mounts	2	. .	. .	12	
Anti-Avion sights	2	. .	. .	12	
Spare part cases, No. 1, complete (1)	1	. .	. .	6	(1) Note No. 13.
Spare part cases, No. 2, complete (2)	1	. .	. .	6	(2) Note No. 14.
Gunner's pouch, complete (3)	2	. .	. .	12	(3) Note No. 15.
Cleaning kit, complete (4)	2	. .	. .	12	(4) Note No. 16.
Tables of fire . . .					
Wind charts	Book				
Temp. charts	form 1	. .	. .	6	
Baro. charts					
Belt boxes	12	. .	. .	72	
Belt	12	. .	. .	72	
Strip boxes (12 strip)	12	. .	. .	72	
Strips (24 rounds)	144	. .	. .	864	
Ammunition, 8-M/M rounds	6456	. .	. .	38736	

GENERAL NOTES.

NOTE 1.--When ordered by the army or other independent commander, there will be added to the normal mobile equipment, for winter use, 1 or 2 O. D. blankets, special provision to be made for their transportation; 1 pair lined gloves or 1 finger mitten.

NOTE 2.--Chevrons and sleeve insignia as prescribed will be issued, 3 to each individual, to be worn on the right sleeve of the overcoat, service coat, and O. D. shirt.

NOTE 3.--Issue of Clothing to Officers.

G. O. No. 7, Par 3, 4, H. A. E. F. (1918)

Officers serving in the zone of advance before going into the trenches will be issued all articles of the enlisted men's uniform and equipment that they may require; when the duty in the trenches is completed, officers will return the articles so issued. Fatigue clothing may be issued to an officer attending school, to be returned upon completion of the course.

The wearing of enlisted men's woolen O. D. breeches, or trousers, and woolen O. D. coats on occasions other than those mentioned in Par. 3 is prohibited.

NOTE 4.--Ordnance Equipment for Officers.

Ordnance Equipment requirement for use by officers will be procured under the provisions of Par. 11, G. O. No. 41, G. H. Q. A. E. F., March 14, 1918.

NOTE 5.--Toilet Kit.

Contents:

1 Brush, shaving
1 Comb.
1 Mirror.
1 Razor.
1 Cake soap, hand.
1 Cake soap, shaving.
1 Tooth brush.
1 Towel, face.

NOTE 6.--Cobbler's Outfit, Hand

Contents of cobbler's kit.

1 Iron stand, with three tasts.
1 Hammer, shoemaker's.
1 Nippers, peg.
1 Handle, sewing awl.
6 Blades, sewing awl.
1 Handle, pegging awl.
6 Blades, pegging awl.
1 Wrench for awl.
1 Knife, shoemaker's.
1 Rasp, shoemaker's.
1 Wax, shoemaker's ball.
1 Thread, shoe, ball.
5 Nails, cobbler, 4/8 lbs.
5 Nails, cobbler, 5/8 lbs.
3 Nails, heel, 6/8 lbs.
100 Half soles, assorted sizes, pairs.
1 Patches for uppers, lbs.
100 Lifts, heel, pairs.
2 Needles, shoemaker's packages (12 to package)
10 Leather, sole, lbs.

NOTE 7.--Field Desk, Small.

The contents of a field desk include records, manuals, blanks and stationery. The stationary for a single desk shuld not exceed the following which is prescribed as an allowance for 30 days. The allowance applies also to each field desk not furnished by the Quartermaster Corps:

	If typewriter is supplied.	If typewriter is not supplied.
Bands, rubber, No. 18 gross	1	1
Blocks, memo, or scratch note, for pencil	1	4
Books, duplicating, letter size	2	2
Envelopes, official	200	100
Erasers:		
Rubber, ink and pencil	1	2
Rubber, typewriter	1	1
Steel	1	1
Fasteners, paper, boxes	1	1
Files, office:	1	1
General Orders	1	1
Special Orders	1	1
Ink:		
Black, powdered, tables, tins	1	1
Red, powdered tablets, tins	1	1
Mucilage (or paste), bottle or tube	1	1
Paper:		
Blotting, 4x9 1/2-inch, sheets	6	6
Blotting, 12x19-inch, sheets	2	2
Carbon, letter size, sheets	25	. .
Letter, typewriter, quires	5	. .
Pencils:		
Indelible	4	4
Lead	2	2
Colored (blue and red)	2	2
Penholders	4	4
Pens, steel	24	24
Pins, office, cones	1	1
Ribbons, typewriter, record	2	. .
Ruler, office, 12-inch	1	1
Shears, office	1	1
Tape, office, spool	1	1
Twine, wrapping ball	1	1
Wax, sealing, ounce	1	1

NOTE 8.--Housewife.

	Contents:
1 Scissors.	1 Card of thread (white, black, and olive drab).
3 Needles, large.	24 Buttons, olive drab shirt.
24 Needles, assorted sizes.	48 Buttons, underwear (24 undershirt, 24 drawers).
20 Pins.	
8 Safety pins.	

NOTE 9.--Field Range No. 1, complete.

1 Field range (1 body, No. 41 and boiling plate No. 42).	1 Grinder, meat.
1 Alamo attachment (2 pieces, 42a and and 42b)	2 Knives, butcher, 8-inch.
6 Boilers, Nos. 48, 49, 50, 51, 53 and 54.	2 Pans, bake, No. 52
2 Cans, G. I., large.	1 Pipe, smoke, elbow, No. 47.
1 Can, G. I., small.	4 Pipe, smoke, joints, Nos, 43, 44, 45 and 46.
	4 Rests, pan, No. 57.
	1 Saw, meat, 15-inch blade.

1 Cleaver, 6-inch.
1 Dipper, 1/2-gallon, No. 55.
1 Dipper, quart, No. 56.
2 Forks, small
1 Skimmer, large
2 Spoons, large.
1 Steel, butcher's, 10-inch.

NOTE 10.--Field Range No 2, complete.

1 Field range (1 body, No. 61, and boiling plate, No. 62).
2 Boilers, Nos. 50 and 51.
1 Dipper, 1/2-gallon, No. 55.
2 Forks, meat, small
2 Knives, butches, 8-inch.
2 Pans, bake, No. 52.
1 Pipe, smoke, elbow, No. 67.
4 Pipe, smoke, joints, Nos. 63, 64, 65 and 66.
2 Rests, pan, No. 57.
1 Saw, meat, 15-inch blade.
1 Skimmer, small.
2 Spoons, small.
1 Steel, butcher's, 10-inch.

NOTE 11.--Butcher's Kit.

The following articles constitute a kit of butcher's tools, prescribed as Mobile Equipment:

1 Cleaver.
6 Hooks, meat, for racks.
2 Knives, butcher.
1 Saw, meat, including two extra blades.
1 Steel, butcher's.
1 Steelyard.

TABLE VIII (Continued)

FIRE CONTROL, DRAFTING MATERIALS AND SUPPLIES FOR A REGIMENT OF 9.2-INCH HOWITZERS (MOTORIZED).

1	2	3	4	5	6
Plan table, tripod.....	1	3	1	10	
Ranging poles, 6 ft. in..... two sections.....	4	12	4	4	
Recorder, hand talley.....	1	3	1	10	
Stadia rod.....	2	6	2	20	
Tally pins.....	12	36	12	120	
Tape repair outfit in leather case.....	1	3	1	10	
Tape, steel, 100 meters.....	1	3	1	10	
Tape, steel, 30 meters.....	2	6	2	20	
Transit, with case and tripod.....	1	3	1	10	
DRAFTING AND STATION EQUIPMENT					
Beam compass, bar and trammel points, micrometer adjustment.....	1	3	1	10	
Bureau of standard Circulars No. 47.....	1	3	1	10	
Chest, field.....	1	3	1	10	
Curves, irregular (sets of 10).....	1	3	1	10	
Drawing board, 24"x36".....	1	3	1	10	
Drawing instruments, set, Engrs, office, standard set.....	1	3	1	10	
Engineer field manual.....	1	3	1	10	
Ephemeris, current year.....	1	3	1	10	
Lamp, acetylene.....	1	3	1	10	
Log tables, 7 place, degree...	2	6	2	20	
Log tables, 5 place, grades..	2	6	2	20	
Log tables, 5 place, mils....	6	18	6	60	
Orientuur officers' manual...	2	6	2	20	
Parallel ruler, rolling, 12-inch.....	1	3	1	10	
Proportional dividers, 8½-inch.....	1	3	1	10	
Protractors, full circle, celluloid, 12" degrees.....	1	3	1	10	
Protractors, full circle, celluloid, 6" degrees.....	1	3	1	10	
Protractors, full circle, celluloid, 12" grades.....	1	3	1	10	
Protractors, full circle, celluloid, 6" grades.....	1	3	1	10	
Protractors, full circle, celluloid, 12" mils.....	1	3	1	10	
Protractors, full circle, celluloid, 6" mils.....	1	3	1	10	

TABLE VIII (Continued)

FIRE CONTROL, DRAFTING MATERIALS AND SUPPLIES FOR
A REGIMENT OF 9.2-INCH HOWITZERS (MOTORIZED).

1	2	3	4	5	6
Protractors, metal, 6" mils..	1	3	1	10	
Reconnaissance sets.....	1	3	1	10	
Scales, map, boxwood, 30 cm. long 1/20000 and 1/50000...	4	12	4	40	
Straight-edge, 2 meter, steel.....	..	3	1	4	
Straight-edge, 1 meter, steel.....	1	6	2	20	
Tapes, map, steel, 1/20000 1 1-4 m.....	2	6	2	20	
Tapes, pocket, steel, 72"....	4	12	4	40	
Transit books.....	6	18	6	60	
Triangles, celluloid, 12"-30° and 60°.....	1	3	1	10	
Triangles, celluloid, 6"-30° and 60°.....	1	3	1	10	
Triangles, celluloid, 12" 45°.....	1	3	1	10	
Triangles, celluloid, 6" 45°.....	1	3	1	10	
((T)) Square, 36".....	1	3	1	10	
Vertical angle Talbes, Stadia, degrees and meters.....	2	6	2	20	
Carbide, lbs.....	90	270	90	1170	
Celluloid, sheets, 20"x25" frosted.....	6	18	6	60	
Celluloid, sheets, 20"x25" clear.....	6	18	6	60	
Clock oil, oz. bottles.....	1	3	1	10	
Crayons, lumber, red, boxes..	1	3	1	10	
Envelopes, Manila 10" x 15"..	24	72	24	240	
Erasers, pencil.....	3	18	6	42	
Erasers, ink, typewriter.....	3	9	3	30	
Erasers, steel.....	2	6	2	20	
Erasers, art gum.....	6	18	6	60	
Erasers, sponge.....	3	9	3	30	
Glass, magnifying.....	1	3	1	10	
Glass, reading 3".....	1	3	1	10	
Glue, pints.....	1	3	1	10	
Horn centers, ½" diam.....	1	3	1	10	
Ink, drawing, black, bottles.....	3	9	3	30	
Ink, drawing, green, bottles.....	1	3	1	10	
Ink, drawing, blue, bottles.....	1	3	1	10	
Ink, drawing, brown, bottles.....	1	3	1	10	
Ink, drawing, brick red, bottles.....	1	3	1	10	

TABLE VIII (Continued)

FIRE CONTROL, DRAFTING MATERIALS AND SUPPLIES FOR
A REGIMENT OF 9.2-INCH HOWITZERS (MOTORIZED).

1	2	3	4	5	6
Ink, fountain pen (with filler)	2	6	2	20	
Paper, computation, 8" x 10½, ruled, pads	6	18	6	60	
Paper, computation, 4" x 6", unruled, pads	6	18	6	60	
Paper, cross section, 50 cm. wide, opaque, 10m. rolls	1	3	1	10	
Paper, cross section, 50 cm. wide, transparent, 10 m. rolls	1	3	1	10	
Paper, drawing, 24" x 36", Paragon, double mounted, sheets	12	36	12	120	
Paper, drawing, 24" x 36", eggshell, sheets	12	36	12	120	
Paper, drawing, 35", singl mounted, Paragon, 10 yd. rolls	1	3	1	10	
Paper, drawing, 35", Whatman's cold pressed, 10 yd. rolls	1	3	1	10	
Paper, Manila, 24" x 36", sheets	12	36	12	120	
Paste, library, jars	1	3	1	10	
Pencils, red	3	9	3	30	
Pencils, blue	3	9	3	30	
Pencils, brown	3	9	3	30	
Pencils, green	3	9	3	30	
Pencils, drawing, Venus, 9 H	12	36	12	120	
Pencils, drawing, Venus, 6 H	12	36	12	120	
Pencils, drawing, Venus 6 H	12	36	12	120	
Pencils, writing, No. 2	36	108	36	300	
Pencil points for beam compass	12	36	12	120	
Pencil points for compasses	12	36	12	120	
Penholder, writing	2	6	2	20	
Penholder, drawing	2	6	2	20	
Penholder, crowquill	2	6	2	20	
Pens, crowquill	12	36	12	120	
Pen points, Gillott No. 303	24	72	24	240	
Pen points, Gillott No. 170	24	72	24	240	
Pen points, Gillott No. 209	24	72	24	240	
Pen points, Gillott No. 404	24	72	24	240	
Pen points, Gillott No. 291	24	72	24	240	

TABLE VIII (Continued)

FIRE CONTROL, DRAFTING MATERIALS AND SUPPLIES FOR
A REGIMENT OF 9.2-INCH HOWITZERS (MOTORIZED).

1	2	3	4	5	6
Pins, colored head, cubes one each, black, red, blue, green, yellow, white	6	18	6	60	
Sandpaper, pads	1	3	1	10	
Sealing wax, stick	1	3	1	10	
Shears, 12"	1	3	1	10	
Spare cups	1	3	1	10	
Sponges for cups, spare	7	21	7	70	
Stone Oil, 3", with case	1	3	1	10	
Thumb tacks, solid head, long point, gross	1	3	1	10	
Tracing cloth, 36", 10-yd roll	1	3	1	10	
Tracing cloth, 30", 10-yd roll	1	3	1	10	
Tubes, map, G.I., 37"x6"	1	3	1	10	
Water color boxes, for 12 full pans and brushes	1	3	1	10	
Water color pans, set	1	3	1	10	
Water color brushes 2 each No. 1 to 6	12	36	12	120	
Water color ink, Prussian blue	2	6	2	20	
Water color ink, Burnt Sienna	2	6	2	20	
Water color ink, Hockers green	2	6	2	20	
Water color ink, Crimson lake	2	6	2	20	
Water color ink, Burnt Umber	2	6	2	20	
Water color ink, Chinese white	2	6	2	20	

TABLE IX.

COMPOSITION OF ARTILLERY EQUIPMENT OF A REGIMENT OF 9.2-INCH HOWIZTERS.

1	2	3	4	5	6
Articles	Battery	HQ Company	Supply Company	Total Regiment	Remarks
I. WHEELED MATERIAL.					
Howitzer, B L. 9.2" with siege carriages bed, firing beams, bed pegs, tie rods and earth boxes	4	..	..	24	
Trailers, 4 T. (Transporting firing beams)	4	..	..	24	
Wagons, transporting, with engine draught connectors:					
For bed	4	..	..	24	
For carriage and cradle	4	..	..	24	
For howitzer	4	..	..	24	
II. SIGHTS.					
Carriers, No. 7 dial sight, No. 4	4	..	..	24	
Cases, large clinometer	4	..	..	24	
Cases, No. 7, dial sight	4	..	..	24	
Clinometers, large	4	..	..	24	
Sight, dial No. 7	4	..	..	24	
Sight, rocking bar	4	..	..	24	
III. TOOLS AND ACCESSORIES.					
(a) For Carriage, Bed and Beam.	4	..	..	24	
Adapters, pressure gauge	4	..	..	24	
Apparatus, securing recuperator ram	4	..	..	24	
Braziers, charcoal (for winter use)	4	..	..	24	
Cans, lubricating, No. 9	4	..	..	24	
Covers, waterproof, black, 10' x 20'	12	..	..	72	
Covers, air pump	4	..	..	24	
Covers, ram recuperator	4	..	..	24	
Driver, bed pegs	4	..	..	24	
Eyes, lifting No. 9	24	..	..	144	
Eyes, withdrawing holdfast pegs	16	..	..	96	
Funnels, filing cylinder	6	..	..	36	
Gauges, pressure, No. 5	6	..	..	36	
Hammers, hide faced, 2-lb	4	..	..	24	
Jacks, screw, lifting, with ratchet and tommy	8	..	..	48	
Levers, ratchet, screw raising	12	..	..	72	

1	2	3	4	5	6
Articles	Battery	HQ Company	Supply Company	Total Regiment	Remarks
Measures, filling hydraulic buffer	6	..	..	36	
Pieces, ramping	12	..	..	72	
Planks, oak, 4½" x 12" x 6' (for firing beams)	24	..	..	144	
Plugs, adapting, 7/8" spanner (Hexagonal)	4	..	..	24	
Screws, raising, long	12	..	..	72	
Screws, 9.2" Howitzer equipment	..	..	..	..	
No. 1 for Mark 1	4	..	..	24	
No. 2 for Mark 1	4	..	..	24	
No. 3 for Mark 1 and 11	4	..	..	24	
No. 4 for Mark 1	4	..	..	24	
No. 8 for Mark 1	4	..	..	24	
No. 9 for Mark 1	4	..	..	24	
No. 10 for Mark 1	4	..	..	24	
No. 11 for Mark 1 and 11	4	..	..	24	
No. 13 for Mark 1	4	..	..	24	
No. 14 for Mark 1	4	..	..	24	
No. 16 for Mark 1	4	..	..	24	
No. 17 for Mark 1	4	..	..	24	
No. 23 for Mark 1 and 11	4	..	..	24	
No. 24 for Mark 1	4	..	..	24	
No. 25 for Mark 1	4	..	..	24	
No. 26 (with tommy) for Mark 1	4	..	..	24	
No. 27 for Mark 1 and 11	4	..	..	24	
No. 28 for Mark 11	4	..	..	24	
No. 29 for Mark 11	4	..	..	24	
No. 30 for Mark 11	4	..	..	24	
No. 31 for Mark 11	4	..	..	24	
No. 32 for Mark 11	4	..	..	24	
No. 33 for Mark 11	4	..	..	24	
No. 34 for Mark 11	4	..	..	24	
No. 35 for Mark 11	4	..	..	24	
No. 36 for Mark 11	4	..	..	24	
Tommies, small, 8"	4	..	..	24	
Tools, inserting, rings supporting packing	4	..	..	24	
Tools, withdrawing split pins					
(b) For howitzers and breech	4	..	..	24	
Bearers, loading tray	6	..	..	36	
Bearers, projectile	6	..	..	36	
Bits, vent, 18	4	..	..	24	
Books, gun	4	..	..	24	
Bore, sights	1	..	..	6	
Boxes, obturator	4	..	..	24	
Boxes, tallow	4	..	..	24	

1	2	3	4	5	6
Articles	Battery	HQ Company	Supply Company	Total Regiment	Remarks
Brush, breech screw	4	..	..	24	
Buckets, sponge, wood or G. I.	4	..	..	24	
Buckets, sponge, G. I. large (special shape)	4	..	..	24	
Cleaners, plasaba, No. 16	4	..	..	24	
Covers, breech	4	..	..	24	
Covers, muzzle	4	..	..	24	
Discs, adjusting, obturator	12	..	..	72	
Drifts, No. 11	4	..	..	24	
Extractors, cartridge	4	..	..	24	
Gauge, thickness, obturator (Mark 11 only)	4	..	..	24	
Lanyards, firing, No. 23	8	..	..	48	
Levers, extracting and inserting T-tubes	6	..	..	36	
Pockets, gunlayers	4	..	..	24	
Pockets, tube	4	..	..	24	
Presses, obturator (For Mark 11 only)	2	..	..	12	
Rammer and sponge	6	..	..	36	
Rimers, vent T	6	..	..	36	
Staves, end, No. 53 (for rammer and sponge)	4	..	..	24	
Staves, intermediate (for rammer and sponge)	4	..	..	24	
Straps, tube b[illegible], long	8	..	..	48	
Tommies, press, obturater (for Mark 11 [illegible]ly)	4	..	..	24	
Trays, loading	12	..	..	72	
Wrenches, breech mechanism:					
No. 103 (for Mark 1 only)	4	..	..	24	
No. 104 (for Mark 1 only)	4	..	..	24	
No. 105 (for Mark 1 only)	4	..	..	24	
No. 165 (for Mark 11 only)	4	..	..	24	
No. 166 (for Mark 11 only)	4	..	..	24	
No. 167 (for Mark 11 only)	4	..	..	24	
(c) For Sights.					
Covers, rocking bar sight	4	..	..	24	
Screwdrivers, adjusting sights	4	..	..	24	
Screwdrivers, Boley	1	..	..	6	
Screwdrivers, opticians	1	..	..	6	
Spanners, adjusting sights, No. 1 (Spanner No. 18)	4	..	..	24	
S½anner, adjusting sight, No. 18 (Spanner No. 19)	4	..	..	24	
Spanner, adjusting sight, No. 4 (Spanner No. 20)	4	..	..	24	
Tools, No. 7 dial sight:					
No. 1, removing eye piece	1	..	..	6	

1	2	3	4	5	6
Articles	Battery	HQ Company	Supply Company	Total Regiment	Remarks
No. 2, removing cap, micrometer head	1	..	..	6	
No. 3, removing plug, supporting pilar	1	..	..	6	
No. 4 Removing lower prism	1	..	..	6	
No. 5 Removing cap, upper prism holder, large	1	..	..	6	
No. 6 Removing ring, retaining upper prism	1	..	..	6	
No. 7 Removing pin, securing toothed segment	1	..	..	6	
No. 16 Removing mount, upper prism 1		..	..	6	
No. 17 Removing collar, worm spindle of No. 2 carrier	1	..	..	6	
Wrenches, adjusting No. 7 dial sight and carrier	1	..	..	6	
(d) For Wagons Transporting.					
Chains, drag shoe No. 34	12	..	..	72	
Rollers, Scotch, 5-3/4"	16	..	..	96	
Ropes, wire, securing howitzer to wagon	4	..	..	24	
Shoes, drag No. 14	12	..	..	72	
Spanner, No. 189 (for wheel caps)	4	..	..	24	
Tools, repairing, large chain (Howitzer wagons):					
Anvils	4	..	..	24	
Chisels	4	..	..	24	
Clamps	4	..	..	24	
Forks, supporting chains	4	..	..	24	
Punches	4	..	..	24	
Tools, repairing, small chain (howitzer wagon):					
Clamps	4	..	..	24	
Extractors, stud	4	..	..	24	
(e) For Maneuvering.					
Blocks, tackle, snatch, 4" circumference cordage	8	..	..	48	
Carts, trench, Mark 11	4	..	..	24	
Cordage:					
Hawser, hemp, 3 strand, 4" circumference 60' lengths	4	..	..	24	
Lashings, tarred, 2½" circumference, Manila rope, 30' lengths	40	..	..	240	

1	2	3	4	5	6
Articles	Battery	HQ Company	Supply Company	Total Regiment	Remarks
Lashings, tarred, 1½" circumference, Manila rope, 18' lengths	40	..	..	240	
Lines, "Hambro" (5/16" diameter hemp), 96' skeins	4	..	..	24	
Lines, white (3/16" diameter cotton), 1 lb skeins	4	..	..	24	
Ropes, drag, heavy (1" diameter, 36' with hook and eye), pairs	9	..	..	54	
Selvages, 53" (slings 1¼ diameter, made of bundled hemp line)	6	..	..	36	
Slings, rope, 6" circumference, 12½' long	4	..	..	24	
Slings, rope, 4" circumference, 5' long	4	..	..	24	
Flashlights, electric, w/bulbs and batteries	20	..	..	120	
Flashlights, batteries, sets snare	20	..	..	120	
Flashlights, bulbs (spare)	10	..	..	60	
Gyns, triangle, 2-3/4 ton	1	..	..	6	
Ropes, bracing	1	..	..	6	
Shoes	3	..	..	18	
Tackle, differential, 2-3/4 tons	1	..	..	6	
Handspikes, common, 7'	20	..	..	120	
Jacks, lifting screw, No. 1	4	..	..	24	(f) For preparation of the position.
Levers, 8'	12	..	..	72	
Levers, 14'	4	..	..	24	
Planks, moving gun--					
Half, 3 x 12" x 6'	8	..	..	48	
Special, oak, 3" x 15" x 10'	24	..	..	144	
Whole, fir, 3' x 17' x 10'	8	..	..	48	
Rollers, ground, 6" x 3', hardwood	8	..	..	48	
Rollers, ground, 5" x 2', hardwood	8	..	..	48	
Scotches, large (hardwood edges, 6" x 6" base x 12")	12	..	..	72	
Scotches, medium (hardwood wedges, 4" x ¼" base x 9")	12	..	..	72	
Scotches, small (hardwood wedges, 2½" x 2½" base x 9")	12	..	..	72	
Skids, 6" x 9" x 3'	6	..	..	36	
Skids, 5" x 6" x 3'	4	..	..	24	
Skids, 4" x 6" x 3'	8	..	..	48	

1	2	3	4	5	6
Articles	Battery	HQ Company	Supply Company	Total Regiment	Remarks
Tackles, luff, 84' rope, 1" diameter w/1 double and 1 single block	8	..	..	48	
Twine, packing, middling balls	2	..	..	12	
Twine, whipping, lbs	2	..	..	12	
Yarn, spun, hemp tarred, 3-thread, ½" diameter, pounds	8	..	..	48	
Adzes	4	..	..	24	
Adze helves (1 spare)	5	..	..	30	
Axes	8	..	..	48	
Axe helves (4 spare)	12	..	..	72	
Buckets, water, canvas	20	..	..	120	
Crowbars, 5'6"	4	..	..	24	
Hatchets	8	..	..	48	
Hatchets, handles (4 spare)	12	..	..	72	
Hooks, bill	8	..	..	48	
Lanterns, w/wicks and globes	12	..	..	72	
Lanterns, globes (spare)	12	..	..	72	
Lanterns, wicks (spare)	12	..	..	72	
Level, mason's	4	..	..	24	
Mauls, wooden, iron bound, heavy	12	..	..	72	
Maul handles (4 spare)	16	..	..	96	
Picks	24	..	..	144	
Pick helves (6 spare)	30	..	..	180	
Rammers, earth	12	..	..	72	
Shovels, short handle	12	..	..	72	
Shovels, short handles (spare)	2	..	..	12	
Shovels, long handle	32	..	..	192	
Shovels, long handled handles (spare)	8	..	..	48	
Sickle	10	..	..	60	
Sledge hammer, 10-lb	4	..	..	24	
Sledge hammer handles (2 spare)	6	..	..	36	
Spades	20	..	..	120	
Spades, handles (spare)	4	..	..	24	
Stones, scythe	2	..	..	12	
Straight edge, 10', wooden	2	..	..	12	
Tape, 100', metallic woven	2	..	..	12	
Wedges, sawyers, steel, 10"	2	..	..	12	
Wedges, sawyers, steel, 7"	4	..	..	24	
Wheelbarrows	8	..	..	48	
(g) For Ammunition					
Drivers, gaummet	4	..	..	24	
Gauges, shell, 9.2":					
Band, front	2	..	..	12	
Body	2	..	..	12	
Gascheck	2	..	..	12	

1	2	3	4	5	6
Articles	Battery	HQ Company	Supply Company	Total Regiment	Remarks
Keys, fuze:					
No. 5, or base fuze and plug	8	..	..	48	
No. 53, 2" percussion or graze fuzes	8	..	..	48	
No. 48, Mark 1	8	..	..	48	
No. 59, Mark 1, G. S. fuze hole plugs and 2" plugs	4	..	..	24	
Planks, stacking projectiles	2	..	..	12	
Wadmiltilts, large (12' x 14' covers for projectiles)	4	..	..	24	
(h) Chests and boxes (Not elsewhere enumerated)					
Boxes, mobilization stores No. 1 with padlocks	2	..	..	12	
Boxes, mobilization stores No. 2 with padlocks	2	..	..	12	
Boxes, Stores No. 1	4	..	..	24	
Boxes, Stores No. 2	4	..	..	24	
Boxes, Stores No. 3	4	..	..	24	
Boxes, Stores No. 4	4	..	..	24	
Boxes, Stores No. 5	4	..	..	24	
Boxes, Stores No. 6	4	..	..	24	
Boxes, Stores No. 7	4	..	..	24	
Boxes, Stores No. 8	4	..	..	24	
Boxes, Stores No. 9	4	..	..	24	
Boxes, Stores No. 10	4	..	..	24	
Boxes, Stores No. 11	4	..	..	24	
Boxes, Stores No. 12	4	..	..	24	
Keys for boxes	4	..	..	24	
IV. SPARE PARTS.					
(a) For Carriage, Bed and Beams (Specify Mark of Howitzer when ordering) (Nomenclature is common for Marks 1 and 11 except where indicated, although actual dimensions may be different for Marks 1 and 11.)					
Beams, firing, complete with tie rod sets	2	..	..	12	
Bolts, securing bed to beam	8	..	..	48	
Bolts and nuts, securint carriage to bed pivot block	8	..	..	48	
Buffer, hydraulic:					
Bushes, control cylinder	4	..	..	24	
Plugs, air filling and drain	8	..	..	24	

1	2	3	4	5	6
Articles	Battery	HQ Company	Supply Company	Total Regiment	Remarks
Plugs, retarding	4	..	..	24	
Plunger, locking gland	4	..	..	24	
Rings, compressed packing:					
No. 5, Buffer gland, outer (Mark 1)	8	..	..	48	
No. 15, Buffer gland, outer (Mark 11)	8	..	..	48	
No. 5, Supplementary Buffer gland, outer (Mark 1)	8	..	..	48	
No. 15, Supplementary Buffer gland, outer (Mark 11)	8	..	..	48	
Rings, rubber or leather:					
Cup shape, stuffing box, Mark 11	8	..	..	48	
L section, inner gland	8	..	..	48	
Tanks:					
Plugs	4	..	..	24	
Valves, air release	4	..	..	24	
Valve spring	4	..	..	24	
Valve washers, leather	8	..	..	48	
Washers, fibre:					
Tank, pipe, elbow (Mark 1)	8	..	..	48	
Plug	8	..	..	48	
Washers, leather:					
Stuffing box (Mark 1)	8	..	..	48	
Control cylinder	8	..	..	48	
Plug, air filling and valve, release	40	..	..	240	
Plug, retarding (Mark 11)	8	..	..	48	
Washers, steel or calamite, thrust, piston	8	..	..	48	
Pipes, pressure gauge connection (complete)	4	..	..	24	
Planks, oak, 4½" x 12" x 6" (for firing beams)	12	..	..	72	
Plates, clutch, elevating gear	4	..	..	24	
Plates, stop, worm wheel, elevating gear	4	..	..	24	
Pumps, air:					
Rings, piston, high pressure	8	..	..	48	
Rings, piston, low pressure	4	..	..	24	
Rods, eccentric	4	..	..	24	
Springs, valve, large	4	..	..	24	
Springs, valve, small	12	..	..	72	
Valves, large	8	..	..	48	
Valves, small	24	..	..	144	
Recuperator:					
Packing, valve, spindle, hemp ½" sq. 21" long	8	..	..	48	
Plungers, locking gland and stuffing box	4	..	..	24	

1	2	3	4	5	6
Articles	Battery	HQ Company	Supply Company	Total Regiment	Remarks
Rings, compressed packing:					
No. 6, gland, ram (Mark 1)	8	..	..	48	
No. 16, gland, ram (Mark 11)	8	..	..	48	
No. 6, supplementary, gland, ram (Mark 1)	8	..	..	48	
No. 16, supplementary, gland, ram (Mark 11)	8	..	..	48	
No. 7, gland, floating piston	8	..	..	48	
No. 7, supplementary, gland, floating piston	8	..	..	48	
Rings, rubber or leather:					
Cup shape, floating piston	8	..	..	48	
U-section, large, gland, ram	16	..	..	96	
U-section, medium, floating piston	16	..	..	96	
U-section, small, gland, floating piston	16	..	..	96	
Spindles, valve, recuperator plug	4	..	..	24	
Washers, leather:					
Stuffing box	8	..	..	48	
Plugs, air filling and drain	24	..	..	144	
Washers, copper:					
Rear plug for gauge connector	8	..	..	48	
Washers, klingerite:					
Rear plug joint	8	..	..	48	
Screws:					
Bracket, traversing worm, center	4	..	..	24	
Bracket, traversing worm, left	4	..	..	24	
Bracket level gears, elevating and traversing	8	..	..	24	
Case, elevating gear, left	4	..	..	24	
Case, loading gear	4	..	..	24	
Case cover, loading gear	8	..	..	48	
Case cover, quick loading gear	4	..	..	24	
Securing carriage to roller frame	16	..	..	96	
Guard, spur wheel, segment, front	4	..	..	24	
Thumb, oil hole 5/16" x 3/8"	24	..	..	144	
Springs:					
Bolt, traveling lock, pivot block	4	..	..	24	
Bolt locker buffer	4	..	..	24	
Gland, front, buffer and recuperator	4	..	..	24	

1	2	3	4	5	6
Articles	Battery	HQ Company	Supply Company	Total Regiment	Remarks
Lever, ratchet, screw, catch pin	12	..	..	72	
Spiral rod, actuating, loading gear	4	..	..	24	
(b) For Howitzer and Breech					
Bearings, ball	4	..	..	24	
Carrier, complete	1	..	..	6	
Obturators:					
Discs, protecting, front	8	..	..	48	
Discs, protecting, rear	8	..	..	48	
Pads	8	..	..	48	
Screws, breech	1	..	..	6	
Shafts, actuating	4	..	..	24	
Springs:					
Catch, breech, screw and B. M. lever	8	..	..	48	
Latch retaining B. M. lever	8	..	..	48	
Retaining T tube	8	..	..	48	
Vent, T, axial	8	..	..	48	
Vent, T, axial	4	..	..	24	
(For Mark 11, Howitzer)					
Arc, control	4	..	..	24	
Balls, 3/8" antifriction	48	..	..	288	
Bearings, ball	1	..	..	6	
Bearings, roller	1	..	..	6	
Carrier, complete	1	..	..	6	
Catches, B. M. lever	4	..	..	24	
Crossheads	4	..	..	24	
Lubricator, No. 1	4	..	..	24	
Obturator:					
Discs, protecting front	8	..	..	48	
Pads	8	..	..	48	
Rings, front	8	..	..	48	
Rings, rear, inner	8	..	..	48	
Rings, rear, outer	8	..	..	48	
Pins, axis, roller, breech screw	4	..	..	24	
Plates, catch, B. M. lever	4	..	..	24	
Plates, retaining breech screw	4	..	..	24	
Rollers for roller bearing	48	..	..	288	
Rollers for breech screw	4	..	..	24	
Screws, breech	1	..	..	6	
Sleeve, carrier, hinge joint	1	..	..	6	
Springs:					
Catch B. M. lever	8	..	..	48	
Retaining T-tube	8	..	..	48	
Vent, T, axial	8	..	..	48	
Vents, T, axial	2	..	..	12	

1	2	3	4	5	6
Articles	Battery	HQ Company	Supply Company	Total Regiment	Remarks
(c) For sights					
Bubbles, spirit glass "A"	4	..	..	24	
Cases, large clinometer	2	..	..	12	
Cases, No. 7 dial sight	2	..	..	12	
Clinometers, large	2	..	..	12	
Sights, dial No. 7	2	..	..	12	
Sights, rocking bar (parts):					
Springs, disc:					
Carrier, axis bolt and deflection pivot	16	..	..	96	
Range pinion	4	..	..	24	
Springs, drift (flat) (Mark 1 only)	4	..	..	24	
Springs, spiral:					
Catch bolt, telescope bearing	8	..	..	48	
Range pointer	4	..	..	24	
(d) For wagons, transporting					
Blocks, brake	24	..	..	144	
Caps, dust, wheel	8	..	..	48	
Chains, endless (howitzer wagon):					
Links, driving, crank	4	..	..	24	
Links, driving, straight	4	..	..	24	
Links, hauling, cranked	4	..	..	24	
Links, hauling, straight	4	..	..	24	
Collars, adjusting wheels	8	..	..	48	
Felloes, wheel No. 10:					
Ordinary	8	..	..	48	
Slip	8	..	..	48	
Pins, linch, wheel	8	..	..	48	
Rings, leather, dust excluders, axle	24	..	..	144	
Screws, cover, case, bevel gearing, raising gear	8	..	..	48	
Spokes, wheel No. 10:					
Back	8	..	..	48	
Front	8	..	..	48	
Springs, brake gear (disc No. 53)	48	..	..	288	
Washers, drag, wheels	8	..	..	48	
Wheels, 1st class "B" No. 10, Mark III	12	..	..	72	
V. TOOLS AND MATERIALS FOR REPAIR					
(a) Artillery Repair Truck.					

One Artillery Repair Truck (from Supply Company) with standard equipment and load, complete, accompanies each battery.

(b) Artillery Supply Truck, Load "D"

One Artillery Supply Truck (from Supply Company), with standard equipment and Load "D" of small tools and repair materials accompanies each Artillery Repair Truck.

(c) Special Tools for 9.2-inch Howitzers.

The following special tools for 9.2-inch howitzers should be added to Load "D" when accompanying 9.2-inch howitzer batteries:

Chalk, carpenter's cakes		2
Hammers, copper, 10 oz., with handles		2
Hammers, copper, 24 oz., with handles		2
Lines, carpenter's		4
Pencils, carpenter's		4
Saws, cross-cut, 5 ft. blades		2
Saws, cross-cut, handles		4
Taps and dies, Whitworth Standard bolt threads, 5/16" to 1¼" inclusive (with tap wrench and die holder)	Sets	2

(d) Special Materials for 9.2-inch Howitzers

The following special materials for 9.2-inch howitzers should be added to Load "D" when acc

Chain, iron, twisted link No. 16, B. W. G.	yards	4
Nails:		
6d	lbs	5
8d	lbs	5
10d	lbs	20
20d	lbs	20
Nuts, 3/8", hexagon, Whitworth bolt standard		8
Pins, keep, split (Spring cotters):		
3/32" x 3/4"		16
3/32" x 1¼"		48
3/32" x 1-3/4"		8
1/8" x 1-3/4"		16
1/8" x 2¼"		56
3/16" x 3"		24
¼" x 2½"		16
¼" x 3"		8
¼" x 3½"		48
¼" x 3-3/4"		8
¼" x 5"		32
3/8" x 6½"		16
Rivets, steel, roundhead:		
3/8" x 2"		24
½" x 2-3/4"		24
Screws, machine, iron, flathead, Whitworth Standard:		
3/8" gauge, No. 8		24
3/4" gauge, No. 10		24
3/4" gauge, No. 12		24

1½" gauge, No. 12		24
2" gauge, No. 14		24
2½" gauge, No. 16		16
Screws, machine, iron, roundhead, Whitworth Standard:		
1¼" gauge, No. 12		12
Screws, wood, assorted sizes	gross	1
Solder, half and half	lbs	5
Soldering paste	lbs	1
Steel pieces:		
Angle, 2" x 2" x 3/8" x 32"		2
Tire, ½" x 6" x 12" curved		2

VI. MATERIALS FOR CLEANING AND PRESERVING

(a) Artillery Supply Truck, Load "A".

Two Artillery Supply Trucks with standard equipment and Load "A" of cleaning and preserving materials are assigned to each 9.2-inch howitzer battery.

(b) Special Cleaning and Preserving Materials for 9.2-inch Howitzers.

In addition to the Load "A" the following special material should be carried for 9.2-inch howitzers:

Brush, wire, cleaning		1
Brooms, corn		2
Brooms, whisk		4
Burlaps, 48" wide	yards	40
Chalk, white (crayon)	gross	2
Charcoal for brazier (for winter use)	lbs	200
Graphite, powdered, lubricating	lbs	5
Lavaline	lbs	5
Lubricant, No. 4½	lbs	20
Lye	lbs	5
Oil, buffer (British) for Mark 1 (spare)	gals	55
Oil, buffer (British) for Mark 11 (spare)	gals	80
Paper, cleaning (optical)	ream	1
Putz, pomade, pounds	lbs	2

TEMPORARY LIST OF MATERIALS FOR CLEANING AND PRESERVING

To replace Section VI of the Tables until the Artillery Supply Trucks with Load "A" are av

		Quantity Per Battery
Brushes:		
Dusting, No. 2		4
Flat camel's hair, 1"		4
Oval paint, No. 6/0		4
Paint, wall, 4"		4
Sash, No. 6		4
Wire, cleaning		1
Brooms, corn		2
Brooms, whisk		4
Burlap, 48" wide	yard	40
Chalk, white (crayon)	gross	2

		quire	1½
Cloth, emery, No. 00		quire	1½
Cloth, emery, No. 1		quart	6
Cosmic, No. 80		pound	5
Graphite, powdered, lubricating		pound	5
Lavaline		pound	40
Lubricant, No. 4½		pound	5
Lye			
Oils:		gallon	55
Buffer (British) for Mark 1 Howitzers		gallon	80
Buffer (British) for Mark 11 Howitzers		ounce	2
Clock		gallon	15
Engine No. 1		gallon	5
Kerosene		quart	2
Neatsfoot		gallon	4
Slushing, light		gallon	1
Sperm			
Paint:		gallon	4
Black		gallon	4
Blue gray		gallon	4
Dark Buff		gallon	4
Light Olive		quart	4
Dryer, Japan		ream	2
Paper, cleaning (optical)	5½ oz	can	2
Petrolatum		pound	2
Putz Pomade		pound	10
Sal Soda		sheet	12
Sandpaper, No. ½		sheet	12
Sandpaper, No. 1		bar	16
Soap, H & H	1 lb	cans	2
Soap, saddle			8
Sponges, 4"		gallon	2
Turpentine		pound	20
Waste, cotton, colored		pound	4
Waste, cotton, white			

APPENDIX I

ARTILLERY REPAIR TRUCK

(a) Body Equipment.

		Number per car
Support for drill press		1
Frame for lathe		1
Drawer for lathe frame		1
Cabinet, bench, complete including all drawers and compartments		1
Screen, generating unit, assembled		1
Frame, body cover, complete		1
Cover, canvas, for body		1
Hatchets		2
Pickaxe		1
Straps, 12" long, (2 for hatchets, 1 for pickaxe and 1 for axe)		4
Shovels, short handle		2
Straps, 15" long (for short handle shovels)		2
Lantern complete, with globe and wick		1
Axe		1
Can, safety, 1 gallon capacity		1
Straps, lantern bracket		2
Pads, lantern bracket, complete		2
Buckets, water, canvas		2
Strap, 22-3/4" long (for water bucket)		1
Oil, medium, gasoline engine, gallon		1
Sibley stove, complete		1
Including:		
Shield tent for Sibley stove	1	
Joints for Sibley stove	4	
Elbow for Sibley stove	1	
Generating unit, 4 K. W. complete		1
Spare parts for generating unit:		
Connecting rod bearings	pair	4
Piston rings, 1/8"		4
Piston rings, 3/16"		2
Cylinder head gaskets		2
Valves		2
Valve tappet		1
Drill, press		1
Cover, canvas, for drill press		1
Cover, generator		1
Switchboard, complete		1
Lathe, screw cutting 9", Star No. 20, 36" between centers		1

The following accessories for lathe are carried in lathe frame drawer No. 16:

Straight tool post with rocket, washer, etc.	1
Follow rest	1
Face plate 9"	1
Space bolts for steady rest	2
Space bolt for steady rest with blocking	1
Block for straight tool post, 2"	1
Drill holder for lathe	1
Lathe clamp dogs	2
Sleeve for lathe centers	1

		3
Lathe centers No. 2 Morse taper		1
Lathe center dog		1
Tail stock wrench		1
Cover, lathe		1
Motor, lathe		1
Grinder, bench		
This includes:		
Norton Alundum wheels 10 x 1", grain 46, grade 0	2	
Adjustable steel wheel guards	2	
Detachment water pot	1	
Operating switch	1	
Cover, grinder and emery wheel		1
Compressor, air		1

NOTE 12.--Rolling Kitchen Cooking Equipment.

2 Buckets, G. I.
6 Canisters.
1 Cleaver.
1 Cook's chest.
6 Cook pots.
2 Conveying poles.
1 Dipper, 1 quart.
2 Dust covers, large.
2 Dust covers, small.
1 Food copper.
2 Forks, large.
1 Knife, bread
2 Knives, butcher's, 8-inch.
2 Knives, slicing.
1 Needle.
2 Oven pans and cover.
1 Poker.
1 Salt, box.
1 Saw, meat.
1 Shovel.
2 Skimmers.
2 Spoons, large.
1 Steel, butcher's, 10-inch.
2 Table boards.
2 Thermos cans.
2 Tills.
1 Tire pump (for trailmobile type only)
1 Wrench.

(The above equipment will be furnished to kitchens not provided with utensils. Existing kitchen equipment will be changed where necessary so as to correspond as nearly as practicable to the above.)

NOTE 13.--Spare Parts Case No. 1 (leather), Hotchkiss Machine Gun.

Contents:

1 Breech block.
1 Ejector.
2 Ejector cushions (rubber).
1 Elevating link.
1 Elevating connection link pin.
2 Extractor springs 2 Extractor.
1 Feed ratchet release pawl.
1 Firing pin.
1 Locking screw gas cylinder
1 Safety sear.
1 Safety sear spring.
1 Traversing clamp.
1 Traversing clamp lever.
1 Traversing clamp spring.
1 Barrel, cleaning rod, 2 sections.
1 Gas cylinder cleaning rod, 2 sections.
1 Scraper for gas cylinder.
12 Cleaning brushes (barrel).
1 Copper hammer.
1 Dismounting wrench.
1 Screwdriver.
1 Wrench teat.
1 File handle.
1 Gauge chamber.
1 Hand extractor.
1 Oil can.
1 Grease box, full.
1 Breech block case, leather.
1 Manual 1917, for 1914 H. M. G.
1 Zinc box and cover, cavas.
1 Recoil spring.
1 Sear.
1 Sear spring.
1 Sprocket, shaft ratchet spring.
1 Box, zinc, containing spare parts as follows:
1 Arm lock handle spring locking belt.
10 Pins, assorted.
1 Coller pin.
5 Rivets.
1 Elevating block trunnion lock.
1 Elevating block trunnion lock spring.
1 Elevating block locking pin.
1 Knee joint lock plunger.
1 Knee joint lock spring.
1 Telescopic elevating screw hook spring.
1 Telescopic elevating screw hook lock.
1 Trunnion cap lock.
1 Trunnion cap lock spring.
1 Trunnion cap lock spring plug screw.
1 Trunnion cap wing nut.
1 Trunnion cap case locking nut.
1 Upper leg head joint pin.
1 Upper leg head joint pin collar.
1 Upper leg head joint pin collar pin.

NOTE 14.--Spare arts Case No. 2 (Leather) Hotchkiss Machine Gun.

Contents:

1 Ejector.
2 Ejector cushions (rubber).
1 Elevating connection link pin.
2 Extractors.
1 Feed ratchet release pawl.
1 Feed ratchet pin spring.
1 Locking screw.
1 Piston.
1 Piston return spring.
1 Sear.
1 Striker.
1 Sear spring.
1 Cleaning rod barrel, 2 sections.
1 Cleaning rod, gas cylinder, 2 section.
12 Cleaning brushes (barrel).
1 Scraper for gun cylinder.
1 Copper hammer.
1 Screwdriver.
1 Dismounting wrench.
1 File and handle.
1 Grease box.
1 Oil can.
1 Front sight cover.
2 Extractor springs.
1 Socket shaft ratchet spring.
1 Hand extractor.

NOTE 15.--Gunner's Pouch, Hotchkiss Machine Gun.

Contents:

1 Extractor.
1 Extractor spring.
1 Striker.
1 Brush, varnish.
1 Defective cartridge extractor.
1 Hand extractor.
1 Wrench for gun regulator.
1 Oil can.

NOTE 16.--Contents of Cleaning Kits, Hotchkiss Machine Guns.

1 Chain mittens, pair.
1 Chain shoulder strap.
1 Canvas water bucket.
1 Oil can.
1 Cleaning rags, package.

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1 Nov 1981
25 Aug 1982

PROCEEDINGS OF A BOARD

CONVENED BY SPECIAL ORDERS NO. 10,

HEADQUARTERS 18TH ARTILLERY AREA,

11 DECEMBER, 1918,

TO REVISE "EQUIPMENT MANUALS FOR SERVICE IN EUROPE"

FOR A

BRIGADE HEADQUARTERS

(ARMY ARTILLERY)

Proceedings of a board of officers convened by the following order:

HEADQUARTERS 18TH ARTILLERY AREA

11 December, 1918.

SPECIAL ORDERS)
)
NO. 10.)

13. Pursuant to instructions contained in letter of Adjutant General, American Expeditionary Forces, dated December 7, 1918, file no. 15895-A 213, the following board of officers is convened in the 18th Training Area to make a complete study and report on the suitability and adequacy of all personnel and material as provided in Equipment Manuals for Service in Franch and Organization Tables for Brigade Headquarters, Army Artillery. (Individual equipment of the soldier will not be included in the deliberations of this Board).

Detail for the Board:

Col. M. A. Crose, C. A. C., 57th Artillery, C. A. C.
Lt. Col, T. A. Terry, C. A. C., 58th Artillery, C. A. C.
Major Charles Hines, C. A. C., HQ 39th Brigade, C. A. C.
Major R. D. Brown, C. A. C., HQ 31st Brigade, C. A. C.
Major H. O. Darnall, M. C., HQ 31st Brigade, C. A. C.
Capt. J. H. Wilson, C. A. C., HQ 31st Brigade, C. A. C.
Capt. J. M. Harris, C. A. C., 55th Artillery, C. A. C.
1st Lt. T. D. Johnson, C. A. C., H! 31st Brigade, C. A. C.

It is proposed to revise Equipment Manuals for Service in Franch and Organization Tables, based on experience gained in operations at the ftong. The Board would make its deliberations most thorough so as to cover entirely questions of personnel and materiel. When any changes are recommended full reasons should be given therefor, so that the officers undertaking final revision may have before them full information and reasons for recommendations and recommended changes.

Prior to the initial sitting the president of the above named Board will report to the Commanding General, 18th Artillery Area for further instructions.

Proceedings of this Board shall be submitted in quadruplicate.

By Command of Brigadier General DAVIS:

R. D. BROWN
Major, C. A. C.,
Chief of Staff.

OFFICIAL:

R. S. STEWART,
Captain, C. A. C., Adjutant

Blaise, France,
17 December 1918.

The Board met at 10:00 A. M.

Present - All members.

The Board then proceeded to a consideration of the data before it, in accordance with the above order and after due deliberation finds and recommends as hereinafter indicated.

In the consideration of its questions the board availed itself of the experience possessed by various officers of all ranks in the different regiments of Heavy Artillery stationed within the 18th Training Area, France.

The Board proposes for Headquarters personnel organization of a Heavy Artillery Brigade (Separate) the table attached hereto marked "A". Points of difference between this table and that now in force are discussed in items as follows:

(a) A Lieutenant Colonel, Artillery, for Chief of Staff. It is thought that the office of Chief of Staff should exist here because of the importance and size of the command and the responsibility devolving upon an officer in this position. His rank should be that of Lieutenant Colonel inasmuch as frequently this officer acts in the absence of his Brigade Commander and makes important decisions and his rank should be such as to guarantee sufficient experience to enable his decisions to be well conceived. It is likewise a well-known truth in a military organization that responsibility should not be imposed on an officer insufficiently endowed with rank to sustain it.

(b) A total of four captains is included in Table "A". It is intended that these be assigned for duty as follows: one brigade adjutant in command headquarters detachment; one medical officer; one orienteur and reconnaissance officer who assists also in operations as hereinbefore mentioned, and one ordnance officer. With the understanding of the duties of the Chief of Staff as hereinbefore commented on there would necessarily have to be an adjutant and officer to command the headquarters detachment. His duties would be largely administrative. He would be necessary when the brigade made its moves from one place to another and as commanding officer of the headquarters detachment his duties are obvious. A captain, medical corps, is added to act as surgeon to the proposed enlarged headquarters (now entirely without medical assistance), and to coordinate the work of regimental surgeons. Table "A" therefore assigns to assist the surgeon a sergeant 1st class, medical corps, one private first class and two privates, medical corps. The orienteur and reconnaissance officer, who assists also in operations, is believed to be necessary in view of what has been said of him in his capacity as assistant in operations and moreover very necessary. His primary duty, would be to do some of the advance orienteur work -- a work requiring higher than usual degree of orienteur knowledge. This officer should be an artillery officer so as to permit his serving as assistant in operations and so that he would understand his duty properly as regards reconnaissance of advance positions. An ordnance officer of the grade of captain is provided by Table "A" instead of the one munitions officer, lieutenant, provided in the present tables. This officer should handle all matters relating to ordnance and to munitions, should be the go-between for the ordnance officers of the regiments as regards this staff department of the next higher unit.

In line 6, Table "A", nine lieutenants are proposed, whose duties would be those given under "Remarks" in Table "A". Those which depart from the present organization tables are three lieutenants for liaison duty. These officers will render the organization of the headquarters staff more flexible than it is at present, would permit the commanding general to have at hand officers whom he could assign to duties that cannot be foreseen in an organization table, moreover to replace officers available for the establishment of advanced observation post serving as the eyes of the Commanding General and keeping him informed of the progress of the infantry in attack. It is well known that Army Artillery of the caliber

for which this table is proposed normally has as its targets those which are so far behind the infantry lines that there is no danger of firing on our own troops. Experience in the present war has not borne out this normal conception of division of functions. As a matter of fact Army Artillery has often had and undoubtedly will always have targets about which there will be question in the matter of danger to ones own troops. This may not be so in the beginning of an action but as that action progresses and as units of heavy artillery cannot keep up with the advance at all times the batteries are continued in action against a fleeting foe up to the limit of their range. Liaison officers are therefore necessary to reduce the hazard incurred by this kind of operation. They are also necessary to maintain connections and proper understanding between the brigade commander and the aviation and balloon units assigned to the brigade for observation and direction of fire, and above all with the Corps. It is of course true that battery officers and battalion officers have to some degree been used for this last mentioned duty of liaison with air service units and it is probable that they will continue to be used for this purpose. This, however, does not give the Brigade Commander the close touch on affairs that he would have with a liaison officer of his own. Looking broadly therefore at the matter of liaison, a subject whose importance cannot be over-emphasized, it is thought in any circumstances at least three lieutenants will be necessary.

It will be noted that the total commissioned personnel thus numbers fifteen and that a judge advocate, of the Judge Advocate General's Department is omitted. The reason for the omission of the captain judge advocate and in fact for the complete omission of any judge advocate at all, is that it has been found, it is believed, that such an officer has nothing to do that could not be properly performed and just as well performed by an officer in the position of the brigade adjutant, as hereinbefore proposed. The duties devolving upon a judge advocate are not onorous at all and are at their maximum only when the brigade is separate in fact as well as separate in name. If a judge advocate of the Judge Advocate General's Department is kept his retention as under the present tables simply means the retention of an officer for a duty that is slight and as such an officer is not trained in anything but law his services are not available for any other department or work. The duties of a statistical officer are performed by the Personnel Adjutant, thus removing even this duty from what might possible be made one of the duties of a Judge Advocate. Therefore no Judge Advocate is included and the statistical work is assigned to the Personnel Adjutant and it is believed furthermore that such duty can better be performed by officer of line experience.

The above remarks comprehend full discussion of duties of the commissioned personnel of Brigade headquarters asked for or suggested in excess of those now assigned as part of such a unit. They are believed to be the minimum number of officers to properly insure the correct and smooth functioning of a separate brigade. It should have been stated before that the idea forming the basis of the conceptions that gave rise to this proposed organization is that a brigade staff should possess a certain amount of flexibility, making it possible to adapt its functions to varying conditions of warfare and different kinds of geography. The board in all of its deductions and recommendations desires that such deductions and recommendations be read in the light of an assemption underlying all its proceedings, namely, that experience gained on the western front in the present war is not necessarily conclusive but should be considered in connection with the type of warfare that grew up under the conditions met with and that similar conditions will not necessarily be met with always. It has thought of possible changes in present artillery organization as regards the brigade, the corps and the army, and has sought to establish a staff with functions that will fit any conditions of organization, warfare and geography that may arise.

Proceedings now to a consideration of the necessary enlisted strength of Brigade Headquarters the following recommendations are made:

(a) Battalion sergeant-major, Judge Advocate General's Department is omitted for the reasons stated in connection with ths omission of the Judge Advocate from the commissioned strength of the brigade headqaurters staff. In his stand are shown in all three battalion

sergeants-major, one of whohm would perform judge advocate work. This noncommissioned staff officer could be either of the artillery or of the Judge Advocate General's Department, it would not matter which. The other two are believed to be necessary due to the enlarged clerical work imposed by reason of an enlarged staff and by reason of the proposed division into departments along the lines referred to in the discussion under commissioned personnel of the Brigade headquarters.

(b) Under Sergeants, line 15 of the old table, there are shown three. Table "A" recommends four due to the enlisted strength of the proposed detachment and to the fact that under the old table no providion is made for oroper administration of guard duty or in fact for any kind of guard duty at all. It is believed that four is a minimum required by the brigade headquarters detachment.

(c) The number of corporals is increased from eight to eleven. The three that are added are for the officers' mess, for intelligence work and to furnish a clerk for the Chief of Staff. It is though that the Chief of Staff should have a clerk whose sole duties would be those of a sort of secretary to the Chief of Staff, who is otherwise unprovided for as regards clerical work, unless he used the clerical force that is destined for other work. One corporal is scheduled for officers' mess. The reason for this is obvious. The total commissioned strength of the new detachment will be fifteen officers. It is not believed that at any time a brigade headquarters commissioned officers' mess ever sits down to mess with less than twenty or more officers and if the commissioned strength above proposed is approved the number actually fed will average daily twenty-five or more officers at nearly every meal. This is regarded as a sufficiently large mess to warrant the use of a noncommissioned officer in charge of the mess. This corporal likewise to assist Duty Sergeant. One clerk for the intelligence department is proposed to record and put in proper form intelligence reports and keep proper files of those received from other sources. The duty of this department will largely be that of compilation of data. There will be necessary undoubtedly mimeographing and typewriting additional for the intelligence department for other departments of the brigade staff. By reason of this fact there should be a corporal of the line furnished for such work.

(d) Table "A" proposed seven wagoners instead of three as called for by the old table. The reason for the increase is seen in the greater number of motor vehicles it is thought necessary to have as transportation for Brigade Headquarters Detachment and staff. The personnel is larger and the materiel and equipment will necessarily be larger. Therefore motor transportation and its drivers will have to be increased and it is thought that the minimum number required will be seven wagoners.

(e) Mechanics. Two are proposed instead of one. This again is by reason of the increase in motor transportation proposed in Table "A", and also by reason of the enlarged brigade headquarters staff and detachment.

(f) Buglers. Two are proposed instead of one because of the increased strength of the detachment and by reason of the great necessity of having someone continually ready to sound the call to take cover from observation overhead by enemy planes. One man in the detachment is not sufficient to accomplish this end.

(g) Under the heading Privates 1st Class and Privates, an increase is made in the former from 23 to 36 and the latter from 18 to 25. This increase is necessary to take care of the proposed enlargement in the number of motor vehicles. The table now in force schedules 13 first class privates for chauffeurs. This number is insufficient. The number actually needed by Brigade Headquarters as found by experience is nearer 25. It is difficult to say the exact number but 25 chauffeurs will come more nearly being exact than will the number 13. It is necessary to have men operating trucks for Brigade Headquarters at times when another man who drives the same truck is getting his sleep. Otherwise men are kept awake driving vehicles for a longer time than is regarded to the best interests of safety on highways. The number of wireless operators or privates trained to the duty of wireless

operation in the original table is three. This number is too small. There should be a continuous radio operator watch twenty-four hours out of the twenty four. For this purpose there should be at least five trained radio operators at the very minimum, giving thus an increase of two men over the present tables. As regards telephone operators and linemen the number allowed by the present tables is far insufficient as actual experience has demonstrated that the minimum number of telephone operators and linemen needed is four for operators and eight for linemen. There may be instances in which more are needed but experience of officers closely connected with this kind of work is that the running of lines and maintaining them in condition (sometimes with Army Headquarters, always with Corps Headquarters and the other posts of command) requires the personnel as proposed in Table "A". The duty of these men extends throughout the twenty-four hours of the day and it is not believed that such duty can be performed by a smaller number of men. The duties thus outlined will absorb all privates 1st class proposed in the Table "A" and a goodly part of the privates proposed in that table. The remaining small number are believed to be necessary for such work as assistant chauffeurs, kitchen police, signalling, orderlies and guard duty.

Reference now the proposed transportation in Table "A" it is thought that needs of Brigade Headquarters were not fully cared for in the table now in force, either as regards class of transportation or number of vehicles. It might be said generally that there are two types of trucks adaptable under nearly all conditions to the uses to which they have to be put at Brigade Headquarters and those are the standard 3-ton trucks and the light delivery truck. The numbers of them necessary are shown in Table "A". The trucks recommended in Table "A" are adapted to travel of all kinds whether on standard highways or on more or less unimproved roads. The light delivery truck is very favorably considered for such purposes, which explains the number called for in Table "A". It will be noted also that the number of passenger cars is increased and that a car is specified for the Brigade Commander. Certainly the Brigade Commander should have a car of the very best and dependable sort and one in which he can travel in comfort. Likewise a greater number of passenger cars should be provided than called for in present tables, in view of the proposed increase of personnel of officers and the greater amount of work to be performed by brigade staff than was foreseen when the present tables were compiled. The number of motorcycles it will be seen is doubled. This is done because the present number afforded is not sufficient and likewise for the reason that motorcycles get out of repair easily and one hundred percent of those furnished are not always available for use. A great deal of courier service emanates from Brigade Headquarters and a great deal of this service, nearly all of it in fact (Brigade Headquarters being a tactical headquarters primarily) demands speed and a great deal of available transportation. Consequently when such transportation is needed it is needed badly. Phones lines go down. It is necessary to send men to them to overrun all lines, locate the fault and repair it and returning to Brigade Headquarters proceed somewhere else. It is often true that eight or ten different officers and five or six enlisted messengers are out on errands simultaneously, each particular errand requiring its own transportation. The needs of the service of liaison alone would justify forty per-cent of the transportation called for in the proposed Table "A". An ambulance is added also as a part of the transportation for Brigade Headquarters. The reason for this is practically the same as the reason for the recommendation that a Brigade Surgeaon be added to the Brigade Staff, namely the distance of other units and possible necessity for the use of an ambulance that could not be obtained unless Brigade Headquarters continually carried such transportation as a part of its equipment.

Lastly the item of pistols, shown in line 33 of the present tables, is not considered as this is a part of the individual equipment of the soldier and with such this board is enjoined not to concern itself.

* * * * *

Reference Confidential Equipment Manual for Service in Europe, Series C, No. 2 Brigade Headquarters, Army Artillery, under date General Staff, 1st Section, August 1918, the board makes recommendation as follows:

It is desired to state preliminary to these recommendations and as forming the basic reason for all of them that the board bases its recommendations and findings on the practical experience of its members and of other officers who have worked intimately and directly with the materiel referred to. It is believed that the board has availed itself of the best obtainable experience in this matter as in the matter of personnel.

Page 5 of Equipment Manual is recommended for change in accordance with the proposed Table "A" hereto attached covering the matter of commissioned and enlisted personnel. The reasons are hereinbefore given.

Page 6, Equipment Manual. It is recommended that this page is changed so as to conform to "Remarks" of Table "A" herewith.

Page 7, Table I. In accordance with recommendation hereinbefore made recommended strike out the words at top of page "including personnel from Judge Advocate General's Department," substituting therefor the words "Medical and Ordnance Department attached." As regards items of equipment of this page, recommendations, none.

Page 8, Table I, continued, no recommendations.

NOTE: Where in the proceedings of the board from now on beginning with Equipment Table it is stated that it is not desired to make recommendations in the words "No recommendations," such is the action of the board either by reason of the fact that the board does not desire to change the table considering it sufficient or by reason of the fact that this table dealt with the individual equipment of the soldier, with which this board has nothing to do.

Page 9, Table II, recommended that column 3 referring to Judge Advocate General's Department, be ommitted throughout. (Mobile equipment in this column to be included in column 2, thereby increasing amounts given in column 2 by the amounts given in column 3 as regards items of total mobile equipment of Brigade Headquarters, Army Artillery.) For reasons see remarks hereinbefore regarding the discontinuance of a Judge Advocate of the Judge Advocate General's Department.

Item "Bugles with chains," change to read "2", this for the reason that two buglers are recommended in the table for enlisted personnel. See Table "A".

Item "Can, oil, typewriter," change "3" to read "4" to accord with increase in number of typewriters hereinafter recommended.

Item "Desk, field, large," change "1" to read "2".

Item "Desk, field, small," change "0" to read "1", by omission of column "3" and substitution of item "1 desk, field, small" therein from column 3 to column 2. Reasons for this recommendation hereinbefore given.

Page 10, Table II, continued, item "Typewriters" change "3" to read "4". The reason for this recommendation is contained in the paragraphs hereinbefore given concerning the necessity for additional officers and separate departments of brigade headquarters staff work.

Item, "Mimeograph machine, 1" to be added. Reason for this recommendation is ever present necessity for the duplication of forms and orders in work which cannot be accomplished by means of the typewriter.

Page 11, Table 11 continued, item "Medical Property" add under this heading "Chest of Supplies 1", "Chest Surgical 1."

Items "Motor Vehicles, Ordnance Property" and "Motor Transport Service" change all to accord with list of this equipment as given in Table "A" hereto attached. Reasons for this recommendation are hereinbefore given.

Page 12, Table III, no recommendations.

Page 13, Table IV, Signal Corps Property. Before proceeding with items under Signal Corps Property it is not amiss to state that there are many telephone lines with an artillery brigade and emanating from it which are of considerable length. Such lines must be carefully constructed. Over such lines are passed the most critical and extremely important orders and instructions. This requires good wire and plenty of material to effect good insulation at joints and other points along the route. Lines are usually run on existing pole routes or trees. In no case must lines be allowed to lie on the ground. There are necessitated a great many tools for proper installing the central equipment and it is found that local station wiring is necessary. Pliers are often lost and a fair reserve must be on hand since this tool is the indispensable tool in telephone construction and trouble clearing. The Camp telephone is a far better telephone in the post command than the Serb type. It is therefore proposed to use this type in all cases except for test sets. For this the Serb set is lighter and much better. The Camp Telephone enables much better transmission and has not the button switch in the transmission circuit which is so tiresome in holding a long conversation. In an ordinary installation it is impossible to handle the traffic with the monocord switchboard. It is therefore proposed to provide a Camp model switchboard in lieu thereof. Two monocord type 12-line boards are necessary for emergency use in case the Camp switchboard goes out of working. For operation of the monocord type boards it is proposed to provide a headset type operator's telephone with at least a four-bar magneto for ringing. A button switch should be arranged for closing the transmission circuit.

Covering generally the subject of equipment it can be stated that such items as flashlights are indispensable for locating trouble in dugouts or at night and at least one battery extra and two extra lamp bulbs are necessary for each flashlight. For the satisfactory installation of communication systems and for the proper use of radio communication as a means supplementary to metallic connection it is recommended that changes therefore be effected as follows:

Page 13, Table IV, changed in items recommended for erasure as shown in Table "B" attached herewith. After effecting changes as shown in Table "B", where mbmers are given in ink, add to Table IV the following items:

Axes, hand	6
Bags, tool, service	1
Bars, digging	2
Batteries, for telephones	36
Batteries, for flashlights	18
Batteries, No. 6, dry	12
Bells, vibrating	4
Belts, linemans, with safety strap	2
Button switches	3
Books, field message	10
Cable, 3 pair, lead, feet	300
Clips, testing	12
Climbers, pairs, with straps and pads	2
Envelopes, field message	200
Flashlights, electric, hand	9
Fuzes, extra, for monocord switchboards	12
Glasses, field	5
Hammers, sledge	1
Hammers, claw	1
Headsets, telephone	2
Insulators, for lance poles	100
Insulators, wooden knob	2000
Kits, inspector's, pocket	2

Kits, flag, combination	4	
Knives, electrician's	12	
Ladders	2	
Lamps for flashlights, extra	16	
Marlin, pounds	20	
Nails, wire, 20d, pounds	20	
Pliers, side cutting, 8"	12	
Poles, lance	50	
Projectors, 24 om. complete with batteries	5	
Reel, carts, hand	2	
Sapinettes	100	
Saws, hand, cross-cut	1	
Screws, wood, No. 8, 1½"	200	
Screwdrivers, 6"	4	
Screwdrivers, 3"	4	
Shovels, short handled, round point	2	
Staples, Blake, insulated	200	
Switchboards, monocord, 12-line	2	
Switchboards, Camp Model, 40-line	1	
Tags, circuit, wooden	200	
Terminal strips, 10 per strip	8	
Tape, friction, pounds	10	
Tape, rubber, pounds	5	
Telephones, 1375-B, W. E. Co.	4	
Telephones, Camp model	14	
Watches, luminous dial, with wristlets	4	
Wire, heavy twist pair, miles	10	
Wire, No. 12, G. I. for guys, miles	½	
Wire, outpost twice pair, for inside wiring, miles	3	
Wire, light, single conductor, single strand, insulated, miles	2	
Panels, Artillery Brigade, black, 4 x 9 yards, shape rectangular	1)	Complete with
Panels, Artillery Brigade, white, 4 x 9 yards, shape rectangular	1)	small black
Panels, Artillery Brigade, black, 4 x 9 yards, shape diamond	1)	and white
Panels, Artillery Brigade, white, 4 x 9 yards, shape diamond	1)	squares for identification purposes.
Radio trailer equipped with radio not capable of receiving damped waves 250 meters to 300 meters and capable of sending and receiving a distance of 25 miles undamped waves 500 meters to 1000 meters	1	

All electrical energy for this should be supplied by a generator connected to a suitable gasoline motor mounted on a trailer. The above generator should be capable of and equipped to charge storage batteries. Present tables call for French equipment which has been found always inadequate and too cumbersome for the efficient use of the radio services in a Heavy Artillery Brigade. The above is therefore recommended as based on experience, such experience actually gained in the field by constant use of different kinds of equipment. This latter remark refers also to the changes in Signal Corps, telephone and related equipment, which has been greatly altered and recommended for change both as regards sorts of items and numbers thereof.

Page 14, Table V, no changes recommended.

Page 15, Table V, continued, no recommendations.

Page 16, Table V, continued, no recommendations.

Page 17, under "General Notes," no recommendations.

Page 18, General Notes continued, no recommendations.

The Board having no further business before it adjourned sine die on December 26, 1918.

M. A. Cross,
Colonel, C. A. C.,
President.

T. D. Johnson,
1st Lieutenant, C. A. C.,
Recorder.

HQ, 18th Training Area, January 12, 1919,

Approved:

Wm. C. Davis,
Brigadier General, U. S. A.,
Commanding

bbb

TABLE "A"

1	Units	Bde HQ	Medi-cal	Ord-nance	Total	Remarks
2	Brigadier General	1			1	(a) Chief of Staff
3	Lieutenant Colonel	1a			1	(c) Surgeon
4	Captains	2d	1c	1c	4	(d) One Brigade Adjutant & Command HQ Co., one Orienteur & Reconnaissance to assist in opns.
5	Lieutenants	9f			9	
6	Total Commissioned	13	1	1	15	
7	Sergeant-Major, Sr Gr	1			1	(e) Ordnance, munitions, etc.
8	Battalion Sergeant-Major	3			3	(f) Two aides to C. G., one personnel adjutant; one radio lieutenant; one telephone lieutenant; one intelligence officer; 3 liaison duty officer.
9	Master Gunner	1			1	
10	Radio Sergeant	1			1	
11	First Sergeant	1			1	
12	Supply Sergeant	1			1	
13	Mess Sergeant	1			1	(g) One orderly for General; one in charge of transportation; one telephone, one duty and guard.
14	Sergeants	4g	1h	1i	6	
15	Corporals	11j			11	
16	Cooks	3k			3	(h) Sergeant 1st class.
17	Wagoners	7			7	(i) Sergeant of Ordnance.
18	Mechanics	2			2	(j) One clerk for adjutant; one clerk for detachment; one clerk for operations; two radios; one telephone; one signalling; one charge of courier service; one intelligence; one clerk for chief of staff; one officers' mess.
19	Buglers	2			2	
20	Privates 1st Class	36 (1)	1		37	
21	Privates	25m	2		27	
22	Total Enlisted	99	4	1	104	
23	AGGREGATE	112	5	2	119	
24	Staff Observation Car				1	
25	Reconnaissance				1	
26	Motorcycles, with side car				12	(k) Two for detachment mess; one for officers' mess.
27	Bicycles				2	(l) Chauffeurs; wireless; four telephone operators and eight linemen; guard and military police, etc.
28	Standard truck, 3-ton				6	
29	Light Delivery Truck				2	
30	Passenger Cars				4	
31	Limousine (For Brigadier Commander)				1	(m) Riders; gas and other guard orderlies for HQ; officers' orderlies; kitchen police and waiters, etc.
32	Ambulance				1	
33	Kitchen, rolling, trail				1	
34	Trailer, wireless				1	

~~CONFIDENTIAL~~
Not to be Taken Into the Front Line Trenches

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EQUIPMENT MANUALS FOR SERVICE IN EUROPE

Series C-No. 2

BRIGADE HEADQUARTERS

ARMY ARTILLERY

GENERAL HEADQUARTERS

AMERICAN EXPEDITIONARY FORCES

General Staff: First Section

August, 1918

TABLE OF CONTENTS

BRIGADE HEADQUARTERS ARMY OR CORPS ARTILLERY

	Page
Table 204--Brigade Headquarters Army Artillery	5
Table I--Individual Equipment of Quartermaster, Ordnance, Medical and Chemical Warfare Service	7
Table II--Total Mobile Equipment of Quartermaster, Ordnance, Medical and Chemical Warfare Service	9
Table III--Special Quartermaster, Engineer and Chemical Warfare Service Property	12
Table IV--Total Signal Corps Property	13
Table V--Total Fire Control, Drafting Materials and Supplies	14
General Notes	17

GENERAL HEADQUARTERS
AMERICAN EXPEDITIONARY FORCES
OFFICE OF THE CHIEF OF STAFF

August, 1918.

1. Hereafter all property in the hands of combatant troops in service in Europe will be divided into classes as follows:

2. Mobile Equipment is the equipment prescribed for use in troop movements, temporary billets, and open warfare. It is limited to the vehicles and articles of equipment prescribed in Tables of Organization, the equipment and clothing worn on the person, and the articles carried in pack or transported in the field.

3. The Mobile Equipment will be carried in all classes of service.

4. Special Equipment shown in Table 3 herein is the equipment which, in addition to the mobile equipment, is prescribed for use at the front.

5. The special equipment prescribed is designed to meet the necessities growing out of actual conditions as exist on the Western Front.

6. The tables given herewith cover all property in the hands of combatant troops and include Quartermaster, Ordnance, Medical, Chemical Warfare Service, Engineer and Signal Property. This equipment manual modifies for European service the allowances specified as equipment A, B and C, described in Par. 319, Compilation of Orders, War Department, 1881-1915, and all equipment in excess of the allowances specified in this manual will be turned in at once to the Salvage Service, S. O. S.

7. This manual modifies existing tables of allowances and equipment only in so far as is considered necessary to meet conditions of service in Europe. Due to the fact that different types of equipment are being issued to our troops and that other changes are to take place in the future, the names of articles and figures given herein will not be strictly applicable in all cases. Where such differences arise the provisions of the manual will be considered to apply in so far as practicable to the corresponding articles of other types.

8. The manual is intended as a guide for organization commanders in determining amounts of equipment and supplies to be kept on hand, and it is authority to supply officers for issues in accordance with its provisions. IT IS NOT INTENDED TO REGULATE OR LIMIT IN ANY WAY CALLS FOR SUPPLIES NECESSARY TO THE EFFICIENT CONDUCT OF OPERATIONS, NOR TO INTERFERE WITH THE DISTRIBUTION OF SUCH SUPPLIES AS ARE DICTATED BY THESE CONSIDERATIONS.

9. Mistakes in this manual should be brought promptly to the attention of General Headquarters, A. E. F., G-1.

BY COMMAND OF GENERAL PERSHING:

JAMES W. McANDREW,
Major General,
Chief of Staff.

(SEE TABLE "A")

TABLE 204 - BRIGADE HEADQUARTERS - ARMY ARTILLERY
MAXIMUM AND MINIMUM STRENGTH.

CONFIDENTIAL.
SERIES C.

1	Units	Brigade HQ	Judge Advocate	Total
2	Brigadier General	1	..	1
3	Major	f1	..	1
4	Captains	g2		
5	1st Lieutenants	k5	1	8
6	2nd Lieutenants			
7	Total Commissioned	9	1	10
8	Sergeant Major, Senior Grade	1	..	1
9	Battalion Sergeant Major	..	1	1
10	1st Sergeant	1	..	1
11	Supply Sergeant	1	..	1
12	Sergeant	a3		
13	Corporal	b8	1	12
14	Cook	e3	..	3
15	Mechanic	1	..	1
16	Wagoners (o)	c2	..	2
17	Bugler	1	..	1
18	Private 1st Class	i10[4c]	..	10
19	Private	m20[2d]	..	20
20	Total Enlisted	51x	2z	53
21	Aggregate	60	3	63
22	Cars, Motor, Staff Observation (O. D.)	2	..	2
23	Cart, Reel, Regimental and Battalion (O. D.)	1	..	1
24	Motorcycles with Side Cars (Q. M. C.)	12	..	12
25	Tractors, 2½-ton (O. D.)	1	..	1
26	Trucks, 3-ton (O. D.)	v2	..	2
27	Truck, Switchboard, Telephone, 2-ton (O. D.)	1	..	1
28	Pistols	60	3	63

(SEE REMARKS OF RECOMMENDED TABLE "A" ATTACHED)

REMARKS

(a) One orderly, one signalman, one radio operator.

(b) One rangefinder, two signalmen, two instrument men, two radio operators, one clerk.

(c) Chauffeur.

(d) Assistant chauffeur.

(e) Includes one cook for officers' mess.

(f) Brigade adjutant.

(g) Information officers and aerial observers, of whom one commands detachment.

(i) Three telephone operators, two signalmen.

(k) One aerial observer, one radio officer, one telephone officer and two aides.

(m) Eight orderlies, two telephone operators, two signalmen, one wire man.

(o) Par. V, G. O. No. 150, War Department, 1917.

(v) One for passengers and one for rations and baggage.

(x) Personnel from Coast Artillery Corps.

(z) Personnel from Judge Advocate General's Department, National Army.

Note. For 2½-ton tractor, one wagoner as chauffeur and one private as assistant chauffeur; for telephone truck, one wagoner as chauffeur and one private as assistant chauffeur; for 3-ton trucks, one private 1st class as chauffeur; for motor cars, one private 1st class as chauffeur.

(SEE PAGE 7 OF THIS REPORT. TO BE CHANGED FOR AN ENLISTED PERSONNEL OF 99.)

TABLE I

SETS OF INDIVIDUAL MOBILE EQUIPMENT FOR ALL ENLISTED MEN OF BRIGADE HEADQUARTERS ARMY ARTILLERY, INCLUDING ~~PERSONNEL FROM JUDGE ADVOCATE GENERAL'S DEPARTMENT~~ MEDICAL AND ORDNANCE ATTACHED

1	2	3
QUARTERMASTER PROPERTY		
Belt, waist	1	
Blankets, O. D.	1	
Brassards (1)	1	(1) 1 to each individual whose duty requires
Breeches, service, wool	1	the wearing of brassards. Blue, agents and
Bugle with sling (2)	1	signalmen; Green, guides and scouts; Red,
Cap, overseas	1	orderlies and messengers.
Chevrons and sleeve insignia	3	
Coats, fatigue	3	(2) For buglers only.
Coat, service	1	
Drawers	1	
Dubbin, 4-oz can	1	
Gloves, heavy leather, pairs	1	
Gloves, wool, O. D. pairs	1	
Laces, shoe, extra pairs	2	
Ornament, bronze	2	
Ornament, bronze, letters	1	
Overcoat	1	
Pins, shelter tent	5	
Poles, shelter tent	1	
Puttees, spiral, wool, pairs	1	
Rations, reserve	2	
Shirts, flannel, O. D.	2	
Shoes, pairs	2	
Slicker	1	
Socks, wool, pairs	4	
Tags, identification	2	
Tape, identification tag, yards	1	
Tent, shelter half	1	
Toilet kit (3)	1	(3) A toilet kit will consist of: 1 brush,
Trousers, fatigue	1	shaving; 1 brush, tooth; 1 comb; 1 mirror; 1
Undershirts	2	razor; 1 soap, and cake; 1 soap, shaving, cake;
Whistle and chain (4)	1	1 towel, face.
ORDNANCE PROPERTY		(4) Whistle and chain will be carried by 1st Sergeants and Sergeants
Can, condiment	1	
Can, meat	1	
Canteen	1	
Canteen cover, dismounted	1	
Cartridges, pistol, cal. .45	35	
Cup	1	
Fork	1	
Haversack	1	

1	2	3
Helmet, steel	1	
Knife	1	
Magazine, pistol, extra	4	
Magazine, pocket, web, double	2	
Pach carrier	1	
Pistol, cal. .45	1	
Pistol belt	1	
Pistol holster	1	
Ponch for first-aid packet	1	
Spoon	1	
MEDICAL PROPERTY		
Foot powder or grease box	1	
Packet, first aid	1	
CHEMICAL WARFARE SERVICE PROPERTY		
Respirator, British, S. B. or equal	1	

(CHANGED TO MEET THE REQUIREMENTS OF AN ENLISTED PERSONNEL OF 99)

TABLE II

TOTAL MOBILE EQUIPMENT OF A BRIGADE HEADQUARTERS, ARMY ARTILLERY

1	2	3*	4	5
Articles	Brigade HQ	Judge Advocate General's Department	Total	Remarks
QUARTERMASTER PROPERTY				
Axe and helve	2	..	2	
Bag, water, sterilizing and cover	1	..	1	
Bed sack (1)	..	..	..	(1) 1 bedsack and 2
Belt, waist	51	2	53	blankets will be
Blankets, O. D. (1)	51	2	53	issued to each offi-
Brassards: (2)				cer and enlisted man
Blue: Agents and Signalmen	..	..	..	in the training area.
Green: Guides and Scouts	..	..	..	
Red: Orderlies and Messengers	..	..	..	(2) See G. O. No. 59,
Breeches, service, wool	51	2	53	H. A. E. F., 1917.
Brush, typewriter	3	..	3	
Buckets, canvas	6	..	3	(3) Chevrons and
Buckets, G. I.	4	..	4	sleeve insignia as
Bugles with slings	2½	..	2½	prescribed will be
Can, oil, typewriter	4⅓	..	4⅓	issued 3 to each
Cap, overseas	51	2	53	individual to be worn
Chevrons and sleeve insignia (3)	..	..	..	on the overcoat, ser-
Coat, fatigue	51	2	53	vice coat and O. D.
Coat, service, wool	51	2	53	shirt.
Cobbler's outfit, hand (4)	1	..	1	
Desk, field, large (5)	2½	..	2½	(4) See Note No. 2.
Desk, field, small (5)	1	1	1	
Drawers	102	4	106	(5) See Note No. 3.
Dubbin, 4-oz can (6)	60	3	63	
Flag distinguishing Artillery Brigade and				(6) Includes offi-
Staff	1	..	1	cers.
Filing equipment:				
Drawers, filing	4	..	4	(7) See Note No. 4.
Pouch	1	..	1	
Type, rubber, sets	1	..	1	
Filing accessories, 6 months supply:				
Cards, guide	100	..	100	
Fasteners	500	..	500	
Folders	1800	..	1800	
Sheets, cross reference	1800	..	1800	
Globes, lantern distinguishing, Artillery				
Brigade, sets	1	..	1	
Gloves, heavy leather, pairs	51	2	53	
Gloves, wool, O. D. pairs	51	2	53	
Housewife (7)	8	..	8	
Laces, shoe, extra pairs	102	4	106	

*Omit this column and substitute equipment in column #2.

1	2	3*	4	5
Articles	Brigade HQ	Judge Advocate General's Department	Total	Remarks
Lantern, combination, complete	4	1	5	
Ornament, bronze	102	4	106	
Ornament, bronze, letter	51	2	53	
Overcoat	51	2	53	
Pick axes and helves	2	..	2	
Pins, shelter tent (6)	345	20	365	
Poles, shelter tent (6)	69	4	73	
Puttees, spiral, wool, pairs	51	2	53	
Range, field, No. 1 (8)	1	..	1	(8) See Note No. 6.
Range, field, No. 2 (9)	1	..	1	
Rations, reserve (6)	120	6	126	(9) See Note No. 6.
Shirts, flannel, O. D.	102	4	106	
Shoes, pairs	102	4	106	
Slickers	51	2	53	
Socks, wool, pairs	204	8	212	
Spades	2	..	2	
Stretcher, shoe	1	..	1	
Tag, identification	102	4	106	
Tape, identification tag, yards	51	2	53	
Tent, shelter half (6)	69	4	73	
Toilet kit	51	2	53	
Trousers, fatigue	51	..	51	
Undershirts	102	4	106	
Typewriters	43	..	43	
Whistle and chain	4	..	4	
Mimeograph machine	1	..	1	
CLOTHING FOR CHAUFFEURS AND MOTORCYCLES				
Boots, hip, rubber	20	..	20	
Coat, oilskin	20	..	20	
Gauntlets, winter, pairs (10)	20	..	20	(10) For winter use.
Goggles, mica or compound	20	..	20	
Helmet, wool or toque (10)	20	..	20	
Mackinaw or jerkin (10)	20	..	20	
Overshoes, arctic, pairs (10)	20	..	20	
Socks, extra heavy, wool, pairs (10)	40	..	40	(11) For motor-
Trousers, oilskin (11)	12	..	12	clists, only.

Note. For issue of expendable Q. M. supplies, see A. R., F. S. R. and current General Orders, G. H. Q. A. E. F.

ORDNANCE PROPERTY

Can, condiment	51	2	53
Can, meat	51	2	53
Canteen	51	2	53
Canteen cover, dismounted	51	2	53
Cartridges, pistol, cal. .rt (6)	2100	105	2205
Cases, dispatch	9	1	10

1	2	3*	4	5
Articles	Brigade HQ	Judge Advocate General's Department	Total	Remarks
Cup	51	2	53	
Fork	51	2	53	
Haversacks	51	2	53	
Helmet, steel (6)	60	3	63	
Knife	51	2	53	
Magazine, pistol, extra (6)	240	12	252	
Magazine, pocket, web, double (6)	120	26	126	
Marking outfit, M-1910, for stamping metal	1	..	1	
Pack carrier	51	2	53	
Pistol, cal. .45 (6)	60	3	63	
Pistol belt (6)	60	3	63	
Pistol holster (6)	60	3	63	
Pistol cleaning kit, complete	1	..	1	
Pouch for first aid packet	51	2	53	
Spoons	51	2	53	
MEDICAL PROPERTY				
Foot powder or grease box (6)	60	3	63	
Packets, first aid (6)	60	3	63	
Chest with wupplies	1	..	1	
Chest, Surgical	1	..	1	
CHEMICAL WARFARE SERVICE PROPERTY				
Respirator, British S. B. or equal	60	3	63	
MOTOR VEHICLES ORDNANCE PROPERTY*				
Cars, motor, staff observation	2	..	2	
Cart, reel, regiment and battalion	1	..	1	
Tractor, 2½-ton	1	..	1	
Truck, switchboard, telephone 2-ton	1	..	1	
MOTOR TRANSPORT SERVICE*				
Motorcycles with side cars	12	..	12	
Trucks, 3-ton	2	..	2	

*Omit, substitute as recommended.

(NO CHANGE)

TABLE III

SPECIAL QUARTERMASTER, ENGINEER AND CHEMICAL, WARFARE SERVICE PROPERTY FOR A BRIGADE HEADQUARTERS, ARMY ARTILLERY, FOR USE WHEN IN THE LINE, TO BE DRAWN UPON ARRIVAL IN THE SECTOR

1	2	3	4	5
Articles	Brigade HQ	Judge Advocate General's Department	Total	Remarks
QUARTERMASTER PROPERTY				
Alcohol, solidified, cans (1)	60	3	63	(1) To be used at the discretion of organization commander in emergency.
Overshoes, Arctic, pair (2)	..	..	..	
Cans, marmite	4	1	5	
Jerkins (2)	..	..	..	
Rations, reserve (3)	..	..	..	
ENGINEER PROPERTY				(2) For use in cold WEATHER. Issued to each man as required.
Augers, earth (4)	..	..	..	
Picks and helves (4)	..	..	..	(3) 4 days' reserve to be held in reserve.
Saws, cross-cut 2-man 6 feet (4)	..	..	..	G. O. No. 38, H. A. E. F., 1917.
Spades (4)	..	..	..	
Section pump with 12 feet or more of rubber hose (4)	..	..	..	(4) To be issued as required.
CHEMICAL WARFARE SERVICE PROPERTY				
Gloves, oilskin (4)	..	..	..	
Bellsar triangles	1	..	1	
Chloride of lime, kegs	1	..	1	
Fire tins (4)	..	..	..	
Klaxon horns	1	..	1	
Respirators, British, S. B. or equal	..	..	..	(5) 5 per cent, to be kept in reserve.
Suits, oilskin (4)	..	..	..	

(SEE BODY OF REPORT OF BOARD'S PROCEEDINGS)

TABLE IV

SIGNAL CORPS EQUIPMENT OF A BRIGADE HEADQUARTERS, ARMY ARTILLERY

1		2	3	4	5
	Articles	Brigade HQ	Judge Advocate General's Department	Total	Remarks
	SIGNAL CORPS PROPERTY				
(a)	Accumulators, 4 volts 100 amperes, hour	2	..	2	(a) Items being obtained in France.
(a)	Accumulators, 40 volts, 3 amperes, hour	2	..	2	
(a)	Amplifier, 3 ter	1	..	1	
(b)	Batteries, dry, No. 6	4	..	4	(b) Items being obtained in the United States.
(b)	Batteries, ever-ready, No. 703	12	..	12	
(a)	Bells, 50 ohm. or equivalent	2	..	2	
(a)	Breast reels	6	..	6	
(a)	Cases, battery	2	..	2	
(a)	Cart, hand reel, Brouette Deroulouse	3	..	3	
(b)	Climbers and straps, linesmen, pair	1	..	1	
(b)	Clips, testing, Muller Universal, or Frankel	18	..	18	
(a)	Fuses, extra, 1 amp, for switchboard	24	..	24	
(b)	Glasses, field, Huet, 8 power, pair	11	..	11	
(a)	Insulators, wooden knob, 4 cm	100	..	100	
(b)	Kits, flag, combination, standard	16	..	16	
(b)	Kits, inspectors pocket	6	..	6	
(b)	Message books, field	100	..	100	
(a)	Nails for insulators	100	..	100	
(a)	Panels, artillery brigade, black	1	..	1	
(a)	Panels, artillery brigade, white	1	..	1	
(b)	Pliers, side cutting, 8"	6	..	6	
(a)	Poles, sectional bamboo	6	..	6	
(a)	Projectors, service, 24 cm	5	..	5	
(a)	Receiving sets, radio, artillery, type A (coffre de reception)	2	..	2	
(a)	Set radio, type E 10 (French)	1	..	1	
(a)	Switchboards, 12 line monotype	1	..	1	
(b)	Tape, friction, lbs	3	..	3	
(b)	Telephones, type W. E. 1375 B	12	..	12	
(b)	Watches, wrist, luminous dial	20	..	20	
(b)	Wire, outpost, twisted pair, kilometers	38	..	38	

(NO CHANGE)

TABLE V

FIRE CONTROL, DRAFTING EQUIPMENT AND SUPPLIES FOR A BRIGADE HEADQUARTERS, ARMY ARTILLERY

1	2	3	4	5
Articles	Brigade HQ	Judge Advocate General's Department	Total	Remarks
ORDNANCE PROPERTY FIRE CONTROL EQUIPMENT				
Arms metal, 1 meter, scale 1/20,000	1	..	1	
Batteries, flashlight (spare)	16	..	16	
Bulbs, flashlight (spare)	4	..	4	
Flashlights, electric	8	..	8	
Range Tables	2	..	2	
Range Tables abridged	2	..	2	
Watches, stop	2	..	2	
ORIENTEUR AND TOPOGRAPHICAL EQUIPMENT				
Alidade, open sight	1	..	1	
Alidade telescopic	1	..	1	
Artillery Board, with cover, 30" by 40"	2	..	2	
Chest, instrument	1	..	1	
Chest, rod	1	..	1	
Clinometer, hand	1	..	1	
Compass, Prismatic	2	..	1	
Level rod	1	..	1	
Plane Table, 24" x 31", with cover	1	..	1	
Plane Table tripod	1	..	1	
Ranging poles, 6 feet in two sections	4	..	4	
Recorder, hand tally	1	..	1	
Stadia rod	2	..	2	
Tally pins	12	..	12	
Tape repair outfit in leather case	1	..	1	
Tape, steel, 100 meters	1	..	1	
Tape, steel, 30 meters	2	..	2	
Transit, with case	1	..	1	
Transit tripod	1	..	1	
DRAFTING AND STATION EQUIPMENT				
Beam compass, bar and trammel points, micrometer adjustment	1	..	1	
Bureau of standard circulars, No. 47	1	..	1	
Chest, field	1	..	1	
Curves, irregular (sets of 10)	1	..	1	
Drawing Board, 24" by 36"	1	..	1	
Drawing instruments, set, engr office standard set	1	..	1	
Engineer field manual	1	..	1	
Ephemaris, current year	1	..	1	
Log, tables 7 place, degrees	2	..	2	

1	2	3	4	5
Articles	Brigade HQ	Judge Advocate General's Department	Total	Remarks
Log, tables, 5 place, grades	2	..	2	
Log, tables, 5 place, mils	6	..	6	
Orienteur Officer's manual	2	..	2	
Parallel ruler, rolling 12-inch	1	..	1	
Proportional dividers, 8½-inch	1	..	1	
Protractors, full circle, celluloid, 12" deg	1	..	1	
Protractors, full circle, celluloid, 6" deg	1	..	1	
Protractors, full circle, celluloid, 12" grades	1	..	1	
Protractors, full circle, celluloid, 6" grades	1	..	1	
Protractors, full circle, celluloid, 12" mils	1	..	1	
Protractors, full circle, celluloid, 6" mils	1	..	1	
Protractors, metal, 6" mils	1	..	1	
Reconnaissance sets	1	..	1	
Scales, map, boxwood, 30 cm. long 1/20,000 and 1/50,000	4	..	4	
Scales, map, boxwood, 30 cm. long 1/5000 and 1/10,000	4	..	4	
Straight edge, 2 meters steel	1	..	1	
Straight edge, 1 meter steel	1	..	1	
Tapes, map, steel, 1/20,000, 1½ m.	2	..	2	
Tapes, pocket, steel, 72"	4	..	4	
Transit books	6	..	6	
Triangles, celluloid, 12"-30° and 60°	1	..	1	
Triangles, celluloid, 6"-30° and 60°	1	..	1	
Triangles, celluloid, 12"-45°	1	..	1	
Triangles, celluloid, 6"-45°	1	..	1	
T-Square 36"	1	..	1	
Vertical angle tables, stadia, degrees and meters	2	..	2	
Carbide, pounds	90	..	90	
Celluloid, sheets, 20" x 25", frosted	6	..	6	
Celluloid, sheets, 20" x 25", clear	6	..	6	
Clock oil, oz bottle	1	..	1	
Crayons, lumber, red, boxes	1	..	1	
Envelopes, manila, 10" x 15"	24	..	24	
Erasers, pencil, ruby, No. 112	6	..	6	
Erasers, ink, typewriter, disc	3	..	3	
Erasers, steel	2	..	1	
Erasers, art gum	6	..	6	
Erasers, sponge	3	..	3	
Glass, magnifying	1	..	1	
Glass, reading 3"	1	..	1	
Glue, pints	1	..	1	
Horn centers, 1/2" diam	1	..	1	
Ink, drawing, Higgins, black (bottles)	3	..	3	
Ink, drawing, Higgins, green (bottles)	1	..	1	
Ink, drawing, Higgins, blue (bottles)	1	..	1	
Ink, drawing, Higgins, brown, (bottles)	1	..	1	

1	2	3	4	5
Articles	Brigade HQ	Judge Advocate General's Department	Total	Remarks
Ink, drawing, brick red, Higgins, (bottles)	1	..	1	
Ink, fountain pen, (with filler)	2	..	2	
Paper:				
Computation, 8" x 10 1/2" ruled, pads	6	..	6	
Computation, 4" x 6", unruled, pads	6	..	6	
Cross section, 50 cm. wide, opaque, 10 m. rolls	1	..	1	
Drawing, 24" x 36" paragon double mounted sheets	12	..	12	
Drawing, 24" x 36" eggshell, sheets	12	..	12	
Drawing, 35 Whatman's cold pressed 10-yard rolls	1	..	1	
Manila, 24" x 36" sheets	12	..	12	
Paste, library, jars	1	..	1	
Pencils:				
Red	3	..	3	
Blue	3	..	3	
Brown	3	..	3	
Green Drawing, venus, 9H	12	..	12	
Drawing, venus, 6H	12	..	12	
Drawing, venus, 3H	12	..	12	
Writing, No. 2	36	..	36	
Pencil points for beam compss	12	..	12	
Pencil points forcompasses	12	..	12	
Pen holders, writing	2	..	2	
Pen holders, drawing	2	..	2	
Pen holders, crowquill	2	..	2	
Pens, crowquill	12	..	12	
Pen points, Gillot, No. 303	24	..	24	
Pen points, Gillot, No. 170	24	..	24	
Pen points, Gillot, No. 290	24	..	24	
en points, Gillot, No. 404	24	..	24	
Pen points, Gillot, No. 291	36	..	36	
Pins, colored head, cubes, one each, black, red, blue, green, yellow, white	6	..	6	
Sandpaper, pads	1	..	1	
Sealing wax, sticks	1	..	1	
Shears, 12"	1	..	1	
Sponge cups with sponges	1	..	1	
Sponges for cups, (spare)	6	..	6	
Stones, oil, 3" with case	1	..	1	
Thumb tacks, solid head, long point, gross	1	..	1	
Tracing cloth 36" 10-yard rolls	1	..	1	
Tracing paper, 30" 10-yard roll	1	..	1	
Tubes, map G. I. 6" x 37"	1	..	1	
Water Colors:				
Boxes, for 12 full pans and brushes	1	..	1	
Pans, colors, sets	1	..	1	
Brushes, 2 each, Nos. 1 to 6	12	..	12	

1	2	3	4	5
Articles	Brigade HQ	Judge Advocate General's Department	Total	Remarks
Water Colors, ink:				
Prussian blue, full pans	2	..	2	
Burnt slenna, full pans	2	..	2	
Hockers green, full pans	2	..	2	
Crimson lake, full pans	2	..	2	
Burnt umber, full pans	2	..	2	
Chinese white, full pans	2	..	2	

GENERAL NOTES

Note 1. When ordered by the Army or the independent commander, there will be added to the normal individual mobile equipment, for winter use, 1 or 3 O. D. blankets, special provisions to be made for their transportation, 1 pair lined gloves or 1 finger mittens.

Note 2. COBBLER OUTFIT, HAND. Contents of Cobbler's Kit:

1 Iron stand, with three lasts.
1 Hammer, shoemaker's.
1 Nipper, peg.
1 Handle, sewing awl.
6 Blades, sewing awl.
1 Hanlde, pegging awl.
6 Bldes, pegging awl.
1 Wrench, for awl.
1 Knife, shoemaker's.
1 Rasp. shoemaker's.
1 Wax, shoemaker's, ball.
1 Thread, shoe, ball.
5 Nails, cobblers, 4/8 lbs.
5 Nails, cobbler, 5/8 lbs.
3 Nails, heels, 6/8 lbs.
100 Half soles, assorted sizes, pairs.
1 Patches for uppers, lbs.
100 Lifts, heel, pairs.
2 Needles, shoemaker's, packages (12 to pkg.)
10 Leather, sole, lbs.

Note 3. FIELD DESK LARGE AND SMALL. The contents of a field desk include records, manuals, blanks and stationery. The stationery for a single desk should not exceed the following, which is prescribved as an allowance for 80 days. The allowance applies also to each field desk not furnished by the Quartmaster Crops.

	If Typewriter Is Supplied.	If Typewriter Is Not Supplied.
Bands, rubber, No. 18, gross	1	1
Blocks, memo or scratch note, for pencil	1	4
Books, duplicating, letter size	2	2
Envelopes, official	200	100
Erasers:		
Rubber, Ink and pencil	1	2
Rubber, typewriter	1	..
Steel	1	1
Fasteners, paer, boxes	1	1
Files, office:		
General order	1	1
Special Order	1	1
Ink:		
Black, powdered tables, tins	1	1
Red, powdered tablets, tins	1	1
Mucilage (or paste) bottle or tube	1	1
Paper:		
Blotting, 4 by 91/2 inch, sheets	6	6
Blotting, 12 by 19 inch, sheets	2	2
Carbon, letter size, sheets	25	..
Letter, typewriter, quires	5	..

GENERAL NOTES (Continued)

	If Typewriter Is Supplied.	If Typewriter Is Not Supplied.
Pencils:		
Indelible	4	4
Lead	2	2
Colored (blue and red)	2	2
Penholders	4	4
Pens, steel	24	24
Pins, office, cones	1	1
Ribbons, typewriter, record	2	..
Ruler, office, 12 inch	1	1
Shears, office	1	1
Tape, office, spool	1	1
Twine, wrapping, ball	1	1
Wax, sealing, ounce	1	1

Note 4. HOUSEWIFE. Contents:

1 Scissors.
3 Needles, large.
24 Needles, assorted sizes.
20 Pins.
8 Safety pins.
1 Card of thread (white, black, ad olive drab).
24 Buttons, olive drab shirt.
48 Buttons, underwear (24 undershirt, 24 drawers).

Note 5. FIELD RANGE NO. 1, COMPLETE. Components:

1 Field range, (1 body, No. 41 and boiling plate 42).
1 Alamo attachment (2 pieces, 42a and 42b).
6 Boilers, Nos. 8, 49, 50, 51, 53 and 54.
2 Cans, G. I. large.
1 Can, G. I. small.
1 Cleaver, 6-inch.
1 Grinder, meat.
2 Knives, butcher, 8-inch.
2 Pans, bake, No. 52.
1 Pipe, smoke elbow No. 47.
4 Pipe, joints, Nos. 43, 44, 45 and 46.
4 Rests, pan, No. 57.
1 Saw, meat, 15-inch blade.
1 Skimmer, large.
1 Dipper, 1/2 gallon, No. 55.
1 Dipper, quart, No. 56.
2 Folks, small.
2 Spoons, large.
1 Steel, butcher's, 10-inch.

Note 6. FIELD RANGE NO. 2, COMPLETE.

1 Field range (1 body, No. 61 and boiling plate No. 62).
2 Boilers, Nos. 50 and 51.
1 Dipper, 1/2 gallon, No. 55.
2 Forks, meat, small.
2 Pans, bake, No. 52.
1 Pipe, smoke, elbow, No. 67.
4 Pipe, smoke, joints, Nos. 63, 64, 65 and 66.
2 Rests, pan, No. 57.
1 Saw, meat, 15-inch blade.
1 Skimmer, small.
2 Spoons, small.
1 Steel, butcher's, 10-inch.

Note 7. ISSUE OF CLOTHING TO OFFICERS G. O. No. 7, Pars, 3, 4, H. A. E. F., 1918. Officers serving in the Zone of Advance before going into the trenches will be issued all articles of the enlisted men's uniform and equipment that they may require; when the duty in the treches is completed. Officers will return the articles so issued. Fatigue clothing may be issued to an officer enlisted men's woolen O. D. breeches or trousers, and woolen O. D. coats on occasions other than those mentioned in Par. 3 is prohibited.

Note 8. ORDNANCE EQUIPMENT FOR OFFICERS. Ordnance equipment required for use by officers will be procured under the provisions of Par. 11, G. O. No. 41, G. H. Q. A. E. F., March 14, 1918.

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UP DOD5200.30,
PARA d, 3a
1 Nov 1981.

EXHIBIT B-5

Proceedings of a Board of Officers convened pursuant to the following orders:

Headquarters, 18th Artillery Area
11 December 1918

Special Orders)
No. 10)

* * * * *

7. Pursuant to instructions contained in letter of Adjutant General, American Expeditionary Forces, dated December 7, 1918, file No. 15893-A 213, the following board of officers is convened in the 18th Trainng Area to make a complete study and report on the suitability and adequacy of all personnel and materiel as provided in Equipment Manuals for service in France and organization tables for Heavy Artillery Mobile Ordnance Repair Shop, Army Artillery. (Individual equipment of the soldier will not be included in the deliberations of this Board).

Detail for te board:

Col. M. A. Cross, C.A.C., 57th Artillery, C.A.C.
Col. Wm. H. Tobin, C.A.C., Army Artillery Park.
Lt. Col. T. A. Terry, C.A.C., 58th Artillery, C.A.C.
Capt. J. W. Doolittle, O.D. Hq., 31st Brigade, C.A.C.
2d Lt. Harry D. Murray, O.D., Army Artillery Park.

It is proposed to revise equipment manuals for service in France and organization tables based on experience gained in operations at the front. The Board should make its deliberations most thorough so as to cover entirely questions of personnel and materiel. When any changes are recommended full reasons should be given therefore, so that the officers undertaking final revision may have before them full information and reasons for recommendations and recommended changes.

Prior to the initial sitting the president of the above-named board will report the Commanding General 18th Training Area for further instructions.

Proceedings of this board shall be submitted in quadruplicate.

By command of Brigadier General Davis:

R. D. BROWN,
Major, C.A.C.,
Chief of Staff.

Official:
R. S. STEWART,
Captain, C.A.C.,
Adjutant.

Headquarters, 18th Artillery Area
11 December 1918

Special Orders)
No. 10)

* * * * *

8. Pursuant to instructions contained in letter of Adjutant General, American Expeditionary Forces, dated December 7, 1918, file No. 15993-A 213, the following board of officers is convened in the 18th Training Area to make a study and report on the suitability and adequacy of all personnel and materiel as provided in Equipment Manuals for service in France and organization tables for Army Artillery Park. (Individual equipment of the soldier will not be included in the deliberations of this board).

Detail for te board:

Col. M. A. Cross, C.A.C., 57th Artillery, C.A.C.
Col. Wm. H. Tobin, C.A.C., Army Artillery Park.
Lt. Col. T. A. Terry, C.A.C., 58th Artillery, C.A.C.
Capt. Frank Haag, C.A.C., Army Artillery Park.
Capt. J. W. Doolittle, O.D. Hq., 31st Brigade, C.A.C.
Capt. J. M. Harris, C.A.C., 55th Artillery, C.A.C.

It is proposed to revise equipment manuals for service in France and organization tables based on experience gained in operations at the front. The Board should make its deliberations most thorough so as to cover entirely questions of personnel and materiel. When any changes are recommended full reasons should be given therefore, so that the officers undertaking final revision may have before them full information and reasons for recommendations and recommended changes.

Prior to the initial sitting the president of the above-named board will report the Commanding General 18th Training Area for further instructions.

Proceedings of this board shall be submitted in quadruplicate.

By command of Brigadier General Davis:

R. D. BROWN,
Major, C.A.C.,
Chief of Staff.

Official:
R. S. STEWART,
Captain, C.A.C.,
Adjutant.

Blaise, France
December 18, 1918

Pursuant to the foregoing orders and to verbal instructions, the Boards met as one Board at 10:00 a.m.

Present: All the Members.

The Board then proceeded to study the suitability and adequacy of the personnel and materiel as provided in the equipment manuals and organization tables for the Army Artillery Park and the Mobile Ordnance Repair Shop, Army Artillery, and finds as follows:

Mobile Ordnance Repair Shop

The personnel as provided in Table 41, Mobile Ordnance Repair Shop (f), copy of which is attached hereto and marked "A," was found adequate and suitable.

The materiel as provided was in general suitable and adequate but the following changes in the equipment of the Trucks, Repair, O. D., are recommended for the reasons stated: Air tank and rivetting hammer; practically no work requiring the use of this device was encountered and it is recommended that it be eliminated from the equipment of the truck. Floor of truck is too high, causing truck to be top heavey.

Great need was felt for an adequate assortment of taps and dies, including metric and pipe up to 2-inch. It is recommended that such an assortment be included in the equipment of the truck.

The impossibility of securing spare parts for motor vehcles in sufficient amount rendered it necessary to make many small parts in the shop. It is recommended that the trucks be equipped with an ample supply of stock from 1/4-inch to 2-inch, and in short lengths.

It is also recommended that the truck be equpped with a large forge and with 50-feet of 2-inch chain, and 100-feet of electric light wire, heavy covered; an air compressor for pumping up the pneumatic counter-recoil cylinders of the guns should also be provided.

Army Artillery Park: Personnel.

The Army Artillery Park is of approximately the strength of a regiment of artillery and has the same need of a band as does a regiment in development of esprit and smartness.

The strength of the organization is such, and the importance of its work such that it should normally be commended by a colonel.

It is therefore recommended that Table 215, Army Artillery Park be amended as follows:

Line 2, column 1; strike out "Lieut. Colonel" and insert therefore "Colonel."

Line 24; immediately below this line insert line 24 1/2, and in column 1, the words "Band, all grades;" in column 2, the figures "49;" in column 11, the figures "49" and in column 16, the figures "49."

Line 25, column 2, strike out the figures "28" and insert the figures "77;" column 16 strike out the figures "1922" and insert the figures "1979."

Line 26, column 2, strike out the figures "32" and insert the figures "81;" column 11, strike out the figures "1889" and insert therefore "1938;" column 11, strike out the figures "1979" and insert the figures "2028."

Materiel:

Great difficulty was experienced in the maintenance and operation of trucks, due to the multiplicity of types greatly complicating the proccurement of spare parts and presenting difficulties in the training of drivers. Certain types of trucks presented difficulties peculiar to them; the four-wheel steer was difficult to handle on congested roads and the small ammunition body on certain trucks was too small and failed to provide protection from the weather for the driver and cargo. It is believd that wherever possible a standard truck, of proper specifications, should be used. Experience at the front with many varieties of trucks and under conditions of all kinds of roads, and weather conditions, has shown the desirability of the following features: Three-ton with cargo body flush with outside of wheels; four-wheel drive; front wheel steer; dual type rear tires; effective radiator shield; magneto ignition; single headlight pivoted on dash; 50-gallon gasoline tank with compartment for emergency reserve; lockers for drivers' personal effects and for tools; racks for pick and shovel; draw-bar at rear and 35-foot towing sling. It is recommended that all trucks for trains be of this type, and that line 31, column, be amended so as to omit "2-ton" and substitute therefore "3-ton." Also that line 32, column 2, be amended to insert between the words "Ration and Baggage" and "(O. D.)," the words "3-ton."

No trucks, supply, (O. D.), were funished and no opportunity was afforded to observe them under conditions at the front. It is believed however, that consideration should be given by th proper authorities as to whether or not it would be better to supply an eqivalent number of standard cargo trucks which would probably fulfill all the requirements of the supply trucks ad also be useful for other purposes.

The need of a suitable wrecking truck was greatly felt. Such a truck would be invaluable in recovering ditched or disabled trucks ad guns and in handling heavy materiel at the park. It is recommended that three five-ton wrecking trucks, with winch, cran with 10-ton chain hoist, gasoline and oil tanks, and sets of auto mechanics tools, be provided for the Park Headquarters to be used wherever necessary, and that the table be amended s follows:

Between lines 37 and 38 insert the following line: Column 1, the words "Trucks, wrecking, 5-ton, (O. D.); column 2, the figure "3;" column 11, the figure "3," and column 16, the figure "3."

There being no further business before it the Board at 10:00 p.m., December 23, 1918, adjourned, sine die.

(sgd) M. A. CROSS
Col, C.A.C.,
President

(sgd) J. M. HARRIS
Capt., C.A.C.,
Recorder

Headquarter 18th Training Area, January 12, 1919.

APPROVED.

(sgd) Wm. C. DAVIS
Brigadier General, U.S.A.,
Commanding

TABLE 215--ARMY ARTILLERY PARK
(Coast Artillery)
MAXIMUM STRENGTH

Confidential
SERIES C.

Corrected to May 22, 1918

1	2	3	4	5	6	7	8	9	10	12	13	14	15	16
		Motor Section				Depot Section (n)				Attached				
1 Units	Park HQ	1 Truck Company	6 Truck Companies	HQ	Total	1 Park Btry	3 Park Btries	HQ	Total	Total Park	Mobile Ord Repair Shop (q)	Ord Dept	Med Dept	Total	Aggregate
2 Colonel	1	...	...	..	...	...	...	..	...	1	..	.	..	..	1
3 Majors	..	...	...	1	1	...	...	1	1	2	..	.	1	1	3
4 Captains	31z	1	6	1	7	1	3	1	4	14	1				32
5 1st Lieutenants	..	1	6	..	6	2	6	..	6	12	1	.	..	1	13
6 2nd Lieutenants	..	1	6	..	6	2	6	..	6	12	1	.	..	1	13
7 Total Commissioned	4	3	18	3	21	5	15	3	18	43	3	.	3	6	49
8 Regimental Sergeants Major	1z2p	...	...	..	...	...	...	..	...	2	..	.	..	..	2
9 Ordnance Sergeants	..	...	...	..	...	...	...	..	...	....	7p	2p	..	9	9
10 Regimental Supply Sergeants	2p	...	...	1p	1	...	...	..	...	3	..	.	..	..	3
11 Battalion Sergeants Major	..	...	...	1p	1	...	...	1p	1	2	..	.	..	..	2
12 1st Sergeants	..	1p	6	..	6	1p	3	..	3	9	..	.	..	..	9
13 Sergeant, 1st Class	..	...	...	..	...	...	...	..	...	....	..	.	1	1	1
14 Mess Sergeants	..	1r	6	..	6	1r	3	..	3	9	..	.	..	..	9

1	2	3	4	5	6	7	8	9	10	12	13	14	15	16
	Motor Section					Depot Section (n)				Attached				
1 Units	Park HQ	1 Truck Company	6 Truck Companies	HQ	Total	1 Park Btry	3 Park Btries	HQ	Total	Total Park	Mobile Ord Repair Shop (q)	Ord Dept	Med Dept	Total	Aggregate
15 Supply Sergeants	..	1r	6	1r	7	1r	3	1r	4	11	..	.	..	..	11
16 Sergeants	az3p	b7r	42	a2r	44	15r	45	..	45	92	12p	.	3	15	107
17 Corporals	af4r	c17r	102	a2r	104	30r	90	f2r	92	200	10p	.	..	10	210
18 Cooks	o1p	3p	18	o1p	19	5p	15	o1p	16	36	2p	.	..	2	38
19 Chief Mechanics	..	1r	6	..	6	1r	3	..	3	9	..	.	..	..	9
20 Mechanics	..	...	...	..	...	4r	12	..	12	12	..	.	..	..	12
21 Wagoners	d2r	d33r	198	d6r	204	d2r	6	d1r	7	213	..	.	..	..	213
22 Buglers	..	2p	12	..	12	2p	6	..	6	..	6	18	..	..	18
23 Privates, 1st Class	e11r	e37r	222	e13r	235	79r	237	2r	239	485	3p63r	.	25	39	1269
24 Privates	3r	g43r	258	3r	261	159r	477	4r	481	745	3p85r	.			
24x Lines 24 1/2 "Bond all grades."	49									41					49
25 Total Enlisted	77	146	876	30	906	300	900	12	912	1895	45	2	29	76	1979
26 Aggregate	81	149	894	33	927	305	915	15	930	1438	48	2	32	82	2078
27 Ambulance, Motor (M. D.)	..	...	...	..	...	...	...	..	...	....	..	.	1	1	1
28 Cars, Motor, 5-passenger (Q. M. C.)	1	1	6	1	7	...	...	..	...	8	..	.	..	..	8
29 Kitchens, Rolling, Trailmobile (Q. M. C.)	..	1	6	..	6	2	6	..	6	12	1	.	.	1	13
30 Motorcycles with Side Cars (Q. M. C.)	9	4	24	7	31	15	45	..	45	85	6	.	5M	11	96
31 Trucks, Cargo, 3-ton (O. D.)	..	27	162	..	162	...	...	..	...	162	..	.	..	..	162

1	Units	2	3	4	5	6	7	8	9	10	12	13	14	15	16
		Motor Section					Depot Section (n)					Attached			
1		Park HQ	1 Truck Company	6 Truck Companies	HQ	Total	1 Park Btry	3 Park Btries	HQ	Total	Total Park	Mobile Ord Repair Shop (q)	Ord Dept	Med Dept	Total	Aggregate
32	Trucks, 3-ton (O. D.)	1	1	6	1	7	2	6	1	7	15	..	.	..	..	15
33	Trucks, Repair, Artillery (O. D.)	..	...	...	2	2	...	...	..	...	2	3	.	..	3	5
34	Trucks, Repair, Equipment (O. D.)	..	...	...	..	...	...	...	..	...	....	3	.	..	3	3
35	Trucks, Repair, Light (O. D.)	..	1	6	..	6	...	...	..	...	6	..	.	..	..	6
36	Trucks, Supply (O. D.)	..	...	...	2	2	...	...	..	...	2	6	.	..	6	8
37	Trucks, Tank (O. D.)	..	2	12	..	12	...	...	..	...	12	..	.	..	.	12
37a	Trucks, Wrecking (O. D.)	3										3				3
38	Pistols	12	9	54	6	60	13	39	5	44	116	40	2	..	34	158
39	Rifles	20	140	840	27	867	292	876	10	866	1773	8	.	..	8	1781

REMARKS

(a) 2 agents.
(b) 5 chiefs of sections, 1 expert mechanics and 1 assistant expert mechanic.
(c) 2 clerks, 2 assistant mechanics and 13 squad chiefs.
(d) Chauffeurs.
(e) Assistant Chauffeurs.
(f) 2 clerks.
(g) Ammunition servers.
(o) Officers' mess.
(p) Armed with a pistol.
(r) Armed with a rifle.
(z) Personnel detachment: 1 captain, 1 regimental sergeant major, 1 sergeant.
(M) Furnished by Medical Dept.
(n) Transportation for personnel to be furnished from Motor Section or by Reserve Army truck trains or by rail.
(q) Table 41, Series A, January 14, 1918.

GENERAL HEADQUARTERS AMERICAN EXPEDITIONARY FORCES

FIRST SECTION - GENERAL STAFF

10th December 1918

CHANGES IN TABLESOF ORGANIZATION

Table #215, Army Artillery Park (Table dated May 22, 1918)

	COLUMN	CHANGE	TO READ
	(3	2P	k2P
Line 22	(7	2P	k2P
	(		
	(12	3p63r	7p147r
Line 23	(15	39	47
	(16	1269	1277
	(12	45	53
Line 25	(15	76	84
	(16	1922	1930
	(12	48	56
Line 26	(15	82	90
	(16	1971	1979
	(12	6	2
Line 30	(15	1[illegible]	7
	(16	96	92
	(12	Insert 6	
Line 31	(15	Insert 6	
	(16	162	168
	(12	Insert 2	
Line 35	(15	Insert 2	
	(16	6	8
	(12	6	3
Line 36	(15	6	3
	(16	8	5
	(12	40	44
Line 38	(15	34	46
	(16	158	162
	(12	8	12
Line 39	(15	8	12
	(16	1781	1785

Column 17 - Add remark, k - 1 bugler, 1st class. Add Carts, water, trail-mobile, 3, to Hea iquarters Section and one to each Park Battery, Total 6.

TABLE 41. MOBILE ORDNANCE REPAIR SHOP (f)
Maximum and Minimum Strength

1	1 Units	2 Headqarters	3 Equipment Section	4 Machinery Section	5 Total
2	Captain	1	...	...	1
3	1st Lieutenant	1	...	...	1
4	2nd Lieutenant	1	...	...	1
5	Total Commissioned	3	...	...	3
6	Ordnance Sergeants	1p	3p	3p	7
7	Sergeants	g1p	a5p	b6p	12
8	Corporals	o2p	h5p	d3p	10
9	Cooks	2	...	...	2
10	Privates, 1st Class	...	3r	i3p	6
11	Privates	2r	3r	3	8
12	Total Enlisted	8	19	18	45
13	Aggregate	11	19	18	48
14	Motorcycles with Side Cars (Q.M.C.)	2	...	...	2
15	Kitchens, Rolling (Q.M.C.)	1e	...	...	1
16	Trucks, Ammunition (O.D.)	...	...	3	3
17	Trucks, Repair (O.D.)	...	.3.	3	6
18	Trucks, Repair, Light	2	...	...	2
19	Trucks, Supply (O.D.)	1	2	3	6
20	Pistols	7	13	15	35
21	Rifles	2	6	...	8

REMARKS:

(a) Two as chauffeurs and automobile mechanics, three as armorers or saddliers.

(b) Three as chauffeurs and automobile mechanics, tree sergeants as mechinists.

(c) One corporal as clerk, one corporal as chauffeur and automobile mechanic.

(d) Three corporals as chauffeurs and automobile mechanics.

(e) Trailmobile type.

(f) Attached to ammunition train.

(g) Mess and supply sergeant.

(h) Three corporals as chauffeurs and automobile mechanics, two corporals as armorers and saddliers.

(i) Three privates 1st class as chauffeurs and automobile mechanics.

(p) Armed wth pistol.

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PARA d, 3a
1 Nov 1981.

EXHIBIT B-6

Proceedings of a Board of Officers convened pursuant to the following orders:

Headquarters, 18th Artillery Area
11 December 1918

Special Orders)
No. 10)

* * * * *

12. Pursuant to instructions contained in letter of Adjutant General, American Expeditionary Forces, dated December 7, 1918, file No. 15893-A 213, the following board of officers is convened in the 18th Training Area to make a complete study and report on the suitability and adequacy of all personnel and materiel as provided in Equipment Manuals for service in France and organization tables for Ammunition Train, Army Artillery. (Individual equipment of the soldier will not be included in the deliberations of this Board).

Detail for the board:

Col. M. A. Cross, C.A.C., 57th Artillery, C.A.C.
Lt. Col. T. A. Terry, C.A.C., 58th Artillery, C.A.C.
Lt. Col. Henry F. Ayres, C.A.C., 53d Ammunition Train
Capt. A.M. Day, C.A.C., 52d Ammunition Train
Capt. J. W. Doolittle, O.D. Hq., 31st Brigade, C.A.C.
Capt. J.M. Harris, C.A.C., 55th Artillery, C.A.C.
Lt. L.H. Spooner, C.A.C., 52d Ammunition Train

It is proposed to revise equipment manuals for service in France and organization tables, based on experience gained in operations at the front. The Board should make its deliberations most thorough so as to cover entirely questions of personnel and materiel. When any changes are recommended full reasons should be given therefore, so that the officers undertaking final revision may have before them full information and reasons for recommendations and recommended changes.

Prior to the initial sitting the president of the above-named board will report the Commanding General 18th Training Area for further instructions.

Proceedings of this board shall be submitted in quadruplicate.

By command of Brigadier General Davis:

R. D. BROWN,
Major, C.A.C.,
Chief of Staff.

Official:
R. S. STEWART,
Captain, C.A.C.,
Adjutant.

Blaise, Hante-Marne, France
December 17, 1918

The Board met pursuant to the above order at 11:00 a.m. to-day.

Present: All members.

The Board then proceeded to study the suitability and adequacy of the personnel and materiel as provided in the equipment manuals and organization tables for Ammunition Train, Army Artillery.

The Board finds that the personnel prescribed in T. of O. No. 227, Series C., May 1, 1918 as modified October 24, 1918 and November 14, 1918, is in general adequate to the performance of the duties of an ammunition train, Army Artillery, except that the maintenance of the materiel was not sufficiently provided for. It is recommended that there be added to the personnel of the headquarters detachment for truck maintenance: One mechanical officer, 1st Lt., four machinists, two for each auto-machine shop, two sergeants and two corporals; two meachinists' helpers (corporals), (one for each auto-machine shop); four meachanics (corporals), on for each truck company; also that on corporal, already authorized, be classified as a blacksmith and acetylene welder.

It is recommended also that all corporals and twelve first-class privates of each truck company be trained as chauffeurs and that thirteen first-class privates and forth-five privates be trained as assistant chauffeurs. This will provide two crews per truck, rendering it possible to get the maximum use out of each truck and enabling the double crew to maintain their own trucks except as to major repairs.

For the administration of the train there should be added one personnel officer (1st Lt.) per Bulletin 22, G.H.Q., c.s., and one sergeant-major, jr.gr.

The ammunition train being an independent command and entitled to colors, one color sergeant should be added.

In order to facilitate training and discipline, it is recommended that one sergeant of te headquarters detachment in addition to his other duties, be designated as chief of drum corps and that six privates 1st class, of the headquarters detachment be designated as fifers, and seven privates of the headquarters detachment as drummers, including one as bass drummer.

It is recommended also that the following additional equipment be authorized:

One kitchen, rolling, trailmobile, for mess of Headquarters detachment.
Two trucks, wrecking, O.D.
One trailer for shop tent, and tent.
Four machine guns; on for each company and headquarters.

The conditions of service render it necessary for the headquarters detachment and officers, to mess separately, and a rolling kitchen is necessary.

The train should be equipped with two wrecking trucks for etting ditched trucks back on the road and for meeting other emergencies such as frequently arise under consitions at the front. These trucks should be fitted with winches, cranes and five-ton chain hoists and should be equipped with gasoline and oil tanks, tackle, and sets of auto-repair tools.

In order that repair work may go on in all weathers, shelter should be provided for th men making the repairs, as this work cannot be efficiently done in the open incold weather, with rain or smow. It is therefore recommended that a tent repair shop, capable of affording floor space for ten trucks be provided, together with a trailer for carrying it.

Ammunition trains were on numerous occasions subjected to hostile airplane fire, the planes descending to a low altitude and sweeping the train with machine-guns fire. A machine gun should be provided with each company to enable it to meet such attacks.

Certain of the equipment included in the present table could be improved by modifications.

The artillery repair trucks proved invaluable in maintaining the equipment, but should be fitted with special tools for the repair of motor vehicles, and should carry as a part of its equipment sets of auto-mechanic tools. It should then be designated as "Trucks, auto-repair, O.D."

The artillery supply trucks were not supplied and are not believed to be well suited for use with an ammunition train. It is recommended that it be replaced by a standard truck to be known as the "Auto spare parts truck," provided with suitable portable chests for spare parts.

The above recommended changes are incorporated in proposed table of organization attached hereto, (exhibit A), which table is recommended for adoption.

The ammunition truck with narrow body was not found desirable due to its small capacity and the lack of shelter for the driver and cargo. The four-wheel steer was found difficult to operate under consitions as they existed at the front. Trucks were frequently damaged by injury to the radiator; projecting hub caps wee knocked off, and specially wide body trucks formed an obstacle on narrow roads. The four-wheel drive was found advantageous, particularly on muddy roads. It is recommended that trucks be provided with four-wheel drive; front wheel steer; cargo bodies flush with the outside of the wheels; dual type rear tires; effective radiator shield; magneto ignition and lighting; single headlight pivoted on dash in addition to usual sidelights; 50-gallon gasoline tank with compartment for emergency reserve; lockers for drivers personal efects and tools; racks for pick and shovel; draw-bar at rear and 35-foot towing sling.

There being no further business before the Board it adjourned sine die at 9:30 p.m., December 21, 1918.

M. A. CROSS,
Col., C.A.C.,
President

JAMES M. HARRIS,
Capt., C.A.C.,
Recorder

Hq. 18th Training Area,
January 12, 1919

Approved:

Wm. C. Davis,
Brigadier General, U.S.A.,
Commanding

Table - Ammunition Train (Army Artillery) (g)
Revising table No. 227

Confidential

1	2	3	4	5	6	7
1 Units	1 Trucks Co.	Hqrs Co.	Med Dept.	4 Trucks Co's.	Total	Remarks
2 Major	1				1	(a) 5 chiefs of sections;
3 Captains	1	P(2)B	1	4	7	1 expert mechanic and
4 1st Lts.	1	K(2)M		4	6	1 assistant expert mechanic;
5 2d Lts	1			4	4	and 1 to perform duties of
6 Total Commissioned	3	5	1	12	18	chief mechanic, Field Art'y.
7 Sgt. Maj., jr. gr. (p)		1			1	(b) Officers' mess.
8 Sgt. Maj., jr. gr. (q)		1			1	(c) Chauffeur.
9 Sgt. Maj., jr. gr. (s)		1			1	(d) Drummers; fifers.
10 Color sergeants		1x			1	(e) 2 clerks; 2 assistant
11 1st Sergeants	1			4	4	mechanics; 13 squad chiefs.
12 Sgt., 1 cl., M.D.			1		1	(g) Fr each 6-inch and
13 Mess Sergeants (r)	1			4	4	heavy howitzer brigade.
14 Supply Sergeants (r)	1	1		4	5	(k) Assistant Chauffeur.
15 Segeants (r)	8a	1x(5)3z 1dx	1	32	38	(o) Par.V., G.O. #150, W.D. 1917.
16 Corporals (r)	f17c	(10)6vc 1t 2yc		68	78	(p) Performs duties of regtl. supply sergeant.
17 Cooks	3	b1		12	13	(q) Performs duties of
18 Wagoners (o) (r)	c30	c5		120	125	Bn. Sgt. Ma., Field Art'y.
19 Buglers	2			8	8	(r) Armed with rifle all
20 Privates, 1cl. (r)	(25)13k 12c	(7)6d 1c	6	100	113	others with pistol.
21 Privates (r)	(58)45k	7d(10)5K	6	232	246	(s) Personnel Department.
22 Total Enlisted	146	43	12	584	639	(t) Blacksmith.
23 AGGREGATE	149	48	13	496	657	(v) Shop repair Cpls.
24 Motor cars, 5-pass.	1	1		4	5	(x) Machinists.
25 Kitchens, rolling, trail mobile	1	1		4	5	(y) Machinists helper.
26 Motorcycles (side cars)	4	7	2	16	25	(z) Shop repair Sgts.
27 Trucks, Amm. (3-ton) O.D.	28	1		112	113	(B) Battalion adjutant.
28 Trucks, auto, machine shop, O.D.		2			2	(K) Unit supply officer.
29 Trucks, auto, spare parts, O.D.		2			2	(M) Mechanical officer.
30 Trucks, light service, O.D.	1			4	4	(P) Personnel adjutant.
31 Trucks, wrecking, O.D.		2			2	
32 Trucks, tank, O.D.	2			8	8	
33 Ambulance			1		1	
34 Trailer, shop tent		1			1	

	1	2	3	4	5	6	7
1	Units	1			4		Remarks
		Trucks Co.	Hqrs Co.	Med Dept.	Trucks Co's.	Total	
35	Pistols	9	10		36	46	
36	Rifles	140	38		580	598	
37	Machine guns	1	1		4	5	

"A"

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Para. 3a,
1 Nov 1981

TABLE 227. AMMUNITION TRAIN

(Army Artillery)[8]

(Personnel from Coast Artillery Corps)

Maximum and Minimum Strength

1	2	3	4	5	6
1 Units	1 Trucks Co.	Hqrs	4 Trucks Co.	Total	Remarks
2 Major	.....	1	.....	1	a 5 chiefs of sections, 1 expert mechanic, 1 assistant mechanic, and 1 to perform duties of chief mechanic, Field Art'y.
3 Captains	1	1B	4	5	
4 First Lieutenants	1	1	4	5	
5 Second Lieutenants	1	.....	4	4	
6 Total Commissioned	3	3	12	15	
7 Sergeant major, junior grade p	.....	1	.....	1	b Officers' mess.
8 Sergeant major, junior grade q	.....	1	.....	1	c Chauffeur.
9 First sergeants	1	.....	4	4	f 2 clerks, 2 assistant mechanics, 13 squad chiefs.
10 Mess sergeants	1r	.....	4	4	
11 Supply sergeants	1r	1	4	5	g For each 155mm gun and heavy howitzer brigade.
12 Sergeants	a8r	*3r	32	35	
13 Corporals	f17r	2r	68	70	k Assistant chauffeur.
14 Cooks	3	1b	12	13	o Sec. V, G.O. 150, W.D., 1917.
15 Wagoners o	o30r	e5r	120	125	
16 Buglers	2	.....	8	8	p Performs duties of regimental supply sergeant.
17 Private, first class	r252c	r71o	100	107	
18 Privates	r5830k	r10k	232	242	q Performs duties of battalion sergeant, Field Artillery.
19 Total Enlisted	146	31	584	615	
20 Aggregate	149	34	596	630	r Armed with rifle all others with pistol.
21 Cars, motor, 5-passenger (Q.M.C.)	1	1	4	5	
22 Kitchens, rolling, trail (Q.M.C.)	1	.....	4	4	w Carries rations and baggage.
23 Motorcycles with side cars (Q.M.C.)	4	7	16	23	z Includes 1 personnel sergeant.
24 Trucks, ammunition (O.D.)	281w	1w	112	113	B Battalion Adjutant.
25 Trucks, artillery, repair (O.D.)	.....	2	.....	2	Note. For light repair trucks and motor cars, 1 private, first class, as chauffeur. For ammunition, supply, tank ad artillery repair trucks, 1 wagoner as chauffeur and 1 private as
26 Trucks, artillery, supply (O.D.)	.....	2	.....	2	
27 Trucks, repair, light (O.D.)	1	.....	4	4	
28 Trucks, tank (O.D.)	2	.....	8	8	

1		2	3	4	5	6
1	Units	1 Trucks Co.	Hqrs	4 Trucks Co.	Total	Remarks
29	Pistols	9	6	36	42	assistant chauffeur.
30	Rifles	140	28	530	588	

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1 Nov 1981

WAR DEPARTMENT
Washington

October 24, 1918

CIRCULAR

Table No. 227, Series G. is ammended by the addition of the following medical personnel and equipment:

1	Captain or 1st Lieutenant
1	Sergeant, 1st Class
1	Sergeant
12	Privates, 1st Class or Privates
1	Motor ambulance
2	Motorcycles with side cars,

to each Ammunition Train (Army Artillery), organized under Tables of Organization No. 227, Series C, as ammended.

(320.2 A.G.O.)

By order of te Secretary of War:

PEYTON C. MARCH,
General, Chief of staff

OFFICIAL:

P. C. HARRIS,
The Adjutant General

Add 2 water carts, trailmobile, 180 gallon to headquarters. (W.D. change November 14, 1918).

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1 Nov 1981

ANNEX L

Recommendation of Artillery Officers
American E. F.

I. Organization

(a) General

FUTURE RELATION OF FIELD ARTILLERY AND
COAST ARTILLERY CORPS

FUTURE RELATION OF FIELD ARTILLERY AND COAST ARTILLERY CORPS

(1) I believe that the future relations of the Coast Artillery Corps and the Field Artillery should be as at present - those of separate arms.

During the war it has been demonstrated that the Coast Artillery Officer, while in many cases thoroughly capable of handling te heavier typs of artillery, is not well qualified for the duties of light artillery commander. This would include the command of Divisional Artillery, Corps Artillery and Mobile Types of army artillery.

It is also a fact, within our won experience, that neither the Coast Artillery nor the Field Artillery, and more especially the latter, made any advance towards a high state of efficiency until after the separation of 1907.

If we are to profit by our own experience the two army must remain separate, D. E. Aultman, Brigadier Genera, Army Artillery, 2nd Army.

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(1) The functions of the Field Artillery and the Coast Artillery have little in common, though they were more nearly on common ground in the trench warfare tan is likely to occur again. It might be appropriate however, for the Coast Artillery to have some training in heavy field guns such as the C.F.F. and those of larger cabibres, E.S. Babbitt, Brigadier General, 4th Brigade.

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(1) As the result of the war, we regard the artillery from a new standpoint. It is not unreasonable to believe that few if any guns, of any calibres will be hereafter mounted on any but mobile carriages. Our existing installments of sea Coast Mortars are as a rule well plced for future contingencies and can be ued as heretofore up to their limiting ranges, but future improved weapons, mortars or guns will, I believe, he made mobile.

(2) A wide rnages of calibres, fromthe 37mm to the 14-inch or larger, has been employed in active field operations. The training of artillerymen in their use, from 3-inch up, begins with principles of gunnery common to all calibres and officers a.d men competent to hndle any one of them can seen be made competent to handle ay other. It is my belief that there is now no more reason for the present division of Artillery in our way Coast and Field - than a further subdivision based on cabibres, or means of traction or localities where used.

The ideal organization would be an arm that includes all guns, except the smallest, which are necessary infantry weapons.

(3) The principal and indeed the only objection to this worth serious consideratin is the effect on the existing personnel of the Regular Army in making the reorganization.

The war has brought the Artillery and Infantry in close contact: each realizes his dependence on the other and the best of feeling and some affection has grown up where the guns have helped the muskets to go forward and have kept them htere. This is so, even with the unwieldy ones of large calibre, where they would be employed. Likewise, when all calibres could work for a common end there has been a common interest and liking in the Artillery itself.

Numerous officers heretofore trained in other work have undertaken the command of artillery of all kinds, and succeeded in it. The field artillery regiments and brigades have been successfully commanded by Coast Artillerymen.

(4) As the result of an extended experience I am convinced that all the friction between the various arms heretofore has been due to inequality ofpromotion and that if this can disappear there will go with it practically all objections to nay rearrangement of duties in the Artiller as well as any proper increase in numberical strength of any arm whatever over any other. And until this can be done there will be such hostility on the part of so many affected that the best of proposed measures will be doomed to serious modifications or failure.

(5) I believe that not only should the existing organizations of Field and Coast Artillery be consolidated and all the officers placed on a single list arranged according to length of commissioned service but that this single list should incude every line officer in the service. There is no insurmountable objection to this. Officers can be commissioned and assigned to the arm for which they are best fitted and retained therein. When promoted they can remain in their arm, detached from that in which the vacancy occures until a vacancy occurs tat will keep them in the former.

(6) It is true that there will be discontent among tose who have already hd promotion over others of longer commissioned service, but, in the first place, more will be venefitted than hurt, and in the second we are building for the future; present irregularities will disappear and eventually a system obtained where absolute equity wll pevial and discontent disappear.

No one should be domoted, if the single list comes in; present rank being retained and officers carried as supernumary members until again promoted.

(7) I therefore, recommend that in any Army Reorganization the artillery be made one arm and that a single list be adopted for all linc officers. - C. J. Bailey, Major General, 81st Division.

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The Field Artillery and the Coast Artillery (per se) have nothing in common. They are both called artillery and they both shoot cannon, but from this point on their paths are absolutely divergent. The Field Artillery hs everything in common with Infantry and Cavalry, nothing in common with the Coast Artillery. This naturally follows from the duties assigned by law to each of these arms.

Their methods of shooting are diametrically opposed and training and skillfulness in one method unfits the individual for training and skillfulness in the other.

Long service with guns on fixed mounts in concrete emplacements under strictly defensive conditions unfits a man for aggressive action under field conditions and creates a physical and mental condition that shortly becomes chrionic. A good coast artilleryman cannont be a good field artilleryman, and vice versa. This was appreciated long before the separation of the arms in 1907. Every artillery officer of any length of service before that date was either a coast or a field artilleryman despite the unison of the arms. If temporarily assigned out of his pew he was discontented and inefficient.

The functions of the two branches have not changed since. They have nothing in common except the red facings of their uniforms. No change in their relations recommended. H. G. Bishop, Brigader General, 3rd F.A. Brigade.

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Complete divorce. The C.A.C. and F.A. were separated in 1907 for good and sufficient reasons. These reasons will be found in the numerous reports of the Chief of Artillery prior to the year of separation. They still hold good. The general training at seacoast fortifications totally unfits the coast artilleryman for duty in the field. He lacks mobility and

knowledge of transport; he lacks adaptability to the rough and changing conditions of the field. - A. J. Bowley, Brigadier General, 6th Corps Art'y.

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(1) - They should be separate organizations. They require separate training. If it is deemed wise to have a corps of Artillerymen trained in the use of the heavier calibres which go into the field, then they should be organized and trained as such in time of peace and their functions and uses studied. - H. W. Butner, Brigadier General, 1st Brigade.

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I think nothing will be gained by combining the coast and the field artillery services into one corps but I do believe in a Chief of Artillery with two bureaus under him, one for coast artillery and one for field artillery. In this way the whole range of artillery matters will be covered with much benefit to the Government and increased efficiency for the two artillery branches. - R. E. Callan, Brigadier General, 33rd Brigade.

Have neither seen or heard anything during this war to cause me to think that there should be any change in the relations of the F.A. and C.A.C. - Tilman Campbell, Colonel, 329th Field Artillery.

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F.A. and C.A.C. should be separated certainly as far as the permanent assignment of personnel is concerned.

All armament involved in Coast Defense proper and larte calibers for use in special missions to the Coast Artillery.

All armament used in the accomplishment of Normal Corps and Divisional missions to the F.A.

There shall be one Chief of Coast Artillery and one Chief of Field Artillery.

The development and use of artillery in this war has warranted the organization of all artillery except the 37 m.m or similar small infantry weapons into one arm. The heaviest calibers are now mounted on mobile carriages and have been used with the Armies in the Field. There seems to be no more reason for the division of artillery into separate arms, Coast and Field artillery, than into Heavy and Light artillery.

It is our belief that it will be more economical and give greater efficiency to consolidate the present Coast and Field Artillery arms into one arm, under a Chief of Artillery with the necessary assistants as was done in the A.E.F. That artillery officers be assigned to duties with that caliber or kind of artillery for which they are best suited. - Army Center of Artillery Studies.

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(1) Future relation of the C.A.C. and F.A.

1. Believe that past and present relations between C.A.C. and F.A. have produced only unfortunate results. In my opinion the services should be combined and all officers trained in field work.

2. Organizations manned by personnel from the Field Artillery but armed and serving as heavy artillery should have the benefit of the advanced grades and additional pay statuses that the C.A.C. enjoy. - A. S. Conklin, Colonel, 303rd Field Artillery.

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The C.A.C. and F.A. are distinctive branches of the service and should not be combined. - A. L. Cox, Colonel, 113th Field Artillery.

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It is not believed in the interest of the military establishment to combine the field and coast artillery.

The thorough development of light artillery service to its maximum efficiency is the natural problem for our Field Artillery -

The thorough development of heavy artillery for coast or land warfare is the natural problem for our Coast Artillery -

And the two artillery services we now have will have plenty to do in working out their separate problems as now organized, and in my opinion, better net results will ensue from this course. - A. Cronkhite, Major General, 6th Corps Artillery.

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The future relation of C.A.AC. and F.A. should be the same as that immediately before the war. There seems to be little enough in common with the Coast Defense and Field Artillery. While Coast Artillery may be properly assigned to Corps and Army Artillery of the heaviest calibers, it would seem far better that it does not find any place in the Divisional Artillery. To have an officer serve efficiently in both C.A.C. and F.A. is not usually possible as the professions are so broad and specialty in one or the other would produce, probably, a very mediocre officer for general value; whereas, at present, there is opportunity to become an officer of general value for aprticular service in either of the two services. Further, it is hardly conceivable that th type of officer who would do best in a mining casement would also excel in mobile combat. - Clarence Deems, Colone, 57th Brigade.

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(1) It is believed that the coast artillery and field artillery should be separate and distnat. The field Artillery should comprise all 75 regiments and 155 short. The past experience of an artillery corps embracing both the field and coast artillery as now organized is sufficient argument against a resumption of the former organization. - W. H. Dodds,Jr., Colonel, 6th Field Arty.

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As this is a day of specialization, it is believed that each arm should remain separated, as each is a highly specialized arm. It is believed that all coast artillery officers could very well be used in the field artillery again, in case of suddent expansion to a war footing, and that their present training is such as to allow amply grounds for absorbing the purely technical needs of artillery. The tactical use of artillery would of course, require considerable time to assimilate, as also the habit of automatically conducting open warfare problems, but they should learn this latter nearly as quickly as the personnel could be trained. - F. C. Doyle, Colonel, 305th Field Artillery.

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In certain of their phases, the Coast Artillery and the Field Artillery services approach each other. In other phases, they are at exactly opposite ends of the same line.

There is ample work for the Field Artillery service in developing to its ultimate efficiency light artillery in all its phases.

There is likewise ample work for the Coast Artillery in developing the service of long-range guns, both fixed and movable, in all their phases.

The long-range movable guns are very appropriately the secondary guns for coast defense, to be used in supplementing the high-power fixed guns at all of our important harbors and in providing the defense of the less important harbors which do not warrant the installation of the high-power fixed guns.

It is believed that the best interests of the service will be subserved by having these two branches work at their problems with proper liaison, rather than as one service.

There is no reason why officers developed in the two services may not be used in war without conflict or overlapping of function and without crimination and recrimination. - R. P. Davis, Brigadier General, 151st Brigade.

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I think they had best be separated entirely and have it made possible to detach them for service with Navy or Marines when needed. - R. H. Dunlap, Colonel, 17th Field Artillery.

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It is believed that the uses of the various calibers and mounts of artillery, as well as the methods employed, will blend so gradually together that it will be difficult, if not impossible, to differentiate between the two branches. The two should be combined in one. - Ira A. Haynes, Brigadier General, 64th F. A. Brigade.

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Unless this be done for the purpose of having a "Single List" for promotion, in which case it should include all the officers of the line and staff except the Medical Department, and Chaplains, the Philipine Scouts, the Dental Corps and Veterinarians, it is believed the consolidation would be a step backward. For years the separation of the Field and Coast Artillery was advocated; the reasons are given in the annual reports of the Secretary of War and of the Chief of Artillery for years prior to 1906 - it is unnecessary to repeat them here. They were good and they apply today, just as forcibly, in my opinion, as they did years ago. Why tear down the structure it took us so many years to build? There are just as great similarities and as great differences to be found in the two arms as there were before they were separated. It is believed tht our Coast Artillery is the best in the world today, but our experiences in this war have not shown that Coast Artillery training has fitted them particularly well in general for Field Artillery duty. Even if for purposes of obtaining equality of promotion a "Single List" should be adopted, it should not mean a consolidation of the two branches. Our officers should still be assigned to one or the other and remain with the branch to which they are assigned except for short periods during which they might be attached to the other in order to get a general idea of the capabilities and the limitations of that branch. Officers must specialize even within the arms as now organized. We can not make jacks-of-all-trades of them. For these reasons we need specialists to supervise, direct and develop each arm - Chiefs of Infantry, Field Artillery, avalry, Coast Artillery, Air Service, etc., call them inspectors if you will - their duties should be the same no matter what may be their designations. - Ernest Hinds, Major General, C. of A.A.E.F.

(1) The F.A. is a part of the mobile army.

The C.A.C. is a part of the immobile army and it is believed that their relations should remain as they have been. In time of war, armies do become immobilized, seiges are conducted and all the warlike resources of governments are used. It is believed that light seige guns can accompany corps troops and should be a part of the mobile army, but there seems no more reason that the F.A. and C.A.C. should now be combined than that the Marines and the U.S. Infantry should be combined. A rotation of service by officers, as alluded to in "i" would seem to be a proper solution. - T. N. Horn, Brigadier General, 7th Brigade.

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The future relation of the C.A.C. and the Field Artillery should remain as it is at present, separate and distinct branches of the service. All divisional artillery, all the corps artillery and all the army artillery of 6 inch caliber and under should pertain to the Field Artillery. All army artillery of above 6 inch caliber should pertain to the C.A.C. These larger calibers would be useful in our coast defenses and the Coast Artillery has nneded heavy railway guns and heavy tractor drawn howitzers and mortars for a long time. This would economize in materiel since the materiel could be used at any threatened point. The mobile army in the future as in the past should consist of infantry, cavalry and field artillery. - J. T. Kennedy, Lieutenant Colonel, 5th Field Artillery.

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The coast artillery, organized and trained for the purpose of the defense of our harbors, has no tactical relationship whatever to the field artillery. There should be no future relation between them, but the entire artillery should be organized not upon a question of calibers or mobility but upon a question of duties. The field artillery is the artillery which accompanies an army into the field. The fact that the coast artillery and officers and men which could be spared from harbor defense were used as field artillery indicates no relation between the coast artillery and the field artillery any more than there is a relation between the field artillery and the cavalry, or with the civil population of the United States which furnished most of the field artillery used in France. The fact that the harbor defense artillery could be used as field artillery under certain circumstances, does not permit of their being considered available as a part of the mobile army. In our wars heretofore, for one reason or another, we have been able to use our harbor defense troops as field artillery and infantry. While they may always be considered as possibilities for duty with field armies, they should not be included so as to replace in any way a full quota of mobile troops, about which there is no doubt as to their ability to go anywhere.

The artillery should be divided into two branches, separate and distinct, based upon their entirely different duties - one should be the harbor defense artillery, whose duty is to guard our harbors; the other, the field artillery, whose duty it is to accompany our armies into the field. The defense of our coasts cannot be turned over to one branch. It must be the duty of the mobile army. In the reorganization along these lines, transfers should be permitted from the coast artillery to the field artillery, and vice versa, up to a certain time, when further transfers will cease. At this time, efforts should be made as far as possible to make an equality of promotions through out, although it is doubtful whether any scheme can be devised by which 25 percent of the officers effected will be satisfied. - A. McIntyre, Brigadier General, 154th Brigade.

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(1) The C.A.C. and F.A. are fundamentally one service. Under modern conditions of warfare the C.A. is only one application of F.A. methods. When heavy artillery reaches the

present development of making important corrections for the earth's rotation all Coast Artillery claims of technical mystery appear absurd. - D. McKell, Colonel, 12th Field Artillery.

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Complete separation of Field and Coast as at present. The Coast Artillery will always be of great value as Army Artillery and Corps Artillery if the latter is considered necessary. - R. H. McMaster, Colonel, 21st Field Artillery.

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1. The Field Artillery and Coast Artillery should be combined. Field Artillery methods today and in the future is closely allied to Coast Artillery practice, and neither is so intricate but that progressive officers cannot learn both. Officers can be detailed in either army, as was done before the separation, depending on their preference or necessity. In any case Coast Artillery officers can keep up on Field Artillery practice so as to be ready for the field at any time. W. F. Platt, Colonel, 302nd Field Artillery.

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I believe the C.A.C. and the F.A. should be made into one body, instead of two, since I can see no clear line of demarkation between them, and believe that very much of the success which we have had in the present war is due to the fact that the higher officers of each have, at one time or another, been trained in both. What form this reuniting is to take, I am not prepared to state, but believe it could be made satisfactorily. Of course, the question of promotions has always been difficult in a thing of this kind, but some sacrifices will undoubtedly be necessary in order that the needs of the service might be met to best advantage. - W. R. Smith, Major General, 36th Division.

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There should be but one artillery service as there was previous to 1907. The principles governing the shooting are the same, those governing mobility are, of course, different, but all artillery officers should serve in both branches of light and heavy. There will never be a war in which an expansion of personnel will not be tremendous, previous service with all classes of artillery will produce a larger body of artillerymen on which to base expansion. - F. W. Stopford, Colonel, 80th Field Artillery.

The relations between the C.A.C. and the F.A. should continue as they have been in the past. They were shown to be best for peace conditions and they have admirably adapted themselves to war conditions. There should be a Chief of Field Artillery inthe War Department as at present constituted as well as a Chief of Coast Artillery. Their functions cannot be successrully combined under one head and our efficiency will suffer greatly if the two arms are united. - C. P. Summerall, Major General, 5th Corps.

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For some years it has been evident to many Coast Artillery Officers that a large proportion of the armament of coast defenses should be mobile and also that owing to the development of mechanical motive power there was no limit to the caliber of the guns that could be made mobile. It was also considered that owing to their knowledge of civil, mechanical, steam and electrical engineering and also to their knowledge of interior and exterior ballistics and of all methods of fire control, the personnel of the Coast Artillery Corps were fully competent to man the mobile armement when mechanical means of transport were used.

It is believed that efficient service has been performed by Coast Artillery personnel with tractor drawn heavyfield guns in operations in France.

The most difficult problem of the Coast Artilleryman is due to the fact that his target moves in varying directions and at varying speeds. A Coast Artilleryman must also have a thorough knowledge of naval construction, naval tactics, strength of armour and penetrating power of projectiles. When engaged, however, against field forces his target is in general stationary and consists of either personnel or materiel, the resisting power of which is easily learned and consequently his problem is more simple.

His training gives him all the knowledge of a field artilleryman except that which is required for the proper care and handling of animals. There is no logical reason for coast artillerymen not doing good work in the field when mechanical motive power is used.

As the necessity arose of making coast artillery armament mobile an increase was being made in the calibers of the guns assigned to the field artillery, until there was an overlapping of the calibers assigned to each branch of the service. Moreover many of the methods of fire control and fire direction developed in this war by the Field Artillery of the different armies are similar to the methods practiced by the U.S. Coast Artillery for the past fifteen years. In other words the line of demarcation between the two branches was based principally upon the want of knowledge of the care and handling of animals on the one hand and the want of knowledge of mechanical, steam and electrical engineering on the other.

There will always be one set of officers better adapted, owing to their scientific attainments and dislike of horses, to the service of the immobile coast artillery guns, submarine mine fields, power plants, search lights, etc. Another set of officers, who from their liking for horses, desire for a more out of door life and their dislike or inability to solve problems of mechanical, steam or electrical engineering will prefer service with horse drawn guns; and lastly a third set of officers who are able to render efficient service with either what was formerly termed Field Artillery or the Coast Artillery.

Again, as soon as the command of the sea is secured in any future war, a personnel as highly trained and as highly disciplined as the Coast Artillery Corps will not be retained in its full strength in sea coast defenses. Its officers and enlisted men will be required for field duty as in this war. They should therefore be so organized and trained that they can go into the field without dislocation; that is, their training should include the methods of the Field Artillery arm.

The employment of Coast Artillery troops with the mobile arm as in this war was foreseen a number of years ago by many Coast Artillery officers. It was also foreseen that if no employed Coast Artillery personnel would act as assistants to the other arm; that is, in a subordinate capacity, notwithstanding the comparative records of officers of the two arms from the time they became 4th classmen at the Academy or from the time they became 2nd Lieutenants.

The more the sugject is studied the more difficult, it is believed, will be the establishment of a distinct line of separation between the two branches of artillery.

It is submitted that some form of amalgamation is inevibable. - H. D. Todd, Jr., Brigadier General, 56th Brigade.

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A consolidation of C.A.C. and F.A. seems advisable. All artillery of whatever calibre should be made mobile (a) to effect concealment (b) to permit of the occupation of alternati positions (c) to increase its sphere of activity. - J. F. Walker, Colonel, 314th Field Artillery.

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1. While not prepared to recommend a consolidation of the C.A.C. and F.A., I do recommend very strongly a closer cooperation between the two branches. Both services have derived great benefit from the close association brought about by the recent system of detail of artillery officers to the F.A. National Army, and the combining of the two systems of firing.

In the event the two services are not consolidated it is thought that the detail of officers from one branch to the other for limited periods, to study the methods, experiments and improvements of both would prove beneficial. Try "to get together" to eliminate friction and petty jealousies. A system providing for equal promotion would go far towards bringing this about.

The C.A.C. to handle only tractorized units 6" or above. The F.A. to handle all units horsed or tractorized below 6". - G. L. Wertenbaker, Colonel, 345th Field Artillery.

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I believe that the Coast Artillery Corps and the Field Artillery should be combined in one arm. This war has shown that there is practically no difference in artillery, and the line of demarcation coming between smaller calibres and the higher calibres, is very hard to fix. With Field Artillery becoming more and more motorized, there is no difference between it and the heavier motorized artillery, except in its weight, and on good roads one can move as freely as the other. In fact, the calibres now grade one within the other. I do not believe that it is a good idea to detach officers from one arm to serve with the other, and I recommend that this practise be discontinued for reasons that I would not care to state here. In case the C.A.C. and the F.A. are not recombined and made one arm, I think that the line of demarcation between the two services should be made perfectly clear and distinct. I think that all field artillery should be divisional artillery, and that coast artillery officers should not be assigned to command the heavy regiments in the division. The Coast Artillery should command the Corps, Army and Railroad Artillery, and should be an entirely separate and distinct proposition. In combining the two arms when they are separated as they are now, it is bound to engender betterness and jealousy, due to the question of promotions, which, in my opinion, is the foundation of many troubles in the army. - C. D. Winn, Colonel, 306th Field Artillery.

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<u>I recommend consolidation of all Artillery</u>.

Attention is invited to page 12, Cont. pamphlet 800, entitled "Artillery Firing." This book emphasizes the need of all Artillery being one arm. Artillery uses at one time principles of snap firing and at another fire with all possible theoritical corrections.

There can be no question that our C.A.C. has run wholly to position firing - such training as we have had the last 10 years has developed defensive feelings - For war we must have offensive training. This one point of view accounts for many excellent C.A.C. officers who have not "made good" in this war.

The C.A.C. officer and the F.A. officer have much in common and must develope along lines at least kindred and crossing.

There should be one Chief of Artillery, under him may come light and heavy field and fixed artillery, but exchange for qualified officers must be allowed. Our old permanent fixed guns must go - No more be built - Tractor and R.R. Guns can take their plce - All officers must be qualified to concentrate guns of all calibers at threatened point and fire effectively by any means at hand.

One list for all Army officers.

The curse of the service in times past has been the jealousy of our branch of the service for another. The basis of the jealousy has been promotion (and its consequent pay increase).

I have profitted by C.A.C. promotion, but am willing to lose now if by such sacrifice we can affect before Congress Military Organization and plans for the "real good of the service."

I recommend:

A single list for all officers (Engineers, Doctors, etc, included).

An elimination of incompetent officers - and a strict one - This to include imcompatible officers as well as incompetent.

I oppose promotion by selection (altho I have profitted thereby) because so far our systems of promotion by selection have been very often, the net always, promotion by personal acquaintance.

The reserve officers of this war commend the efficient regular officers for their magnificient work, but damn the incompetents and the system which lets them live.
- P. H. Horcester, Colonel, 148th Field Artillery.

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A D D E N D U M

To

ANNEX 1

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Recommendations of Artillery Officers,

American E.F.

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FUTURE RELATION OF FIELD ARTILLERY

and

COAST ARTILLERY CORPS

- - - - -

Received Subsequent to the Dissolution of the

Board

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It is recommendd that the coast defense guns of the U.S. be turned over to the Navy Department and the Coast Artillery Corps abolished. The mobile artillery of the army should be reorganized under one chief of artillery but with several distinct and separate branches such as Railroad Artillery, Tractor Drawn Artillery, Horse drawn artillery, anti-aircraft artillery and trench mortar service. - P. D. Glassford, Brigadier General, 51st F. A. Brigade.

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1. Tere is no question in my mind that the future relations of the C.A.C. and the F.A. should be much closer than has existed for the past 12 years. One of the important lessons learned in this war is that guns mounted in vixed emplacements cannot by themselves successfully resist concentrated attacks by high powered artillery. They must be at least supplementsed by high powered guns on mobile mounts.

2. The defense of seacoast harbors involves the employment of all calibres, including those used by the Field Artillery. I do not believe that our permanent mounts, providing stable emplacements which afford quick laying, ease of ammunition supply, the firing with great rapidity and great accuracy on fast moving targets should be discarded. Our present fortifications as now constructed can serve a useful and necessary purpose and should be retained by armanment capable of the greatest mobility. The policy of our government has been clearly and frequently indicated by the employment of Coast Artillery troops with the mobile army, as soon as it was evident that our country was secure from hostile naval attack. In every case where Coast Artillery troops have been so employed, they have entered upon their new duties considerably handicapped from lack of training for their new duties considerably handicapped from lack of training for their new duties considerably handicapped from lack of training for their new mission. It appears to me that every consideration of economy, preparedness, and efficiency demands a consolidation of these two arms. The only objection that I can see that might be offered is one that relates entirely to the personnel, that of promotion of officers, which is entirely to the personnel, that of promotion of officers, which is entirely capable of being equitably adjusted. - C. C. Hearn, Brigadier General, 153rd F. A. Brigade.

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The relations between the Coast Artillery Corps and the 53rd F. A. Brigade were maintained in the most cordial manner, and both Corps and Army Artillery promptly and effectively responded when and as called upon for support, and it would seem that the Corps Artillery, but especially the Army Artillery, should be considered the work of the Coast Artillery Corps, and the ordnance and caterpillar tractors of the Corps and Army Artillery might well be maintained in times of peace at or in the immediate vicinity of Coast Artillery stations, so that the training of the Army and Corps Artillery might be kept apace with that of the Coast Artillery and by the same personnel. W. G. Price, Jr., Brig. General, 53rd F. A. Brigade.

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WAR DEPARTMENT
OFFICE OF THE CHIEF OF STAFF
WASHINGTON

IN REPLY REFER TO
CHIEF OF FIELD ARTILLERY
STATE, WAR, AND NAVY BUILDING
WASHINGTON, D. C.

December 27, 1918

Major General Ernest Hinds,
Chief of Artillery,
A. P. O. 706,
American Expeditionary Forces,
France

My dear Hinds:

I asked DeArmond to get up a letter for you to go by the courier leaving tomorrow. DeArmond is, however, absent on leave, as is most everybody else around the office, so that I have no idea what he has gotten up. As, however, I remember that in your last letter you asked for a list of regular army Field Artilleryman, I enclose such a list. This list, according to the Adjutant General, contains all permanent promotions under existing regulations.

During the holidays things are rather slow around the War Department. The principal items of interest at present, however, are the following:

1. Secretary Baker has asked Congress for legislation making permanent the present rank of Generals Pershing, March and Bliss. Mr. Taft is out in a statement in the newspapers in which he says that Crowder should also be included with the same rank as the three above named.

2. The Secretary appears before the Senate Committee this afternoon asking that restrictions on the voluntary enlistment of men in the regular army be removed up to the number, it is understood, of 500,000 men. I have not seen a copy of his proposed bill and hence do not know what further details, if any, are comprised in it. It is understood, however, around here that this bill is only in the nature of stop-gap legislation until something permanent can be formulated.

3. The War College is working on a permanent reorganization of the army. It is not known when this will be ready, nor what form it will take. In fact, progress on it has so far been but slight.

4. Two rival camps are forming here on the subject of the Artillery. One faction proposes to combine the Coast and Field, and the other faction is opposed. The former faction includes practically all of the Coast Artillery, while the latter, practically all the Field. I am quite anxious to get an expression of your views on this question at as early a date as practicable. If you are in favor of this consolidation, I think I can call off all opposition, although most of us at the present time feel that the combination would be a mistake, and I personally am strongly opposed.

With best regards to you, I am

Yours sincerely,
/s/Wm J. Snow

Office Chief of Artillery,

December 22, 1918

My dear Snow:

Reference your letter of the 5th instant, jsut received, the matter of the consolidation of the Field and the Coast Artilleries is being discussed over here also. General Fiske in a Memorandum on a "proposed military policy", dated December 6th, advocates it. Generally speaking, of the officers with whom I have come in contact here the Field Artillery oppose and the Coast Artillery advocate it. Westervelt advocates it, Colonel Shedd of the Coast Artillery in this office opposes it; but ordinarily the lines are drawn as indicated.

After many years observation I have reached the conclusion that most men, myself included, are influenced, first, last and all the time, by their own selfish interests -- many of them unconsciously perhaps. In the first place they naturally see and emphasize the reasons which tend to guard their own interests. As they think these over their importance is magnified and the opposing reasons are minimized until a final conviction in harmony with their personal interests is reached. Because of this fact, in my paper commenting on Fiske's Memorandum, I recommended that "a thorough study should be made at this time of the advantages, disadvantages and difficulties in the way of establishing this system (the single list) and if felt to be practicable it should be recommended"; but I said further that the Single List should not be regarded as a consolidation of the various arms of the service. It is a consolidation for purposes of promotion only, and if adopted at all it should include all arms, not the two artilleries alone.

In regard to the "consolidation of the Field and the Coast Artillery" I said, "6.- Unless this be done for the purpose of having a "Single List" for promotion, in which case it should include all the officers of the line and staff except the Medical Department, the Chaplains, the Philippine Scouts, the Dental Corps and Veterinarians, it is believed the consolidation would be a step backward. For years the separation of the Field and the Coast Artillery was advocated; the reasons are given in the annual reports of the Secretary of War and of the Chief of Artillery for years prior to 1907 - it is unnecessary to repeat them here. They were good and they apply today, jsut as forcibly, in my opinion, as they did years ago. Why tear down the structure it took us no many years to build? There are just as great similarities and as great differences to be found in the two arms as there were before they were separated. It is believed that our Coast Artillery is the best in the world today, but our experiences in this war have not shown that Coast Artillery training has fitted them particularly well in general for Field Artillery duty. Even if for purposes of obtaining equality of promotion a "Single List" should be adopted, it should not mean a consolidation of the two branches. Our officers should still be assigned to one or the other and remain with the branch to which they are assigned except for short periods during which they might be attached to the other in order to get a general idea of the capabilities and the limitations of that branch. Officers must specialize, even within the arms as now organized. We can not make jacks-of-all-trades of them. For these reasons we need specialists to supervise, direct and develop each arm - Chiefs of Infantry, Field Artillery, Cavalry, Coast Artillery, Air Service, etc., - call them inspectors if you will - their duties should be the same no matter what may be their designtions."

I fully concur in the reasons contained in your Memorandum opposing the consolidation of the Coast and the Field Artilleries. I do not know that any reasons other than those that you have stated can be advanced. I should have stated also in my paragraph 6, quoted above, that it is believed that Field Artillery training does not fit officrs of that arm particularly well for duty with Coast Artillery. The Coast Artillery officers who have been on duty with Field Artillery in this war have probably done just as well, if not better, than Field Artillery officers would have done had they been on duty with Coast Artillery.

There are two other very important points in General Fiske's Memorandum: one is his advocacy of a permanent personnel for the General Staff, which I regard as a dangerous, pernicious propositon; and the second point is the following: "To secure the absolute supremacy of the General Staff and the complete recognition of that supremacy by the whole service is regarded as a sine qua non of efficient organization." I have discussed these two points quite at length in my Memorandum, a copy of which I have given to Lieutenant Colonel Hammond, General Staff, Infantry, who left here for duty in Washington two or three days ago; and I have also given a copy to Colonel Sturgill, Field Artillery, who leaves for Washington tomorrow, in compliance with your recent cablegram. I asked him to have a copy made for you. I think you may be interested in the other points as well as that of the consolidation of the two artilleries.

With best wishes,

Sincerely yours,

Major General,
Chief of Artillery, A. B. F.

Major General Wm. J. Snow,
Chief of Field rtillery, U. S. A.
War Department, Washington, D. C.

WAR DEPARTMENT
OFFICE OF THE CHIEF OF STAFF,
WASHINGTON

IN REPLY REFER TO
CHIEF OF FIELD ARTILLERY STATE, WAR, AND NAVY BUILDING
WASHINGTON, D. C.

December 5, 1918

Major General Ernest Hinds
Chief of Artillery
American Expeditionary Force
A. P. O. 706
France

My dear Hinds;

I had just gotten up a very elaborate letter to you giving you for the Field Artillery complete information similar to that given by General Coe for the Coast Artillery, when the armistice was signed. I concluded that, as the matter contained therein would have no practical value for you on account of the changed conditions, it would be useless to take up your time in reading the letter, consequently, I did not sent it. There are, however, two or three things which have recently come up here that I want to speak to you about.

The first of these questions, is the consolidation of the Coast and Field Artilleries. I enclose a memorandum I have prepared on this subject and which represents my views. It is also the consensus of opinion of all field artillery officers with whom I have talked, that the consolidation of the two arms would work to the disadvantage of each. I would be very glad indeed if you would send me at your earliest convenience, an expression of your views on this question, together with a statement of your reasons therefor. The Coast Artillerymen in this country, including General Coe, are very strong for this consolidation. Coe and I have talked the matter over several times at considerable length, but have been unable to come to an agreement.

The two arguments advanced by the Coast in favor of consolidation are: First - that questions of mobility have disappeared as the result of motorization, and that questions of fir control have disappeared also. Personally I think that both of these are minor questions, and that the broad distinction between the two arms is the purpose for which they exist, and that the tactical use and training of the two arms is drametrically opposed to each other. It seems to me that all artillery designed to accompany a mobile army should be classed as Field Artillery, so organized, and so trained. The fact that we used Coast Artillery for our heavier guns in this war was merely due to the fact of our inadequate supply of field artillery, and was merely parallel to our taking over thirteen regiments of cavalry. That is, we converted arms for which there was no use in this war, into Field Artillery.

During the war, the shortage of field artillerymen has been so great that of necessity, the arm was obliged to give up all representation as far as it was a possibiiity to do so, on the General Staff and in the Staff departments. This led to no particularlybad results. At the present time however, things are quite different. As most of the General Staff is now composed of coast artillerymen, their views are all powerful and they necessarily permeate all mtters. For this purpose we are trying to secure adequate field artillery representation. The Chief of Staff promised me recently that he would give us such representation and I

submitted to him a list of names of officers whom I regarded as suitable to be immediately attached to the General Staff for work there pending readjustment and reapportionment among the different arms. No action has yet been taken by General March, beyond the fact that he gave me authority a day or two ago to attach Colonel Gruber to the War Plans Division. I hve also placed Colonel Daley and Lieutenant Colonel Higley on the Operations Section here. Colonel George is also on this section.

We are asking for a Board to make a special study and report on the materiel of the Field Artillery. Necessarily during the war many different types were used, some of which are known to be unsitable for permanent adoption, and of some of the others there is a question. De Armond suggested that now is the time to study this entire question and I agree with him. Accordingly he and Gruber ar working up a memorandum, a copy of which I will enclose if it is ready by the time this letter has to go.

Materiel is jsut started coming through in quantities. With the signing of the armistice, all shipments to France were stopped, and this materiel of all sorts is now coming through in a stream, which promises shortly to become a flood. For instance a cablegram came in today asking that four, two and one half ton tractors be sent you for test to determine their suitability for use with the 75 mm. gun. I have, within a day or two, ordered the distribution of about 200 of these tractors for the purpose of making ths same test. Although further construction on the tractor was stopped with the signing of the armistice, yet before the flood will be absolutely stopped, I think there will probably be about 1,000 of these. You may recall that at the time Pershing cabled for 10,000 of these by April, there had been but two of them completed. Every energy was immediately concentrated toward increasing the flow to the maximum, with the result that I just stated. For the first time since the war started, everything in this country will shortly be fully equipped and the great problem is then going to be where to store things. I think these will be between 8 and 9,000 guns alone.

With the signing of the armistice, cantonment construction work was reduced to the minimum, and we are finishing up what can be done economically. In this connection the additional construction at Camp Jackson, South Carolina, for four brigades was stopped and the project abandoned. The six brigades and central officers' training school at Camp Knox, Kentucky were reduced to four brigades. The six brigade project at Camp Bragg, North Carolina, was reduced to two brigades. Further expanxion of the School of Fire from 200 to 300 per week was also cancelled. We are however planning in the office here a comprehensive Field Artillery scheme, and as fast as parts of it are formulated, I will send it to you. I would be very glad indeed if you would criticize freely anything I will send you.

Referring back to the first part of this letter, I forgot to state that in advocating the continued separation of the Coast and Field Artillery, with a chief for each, I am not advancing my personal interests. I came in this office without my request or any action on my part, and with the sole object in view of bringing order out of chaos in the Field Artillery, and assisting as far as I could in winning the war. This result has been accomplished, and I do not care what happens to me personally, as I have got a colonel's commission in the regular service and consider that I can still command a regiment.

With best regards to you and my other friends, I am

Very truly yours,
/s/Wm J. Snow

(MEM. FOR GEN HINDS - YOUR VIEWS HEREON (AS TO THE RELATIONS BETWEEN THE COAST & FIELD ARTY'S) IS DESIRED. /s/ WM J. SHOW)

MEMORANDUM ON RELATION BETWEEN COAST ARTILLERY AND FIELD ARTILLERY:

1. The colclusion of the war will necessarily be followed by a reorganization of the Army. This reorganization to be effective and enduring must be based on sound principles. Two of the most important of these principles are:

(a) To group together duties of a similar nature and to avoid putting in any one corps or department duties wholly unrelated to each other.

(b) To avoid confusion in policy and duplication of effort in placing in two separate departments, the duties which can and should be coordinated in one.

The part that each arm is designed to play in war and the relation of these parts to each other during that time is the determining factor as to how they should be grouped together in time of peace.

2. We must, therefore, examine into the nature of each arm and determine the reason for its existence.

3. Prior to 1907 the Coast Artillery and Field Artillery were combined. The reason for theri proposed separation at that time was set forth by General Murray, Chief of the conbined arms, as follows:

"It is a sound miliary principle that only such arms of the service as have a fighting or tactical relation with each other should be combined for organization purposes. The Coast Artillery, organized solely for the proper handling of the two correlative elements of harbor defense - havy guns in fixed emplacements and submarine mines fixed in position in channels to be defended - constitutes in reality a passive defensive force which has no tactical relation whatever with the active forces of infantry, cavalry, or Field Artillery, the three fighting elements of a mobile army. In all mobile armies there is a definite ratio betweenthe three fighting elements whenever these are combined in organization between the three fighting elements whenever these are combined in organizations for tactical purposes, the size of the organization or of the mobile army determining the amount and organization of its Field Artillery. The Coast Artillery constituting the defense of harbors against an enemy's fleet, not only has no tactical relation with any of hte fighting elements of a mobile army; but there is no definite ratio between the two fightin elements, heavy guns and mines. The number and character of the guns and the number of mines vary with each harbor to be defended. The combination of the Coast and Field Artillery into a corps as is now done is not only unsound as a military principle, but the frequent interchange of officers between these tactically unrelated arms is considered detrimental to the efficiency of both:"

Secretary Taft in his hearings before the Military Committee on this principle testified as follows:

"****Another difficulty about the artillery is the fact that we have united in one corps two branches of the army service that, under modern conditions, under the lessons of modern warfare, are as distinct as cavalry and infantry.****

The truth is, if you will allow me to say so, that the subjects on which the officers are examined - and that, after all, determines what they ought to know - are very different in some important branches, such as the Coast Artillery, the light artillery, and the Field Artillery, and it is really not fair to a man who is fitted for the light artillery, and who is devoting his whole attention to acquiring a knowledge of that branch of the service - and there are no officers in the Army who are more enthusiastic than the officers of the Field Artillery - to compel him to go down to Fortress Monroe and sit down for six months and cram up on a lot of subjects that he does not need as a field officer, merely in order to get promoted. It seems to me it is a waste of effort."

On this question the General Staff as a whole reported:

"This separation is one of the most important and necessary parts of any scheme looking to the improvement of the present conditions existing in the Artillery corps."

The separation was further recommended by a special committee of the General Staff, consisting of two infantry, two cavalry, and one artillery officers, appointed to consider the special needs of hte artillery, and General Chaffee, as Chief of Staff, in approving the report of the committee, stated:

"I concur with the special committee that the Field Artillery should be given a regimental organization, and that it be completely separated from the Coast Artillery and become a distinct arm of the service in every respect.

It, therefore, appears that the idea of separating the two branches was to secure increased efficiency in each. Actually this result has been accomplished by the separation. It is a matter of common knowledge and observation that since the separation, each arm has made giant strides in efficiency. The question then remaining to be considered is whether a need has occurred in the present war to call for a reversal of ideas on maintaining the two arms separate. Tactical principles are the same now as always. The only new artillery features introduced in this war are larger calibers, longer range, greater accuracy, motorization, use of aircraft and railway artillery. None of these affects the underlying principles.

The term Field Artillery has been constantly widened in its scope and application. Whereas fifteen years ago, the term Field ARtillery was still applied to all artillery on wheeled mounts, emphasizing thereby the factor of mobility, modern improvements in mechanical transportation have compelled its application to all artillery which <u>accompanies an Army in</u>

the field. What comprises the Field Artillery is not a question of caliber but a matter of mobility. The greater the improvements in transportation and particularly in motor transportation, the greater will be the caliber of the armament which will be classed as Field Artillery. The motorization of Field Artillery has developed to such an extent that it is not inconceivable that in the near future all field artillery will be more or less motorized. The Field Artillery should therefore comprise:

(a) Light artillery which includes light horse and mountain artillery.

(b) Medium Heavy artillery, which includes the 4.7 gun and our light howitzer.

(c) Heavy artillery which includes Heavy, Tractor and Caterpillar Artillery.

It is true that the Coast Artillery has handled heavy mobile guns in this war but so also has the Navy handled railway artillery. Each was an expedient necessitated by the circumstances and it cannot be contended that the Coast Artillery while thus employed was performing its normal function any more than was te Navy and no one contends that the function of the Navy is to employ its heavy guns as inland or railway mounts. Expedients will have to be resorted to in all wars; but it certainly is not a sound principle to organize and train an army in the time of peace on the expedients which were compelled by necessity in time of war.

Again high powered heavy guns are handled in Europe by Fortress Artillery and not Field Artillery. But in such case,the critical frontiers are land ones while in the United States they are water ones. The guns in land fortifications abroad are designed for land defense and with the idea of taking them out of such fortifications when they have thre served their purpose and then using them with the mobile army. Fortification guns in the United States, on the other hand, are designed with no such end in view.

Another fact to be borne in mind is that all danger during the present war of an attack on our coast was eliminated by the action of the combined Navies of the Allies and hence it was practicable to strip our coast forts of practically all officers and men and of some of their guns. It is both imprudent and dangerous to base our national defense, and therefore,

the reorganization of our army in the hope or the supposition that the same unusual military situation will confront us in our next or any future war.

From the above it would appear that the Field Artillery and the Coast Artillery have separate and distinct functions to perform and that the combination of the two arms would result in each interferring with the normal development of the other. As a general classification it may be stated that the Field Artillery should include all guns and howitzers accompanying a mobile army irrespective of their calibers provided no special preparation is necessary for their transportation and no special reparation or emplacements are necessary for their firing. The Field Artillery would then include light artillery, horse artillery, mountain artillery, heavy artillery and caterpillar artillery. The Coast Artillery would include all guns, howitzers and mortars in permanent emplacements for seaward defense, railway artillery, submarine mines, anti-aircraft artillery permanently emplaced. Should the conditions necessitating the defense of our Coast for which our Coast defenses are planned cease to exist, then such parts of the armament as can be converted to land defense should be temporarily adapted for use with a mobile army whereon this can be done without endangering our Coast defense.

The Coast Artillery Corps is after all an organization to provide for our Coast defense and as such has a tactical relation not with our mobile armies but with our Navy. There is greater reason, therefore, for organizing it as Marine or Coast Defense Artillery forming an integral part of our Navy, than there is for combining it with the Field Artillery.

The general conclusion, therefore, is that the two arms should not be again combined but that each should be alloed to develop along normal lines unhandicapped by the other.

William J. Snow,
Major General, U.S.A.
Chief of Field Artillery.

Office Chief of Artillery,

December 22, 1918

My dear Snow:

Reference your letter of the 5th instant, jsut received, the matter of the consolidation of the Field and the Coast Artilleries is being discussed over here also. General Fiske in a Memorandum on a "proposed military policy", dated December 6th, advocates it. Generally speaking, of the officers with whom I have come in contact here the Field Artillery oppose and the Coast Artillery advocate it. Westervelt advocates it, Colonel Shedd of the Coast Artillery in this office opposes it; but ordinarily the lines are drawn as indicated.

After many years observation I have reached the conclusion that most men, myself included, are influenced, first, last and all the time, by their own selfish interests -- many of them unconsciously perhaps. In the first place they naturally see and emphasize the reasons which tend to guard their own interests. As they think these over their importance is magnified and the opposing reasons are minimized until a final conviction in harmony with their personal interests is reached. Because of this fact, in my paper commenting on Fiske's Memorandum, I recommended that "a thorough study should be made at this time of the advantages, disadvantages and difficulties in the way of establishing this system (the single list) and if felt to be practicable it should be recommended"; but I said further that the Single List should not be regarded as a consolidation of the various arms of the service. It is a consolidation for purposes of promotion only, and if adopted at all it should include all arms, not the two artilleries alone.

In regard to the "consolidation of the Field and the Coast Artillery" I said, "6.- Unless this be done for the purpose of having a "Single List" for promotion, in which case it should include all the officers of the line and staff except the Medical Department, the Chaplains, the Philippine Scouts, the Dental Corps and Veterinarians, it is believed the consolidation would be a step backward. For years the separation of the Field and the Coast Artillery was advocated; the reasons are given in the annual reports of the Secretary of War and of the Chief of Artillery for years prior to 1907 - it is unnecessary to repeat them here. They were good and they apply today, jsut as forcibly, in my opinion, as they did years ago. Why tear down the structure it took us no many years to build? There are just as great similarities and as great differences to be found in the two arms as there were before they were separated. It is believed that our Coast Artillery is the best in the world today, but our experiences in this war have not shown that Coast Artillery training has fitted them particularly well in general for Field Artillery duty. Even if for purposes of obtaining equality of promotion a "Single List" should be adopted, it should not mean a consolidation of the two branches. Our officers should still be assigned to one or the other and remain with the branch to which they are assigned except for short periods during which they might be attached to the other in order to get a general idea of the capabilities and the limitations of that branch. Officers must specialize, even within the arms as now organized. We can not make jacks-of-all-trades of them. For these reasons we need specialists to supervise, direct and develop each arm - Chiefs of Infantry, Field Artillery, Cavalry, Coast Artillery, Air Service, etc., - call them inspectors if you will - their duties should be the same no matter what may be their designtions."

I fully concur in the reasons contained in your Memorandum opposing the consolidation of the Coast and the Field Artilleries. I do not know that any reasons other than those that you have stated can be advanced. I should have stated also in my paragraph 6, quoted above, that it is believed that Field Artillery training does not fit officrs of that arm particularly well for duty with Coast Artillery. The Coast Artillery officers who have been on duty with Field Artillery in this war have probably done just as well, if not better, than Field Artillery officers would have done had they been on duty with Coast Artillery.

There are two other very important points in General Fiske's Memorandum: one is his advocacy of a permanent personnel for the General Staff, which I regard as a dangerous, pernicious propositon; and the second point is the following: "To secure the absolute supremacy of the General Staff and the complete recognition of that supremacy by the whole service is regarded as a sine qua non of efficient organization." I have discussed these two points quite at length in my Memorandum, a copy of which I have given to Lieutenant Colonel Hammond, General Staff, Infantry, who left here for duty in Washington two or three days ago; and I have also given a copy to Colonel Sturgill, Field Artillery, who leaves for Washington tomorrow, in compliance with your recent cablegram. I asked him to have a copy made for you. I think you may be interested in the other points as well as that of the consolidation of the two artilleries.

With best wishes,

Sincerely yours,

Major General,
Chief of Artillery, A. B. F.

Major General Wm. J. Snow,
Chief of Field rtillery, U. S. A.
War Department, Washington, D. C.

ANNEX 2

Recommendations of Artillery Officers

American E. F.

I. Organization

(b) Details of organization

BATTERY, BATTALION, REGIMENT, BRIGADE

(see also Exhibit B. Proceedings
Board of Officers, 18th Training Area.)

A.

ORGANIZATION OF THE BATTERY, THE BATTALION, THE REGIMENT AND THE BRIGADE.

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The organization of batteries, battalion, regiments, and brigades as now provided for by our tables of organization is believed to be satisfactory, as it has been based upon experience and has given satisfactory results in the field.

The only change recommended is that the howitzer regiment with the divisional artillery be organized inot two battalions of three batteries each instead of three battalions of two batteries each. This organization will permit the assignment of one half of the heavy regiment in support of each infantry brigade and simplify the liaison therewith. - D. E. Aultman, Brigadier General, Army Artillery, 2nd Army.

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1. For light guns it is believed that provision for two gun crews would be sufficient instead of three as at present.

2. Provision should be made in the Tables of Organization for a Regimental Munitions Officer, and an assistant to the Radio and Telephone Officer (the telephone officer in active operation is overworked, due to the frequent cutting of communications) and additional non-commissioned officers should be provided to accompany Liaison Officers, and to act as liaison men on occasion.

3. The Brigade Headquarters should have two additional liaison officers, who can be sent to the Brigade Headquarters of adjacent divisions. The enlisted personnel should be increased by 3 corporals, 12 chauffeurs, with the rank of Wagoner, and 10 privates 1st class. The 10 privates 1st class carried as chauffeurs and motorcycle couriers in the Table of Organization, should be ranked as Wagoners and receive the pay thereof instead of Pvt. 1st Cl. as now provided.

NOTE:- Uncer date of November 1918, G.H.Q. issued a Provisional Staff Manual which has just reached these headquarters. On page 6 is given the organization of the Brigade Staff, which is considered entirely inadequate for the proper functioning of the Brigade in active operations. During the Argonne offensive this Brigade operated with an organization given in Table 12 of the Tables of Organization, which provide for a total of 12 commissioned officers and 65 enlisted men. If such a small number as given in the Staff Manual is adhered to, there will undoubtedly result an assignment of officers and men for temporary duty at Brigade Headquarters, these being taken from the regiments and from the class that they most need. Even so, they will not be as efficient as if trained for the work that they are calld to do.

The two officers recommended above are in addition to the 12 in the table referred to, or a total of 14 officers for Brigade Headquarters. - E. B. Babbitt, Brigadier General, 4th Brigade.

1. No change recommended in the battery.

2. The battalion is the normal small tactical unit and is very frequently detached or well separated from the regiment. It should be made a more self-sustaining unit, particularly as regards its headquarters.

The training of the battalion headquarters specialists should be wholly under the battalion commander. The present method is not based on sound principles.

3. Regiment: No change.

4. Brigade: No change. - H. G. Bishop, Brigadier General, 3rd Brigade.

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The organization of divisional artillry appears to me in general to be satisfactory. The regiment of heavy field artillery should be composed of two battalions of two batteries each of light howitzers and one battalion of two batteries of 4.7 guns. One battalion of three batteries of mountain guns for use as accompanying guns should be added to the divisional organization. The trench mortar should not form part of the divisional artillery. In connection with the organization of divisinal field artillery, under no circumstances should the amount of artillery assigned to a division be reduced. It will be noted that in the case of every serious attack divisional artillery has always been increased by two and even three times the number of divisional guns. These should be supplied from the army artillery park. - A. J. Bowley, Brigadier General, 6th Corps Artillery.

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Organizaton of the Battery.

Horses and harness were issued to the batteries of my regiment (307th F.A.) about a week before being ordered not the line at Mamey (San Mihiel Sector). Batteries had only seven sections, a rolling kitchen, a ration cart and a fourgon wagon for instruments and wire. There was not sufficient time given the regiment to properly train the drivers and those responsible for the care of animals and mounted equipment. This condition of unpreparedness together with orders requiring night movements, the restrictions thrown around watering animals in large groups (camouflage rules), and the demands for the supply of ammunition at all hours of the day and night soon brought about a critical condition among the horses and the mounted equipment of the batteries. Animals fell away in flesh, sickened and either died in large numbers or were evacuated to the rear for recuperation and were never returned to their organizations. The tactical requirements demandeing a great distribution in depth of the various elemenst of the battery (firing battery, limber and combat train positions, etc.) made it impossible for the Captain of a battery to keep in close personal touch with the majority of his men, horses and equipment. As a result of this experience and from general observation in other commands I am led to believe that our batteries are too large for close supervision by officers and non-commissioned officers of the type available generally in time of war.

Suggestion:

A battery of five sections (to include the supply section). In addition a pack mule for wire and instruments, an instrument and wire cart, rolling kitchen, ration cart and baggage wagon. This suggestion contemplates taking away the combat train sections of each battery and grouping them into a fourth battery of the battalion. It is hoped this reduction in materiel and a corresponding one in men and horses in the battery will make it possible in a short length of time for training, to get greater efficiency.

Organization of the Battalion.

Suggestion:

The Battalion to be composed of four batteries, three batteries organized as indicated above, and a fourth battery called an ammunition battery, equipped with the English type of limbered service wagon. The battery to have about ten sections, with supply section, kitchen and baggage wagons. This battery to be organized, officered and manned so as not to be dependent upon the other three batteries for anything. When in command of the 307th F.A. I organized the battery combat trains into two batteries with permanent commanding officers,

1st Sergeant, cooks, etc. This trial organization had to be abandoned on account of shortage of horses, but it was in operation long enough to convince me that such an organization was better than a loosely assembled group of combat trains under officers and non-commissioned officers who were not familiar with all the units.

Organization of the Brigade.

Suggestions:

1. Take the Trench Mortar out of the Brigades and organize them into a special corps from which they will be detailed for operations requiring this special type of artillery.

2. Give to the Brigade a battalion of Pack Artillery (mountain type) to be trained for close support of, and to accompany the infantry battalions in action. The pack type will make it possible to advance more silently and with greater rapidity in woods, along the banks of streams and in ravines. If pack animals are lost, the guns are small enough to be carried forward by hand. - J. H. Bryson, Brigadier General, 155th Brigade.

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Except as indicated in (c) and (m), I believe that our organizations are flexible enough to meet all conditions; though given any particular set of conditions, a particular organization might be preferable. - H. W. Butner, Brigadier General, 1st Brigade.

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I have never seen a battery, battalion or regiment completely equipped as per tables of organization.

I believe that for open warfare the battery details are much too large. I should like to see the combat trains equipped with at least half wagons. An escort wagon with four animals will carry as much ammunition as a caisson and cost much less money. When not carrying ammunition it can be used for other purposes such as carrying forage, etc. I believe that extra officers, say three per regiment, should be provided for liaison. The taking of officers from the batteries for this work is not good practice. I think for trench warfare the battalion details are too small. - Tilman Campbell, Colonel, 329th F. A.

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As at present organized in the A.E.F., with the following modifications:

Battery:

Add one ammunition Sergeant.
Make chief mechanic a Sergeant mechanic.
In motorized battery have a motor Sergeant corresponding to the stable sergeant of a horse drawn battery.
Omit 6th, 7th, and 8th sections.

Battalion:

Add one minitions officer) both to be in headquarters
Add one ammunition sergeant) company.
Add one orientation officer)

Regiment:

To consist of 6 firing batteries
1 Hdqs Company
1 Supply Company
1 Ammunition battery for each battalion.
Add one regimental ammunition sergeant
Substitute properly trained artillery personnel for ordnance personnel.

Brigade:

Add one Captain brigade supply officer

Note: Double all telephone details, from battery to brigade inclusive. -
Center of Artillery Studies.

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1. Service in the field has indicated that the assignment of officers developed by this regiment fulfils the tactical and administrative needs of the regiment (Manning table attached).

2. In reorganizing the enlisted personnel the tables of organizaton provided an insufficient number of sergeants to hold several responsible positins. I am suggesting a few changes that should be made, but the real solution should be the preparation of new tables of organization for G.P.F. regiments by a board consisting of officers who have had actul experience with the guns at the front or at training areas. The signal detail should be increased by one telephone sergeant, one radio sergeant, one radio corporal per battalion. The orientation detail should be increased by one sergeant per battalion and the number of corporals could be cut down. There should be regimental and battalion gas sergeants performing no other duties. Each battalion should have one sergeant whose sole duties should be to assist the mechanical officer in the supply of gas, oil and repair parts, and a chief mechanic in addition to the mechanic provided in tables of organization.

3. The personnel department should be made adequate to handle payrolls and paper work by the regiment instead of by battery.

That the regimental personnel office be the only office of complete statistical record. If this is done, the office work of the batteries can be infinitely simplified and duplication avoided. In this regiment the monthly resters are prepared by the Regimental Personnel Adjutant, and all other matters relating to personnel are handled by him, without recourse to the battery offices. The batteries maintain only the clothing slips, delinquency records, and duty rosters, and make no reports to the Personnel Office except the morning report and Report of Charges against Enlisted Men (lost clothing, etc.).

MANNING TABLE

Regiment	Battalion	Battery
Colonel	Major	Capt. B.C.
Lieut. Colonel	Capt. Adjutant (Opns.)	1st Lt. Executive & camouflage
Major, Medical	1st Lt., Orienteur (Asst. Opns.)	
Chaplain	Intelligence	1st Lt., Asst. Executive & machine gun
Capt. Adjutant (Operations)	Medical	
Intelligence (C.O., Hq.Co.)	Dental	
Personnel Adjutant	2nd Lt., Signal	2nd Lt., Mechanician
Supply (C.O., Supply Co.)	Gas (Asst. Int.)	" " Asst. B.C.
Ordnance	Mechanician	
1st Lt., Orienteur (Asst. Operations)	Supply & ammunition	
Signal		
Gas (Asst. Intelligence)		
Ammunition		
Mechanician		
Assistant Supply		
Assistant Personnel Adjt.		

A. S. Conklin, Colonel, 303rd F.A.

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BATTERIES: In addition to present enlisted personnel, it is recommended that one enlisted man from the Veterinary Detachment be al all times on duty at the horse lines, to assist in the treatmnet of such animals as may need attention.

Note enough distinction is made between non-commissioned officers, especially of the grade of sergeant and above should be a distinctive grade and such accommodations should always be provided for them as would give them a greater sense of authority and responsibility.

It would be well to provide an assistant to the Stable Sergeant of the grade of Corporal.

REGIMENT: It is suggested to have one officer as telephone and radio officer and not one officer as telephone officer and another as radio officer.

There should be one adjutant instead of two as now organized, who should be responsible for the work now coming under the head of Regimental Adjutant and Personnel Adjutant. He should be allowed two lieutenants, who would have direct charge; one of the personnel work and the other of operations.

BRIGADE: One major who should be adjutant and chief of staff and be responsible for the operation of the headquarters and also of the operations in the field. He should be allowed two assistants who would have direct control; one over office work, one over operations. - A. L. Cox, Colonel, 113th F.A.

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Each of these should be complete in itself and each should include complete personnel for its operation as an independent unit.

The organization of the battalion as a complete unit is very important - and I mean complete in every particular, both as to personnel and materiel, without drawing from a Headquarters Company or any other source. - R. P. Davis, Brigadier General, 151st Brigade.

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1. It is earnestly recommended that an additional lieutenant be assigned to each battery of field artillery.

Reasons: Very seldom is the full complement present, due to special duties, casualties, transferred to the United States and other causes the number of officers present frequently was but two with those batteries which were in action and occasionally a single officer. This meant neglect in the echelons and the performance of technical duties by noncommissioned officers who were not qualified, due to the best ones having been taken away for the material needed to make officers. The demands on officers for liaison duty in the front lines with the infantry together with the needs of officers in forward O.P.s, and reconnaissance duty, day and night, for many days at a time, when the command was in slow motion, so wore out our younger officers who were on this duty under the heaviest kind of fire, than an additional officer would be justified nearly for the purposes of the relief, so badly needed and which could not be given. The above remanrks apply to conditions found in a 75 mm. regiment, and apply to them alone as I do not know what experience proved in the 155 mm. regiment.

2. In the brigade organization, it is recommended that enough mounts be supplied to allow one to each officer and one to each orderly. An orderly should be authorized for each officer and be required to care for a pair of horses. The present allowance is but ten (10) horses. - C. J. Deems, Colonel, 57th Brigade.

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The organization of Batteries and Battalions as at present prescribed is found to be satisfactory. A Battalion of 75's consisting of three batteries can be controlled and fought by one man. - W. H. Dodds, Colonel, 6th F. A.

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Due to necessity for forward guns, recommend that battery in each battalion have five (5) gun sections, and one extra lieutenant. Also the extra horses and personnel corresponding to increase of one (1) section. F. C. Doyle, Colonel, 305th F.A.

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1. The present organization of the batteries, both heavy and light, provides for 12 caissons, thus giving 9 sections per battery. The result is that the battery becomes so large as to be unwieldy, and its care and administration makes too many demands on the Captain, who at the beginning of the war and for a considerable time thereafter will will in the great majority of cases, be inexperienced and not able to meet these demands efficiently.

When this Brigade came to the front it had 10 caissons per light battery and 4 caissons and 6 chariots per heavy battery. Even batteries of this size were found objectionable for the reasons given above.

Just before the march to the Rhine began all batteries in this Army were reduced so that they really became six section batteries (including what corresponds to the old ninth section). The light regiments habitually marched in different columns and to each regiment was attached an Ammunition Company of the Ammunition Train. The result was greatly increased flexibility and ease of administration within the batteries, notwithstanding the fact that the personnel, which had not beed reduced, continued to be a strain because their rations, rolls, etc., had to be carried.

2. In thime of peace the sixth, seventh, and eighth sections are not provided. In my opinion it would be better not to provide thm as part of the batteries in time of war, but to add an Ammunition battalion to each regiment with sufficient ammunition carrying capacity to transport an equivalent amount of ammunition. This Ammunition Battalion should be organized into as many companies as there are battalions in the regiment; viz: two per light regiment

and three per heavy regiment; each company should be susceptible of sub-division into as many section as there are batteries in a battalion; viz: three in the light regiments and two in the heavy regiments. Excellent commissioned personnel for these Ammunition Battalions could be secured from regular noncommissioned officers who can perform that work well (of which we have specific proof in this Brigade), whereas, as a rule, they do not make competent field artillery officers. A reduction of one lieutenant per gun battery could be made under this proposed organization.

This proposed organization would not appreciably increase the total strength of men or animals per regiment, would give compact, easily maneuvered firing batteries, provide the same amount of ammunition per regiment under the immediate control of the Regimental Commander, and obviate the necessity of subdivision for action since each ammunition company would constitute a battalion combat train.

The same principle could be applied whether the regiments are horsed or motorized.

3. For heavy horse drawn regiments neither the caissons nor chariot is really satisfactory. A light vehicle than the chariot and one so constructed that it cannot well be overloaded would be an improvement on either.

For motorized heavy regiments I think a special type of trailer could readily be designed and constructed to replace the present caisson which is entirely too heavy and cumbersome for the number of rounds it transports. It seems possible to even replace the limber with such a trailer.

4. Regardless of whether or not the firing batteries are horse drawn or motor drawn, I am inclined to think that the casson companies suggested above could well be utilized; for example, a single baby caterpillar tractor with two 3-ton trailers could transport 600 rounds of 75 ammunition and replace 6 caissons, or 6 such units; that is, 6 trailers and twelve 3-ton trailers, would replace 36 caissons, and the personnel required would be practically insignificant. I should at least like to see the experiment tried. The adoption of this method need not prevent the retention of certain horsed caisson companies for the more rapid replenishment of ammunition. - A. S. Fleming, Brigadier General, 158th Brigade.

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Recommend that the number of privates attached to the various special details be increased. - Q. A. Gillmore, Colonel, 112th F.A.

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IN THE BATTERY:----Officers.

The number of officers as prescribed by Tables of Organizaton is considered proper, but this number of officers should al all times be maintained in the battery and be solely and wholly at the disposal of the battery commander - that is, he should at all times be able to count on two 1st and two 2nd lieutenants to supervise the proper functioning of the battery. With this allowance he is then able to have two executives, one on duty and one substitute - one officer with him in his P.C. for relief and one officer as a substitute for any of the above mentioned officers in case of casualy or of over-work, and at the same time to look after the limber echeon of the battery. It is considered absolutely necessary to have available at all times this double shift of officers in order that the work may be efficiently done if called for continuously. In almost every case of failure of artillery to promptly comply with orders which they have received, the cause may be directly associated with the worn-out and fatigued condition of officers for whom no substitutes were available, and who had been kept so long at work that their minds and bodies were not properly performing their functions.

Battery Headquarters Detail

The experience of this regiment on the front has been only those in connection with the control of fire by maps. For this work the detail as prescribed in Tables of Organization is not considered the most efficient, nor does it provide a sufficient number of telephone and line-men; further, the mounting of the battery detail tends to hamper in part its efficiency. It is therefore suggested that the following changes be made: Light cars (Ford van or similar) be supplied for the quick maneuvering of part of the detail; that the number of telephone operators be 9, thus providing for 3 at firing battery, 3 at P.C., and 3 at battery O.P., the number of linemen 6, that men might work in pairs on battalions, battery or battery O.P. hunting trouble.

Gun Section out to one Gun Crew.

The 5th section to be composed of one line sergeant, one corporal, and 7 men - all dismounted, to be carried in a truck. These men to be used for the carrying of ammunition, preparing of dugouts, litter-bearers, temporary replacements and other necessary work about the firing battery, for which it is not desired to draw on gun crews - chief mechanic to go to all parts of the battery, and one mechanic assigned to each gun, making 4 mechanics per battery. There will also be assigned to this section one camouflage sergeant, one gas corporal and one machine gun corporal, 4 machine gunners and 3 buglers.

The 6th section to be composed of one mess sergeant, one supply sergeant, one stable sergeant, one farrier, 4 cooks, 3 horseshoers, one saddler, one driver of ration cart, one driver of water cart, 2 drivers of kitchen wagon, 3 kitchen police, and 3 orderlies for officers, one to act as guidon.

IN THE BATTALION.

The Battalion in organization to remain approximately as now prescribed in the Tables of Organization. For changes in personnel note proposed organization of Headquarters Company under the regiment and Staff under (c).

FOR THE REGIMENT.

The Regiment to consist of three battalions in Light Artillery and four battalions in Heavy Artillery. This additional battalion in each case to be the replacement, ammunition and supply battalion. It will be composed of four units - the two replacement batteries, the ammunition train and the supply train. The battalions to be command by a Major whose duty it is to maintain this battalion at all times in a high and efficient state of equipment, discipline and training. Each replacement battery will furnish complete supplies for its fighting battalion, replacing damaged or destroyed material and killed, wounded or exhauseted personnel. For this purpose there will be with each regiment replacement battery a full complement of five officers, a full complement of sergeants, one complete battery detail, four gun sections of three gun squads each. In Materiel: two guns, four ammunition wagons, and six one-horse two-wheeled ammunition carts complete with horses and harness.

Regimental Ammunition Train.

One Captain and Ammunition Officer, two 2nd Lts., and one 1st Sergeant, 17 chauffeurs, 17 assistant chauffeurs, 30 privates, two cheif machanics, four mechanics, Material: one Dodge five-passenger car, two Ford vans, 12 3-ton Peerles trucks and two 55-Holt tractors (for the purpose of assisting trucks over bad ground), one trailer fitted with spare parts, tools, accessories, etc., for repairs. (For reasons see paragraph m.)

The supply train.

To be increased by one battalion Supply Sergeant, one chauffeur for Ford van, six chauffeurs and six assistant chauffeurs for trucks. In material: one Ford van, and six three-ton Peerless trucks, also one combined Bath, Laundry, and Delousing machine.

IN THE BRIGADE.

A complete and absolute abolition of the Field Artillery Brigade. For reasons note the remarks under paragraph (b) and (c). E. St. J. Greble, Jr., Colonel, 76th F.A.

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The present organization of the battery, battalion, regiment and brigade, as far as can be learned, and from what experience this Brigade has had, seems to be entirely satisfactory, except certain changes in the Brigade Staff and Trench Mortar Battery, which are outlined in "c" and "n" herewith. - I. A. Haynes, Brigadier General, 64th Brigade.

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Battery strength O.K., except motorized batteries could be reduced in strength.
Batteries should have a pack outfit for first needed instruments and equipment, in quick occupation of position.
Battalions remain as at present.
Regimental organization as at present.
Brigade: Omit trench mortar battery.
Add two machine guns, and personnel therefor, to each Ammunition Train Company.
Let the air observers for reconnaissance and adjustment for the brigade come from the brigade and nowhere else. - T. N. Horn, Brigadier General, 7th Brigade.

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(1) The Battery:
For horse drawn artillery, just exactly according to Tables of Organization now in force.

(2) The Battalion:
1 Major, commanding battalion
1 Captain, operations and administration
1 1st Lieutenant, telephone and radio
1 2nd Lieutenant, liaison, munitions and observation post.
Each of the three Staff officers must be able to perform the duties of the other two. A Battalion of 75's should consist of 3 batteries, a battalion of 155's of 2 batteries.

(3) The Regiment:
1 Colonel
1 Lt. Colonel
1 Captain, Personnel Adjutant
1 Captain, Regimental Adjutant, Intelligence Orders, etc.
1 Captain, Operations
1 1st Lieutenant, Telephone
1 1st Lieutenant, Radio
1 1st Lieutenant, Munitions
1 1st Lieutenant, Liaison, Gas, Observation, etc.
Each of the 1st Lieutenants should be able to perform the duties of every other 1st Lieutenatn. a 75 regiment should have two battalions; a 155 regiment, 3 battalions.

(4) The Brigade:
1 Brigadier General
1 Major, Adjutant, Operations and General Supervision
1Captain, Assistant to Adjutant and Personnel, Supply, etc.
1 Captain, Munitions
1 1st Lieutenant, Telephone and Radio
1 2nd Lieutenant, Liaison)
) Personal Aides
1 2nd Lieutenant, Intelligence)

NOTE: - The Headquarters Company of a regiment should remain about as at present. The Battalion sections should be organized and maintained as units in the Headquarters Company.

The Brigade should have a detachment organized about as at present. -
J. T. Kennedy, Lt. Col, 5th F.A.

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My impression is that our organization of artillery up to and including divisional artillery is essentially good at the present time; that with respect to corps and army artillery, certain principles should be observed as I have attempted to point out in accompanying documents. The principal matter arising at the present time is as to the organization of army artillery. My belief is that the amount of artillery assigned organically to the army should be very limited and that the General Reserve of Artillery under General Headquarters should constitute a pool for supplying the different armies for particular operations with such artillery of all types as the operation in view may require. - Wm. Lassiter, Major General, 32nd Division.

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In view of the fact that the battalion is the normal small tactical unit and is almost habitually well separated from the remainder of the regiment, it is considered that each battalion, including the battalion Headquarters and Detail, should be formed and trained as a separate and self-sustaining unit; an officer with a detail from the Regimental Supply Co., can be attached to the Battalion for purposes of supply when necessary. - C. R. Lloyd, Colonel, 10th F.A.

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The organization of the battey at the present time I consider to be satisfactory, except that I believe better results will be obtained by permanently removing the combat train, i.e., the 6th, 7th, and 8th sections, from the batteries and forming them into a battalion combat train, a separate and distinct organization, similar to a battery, forming a fourth organization of the battalion in the case of a light artillery, and a third organization in the case of the heavy artillery, the organization being such as to permit its quick subdivision. This would result in a reduction of one lieutenant from each battery, to be assigned to the battalion combat train, and a captain should be provided to command each of the battalion combat trains. The objection to this organization might be that it will take spare drivers and cannoneers from the batteries. This is true, but could be provided for without difficulty in the reorganization.

The battalion as it is at present organized is satisfactory, except as recommended above, i.e., for the formation of a battalion combat train. It is also believed that better results would be obtained by hving a battalion detail actually a part of the battalion and under the battalion adjutant for instruction, discipline and tactical use. The organization of three batteries to a battalion of light artillery and of two batteries to a battalion of heavy artillery is, I believe, satisfactory.

The regiment as at present organized is satisfactory, except as above noted, I believe that the grouping of all the details in one organization, the headquarters company, is faulty. The fault undoubtedly lies in the way these organizations have been handled. But the organization which has one colonel, two or three majors, and four or five captains all connected with the handling of its personnel, is certainly an awkward one.

The organization of the brigade is satisfactory, with the following exceptions:

The brigade commander, as such, is chief of hte divisional artillery, and according to our field service regulations, is responsible for the ammunition supply not only of the artillery but of the infantry of his division. If this responsibility is to be continued, the ammunition train should have its status definitely fixed. It should be a part of the brigade and entirely under the brigade commander, except at such times as it may be turned over to the train commander to be conducted as a part of the divisional trains, or, if this is not done, the brigade commander should be relieved from the responsibility for ammunition supply.

The trench-mortar battery is useful under certain conditions, but it is not believed that its use is general enough to have it form a permanent unit of the brigade. With sufficient materiel on hand in the brigade a sufficient amount of instruction in trench-mortar work could be given to all officers and men, and in these particular cases where trench-mortars might be desirable, an organization could be quickly made up for the handling of this weapon. It is not considered that there are sufficient requirements to warrant making this organization a permanent one. - A. McIntyre, Brigadier General, 154th Brigade.

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Headquarters Company should be abolished as such, substituting therfor a Headquarters Detachment sufficient in size and with appropriate grades for administrative and tactical functioning of Regimental Headquarters and administrative functioning of Battalion Headquarters. Provide in the Tables of Organization for the officers now authorized and assigned to Headquarters Comapny being assigned directly to Regimental and Battalion Staffs. The enlisted personnel of battalion details to be provided for in Tables of Organization pro-rata in the batteries. Headquarters Company, as it exists, is expensive in personnel, unwieldy, always low in discipline, deficient in drills and courtesies and considered unsatisfactory. The nature and variety of duties and services involved make it impossible to remedy these conditions. Provide motor trucks to the number of at least six (6) per battery to replace all horse drawn caissons, each truck provided with collapsable racks for carrying ammunition and being means for transporting a field piece. These trucks at other times would afford ample means for the transportation of personnel and equipment. - J. A. Mack, Colonel, 102nd F. A.

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Battery - Combat trains to be combined into a battalion train with sufficient personnel and materiel. The duties of this organization are so important that it should be included in the peace footing organization in order that suitable mteriel may be developed and opportunities for training the personnel are available.

Brigade - A more marked division of the administrative and the tactical staff be made and sufficient personnel for each be provided. A brigade supply officer with necessary office force and transportation should be provided. This has been particularly necessary as the artillery brigades have been in many cases separated from their divisions and were dependent on their own resources for the procuremtn and distribution of supplies. - E. A. Millar, Brigadier General, 6th Brigade.

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(In the following suggestions, the table referred to is Table 17, Series A, January 14, 1918, as corrected to July 15, 1918).

(a) Organization of the battery, the battalion, the regiment, the brigade.

1. The man in charge of battery motor vehicles should be a sergeant instead of a Chief Mechanic. He frequently needs the authority which goes with the rank of sergeant which he completly lacks in his present grade, though, of course, mechanical ability will be necessary.

2. Sufficient gas non-commissioned officers should be provided to comply with paragraph 5, G.O. 79, G.H.Q. American E.F. May 27, 1918. It is found that the sergeants at present in a battery cannot do this work satisfactorily.

3. Two additional clerks, preferably corporatls, should be provided in either Regimental Section or Personnel Section.

4. For Corps nd Army Artillery four additional linemen should be provided, owing to the greater length of wire necessary.

5. Provision should be made for a liaison detail.

6. Machine gun details should be specifically provided for.

7. Provision should be made for gas officers, munitions officers, Regimental transportation officer, and camouflage officer.

8. Liaison officers should be 1st Lieutenants instead of 2nd Lieutenants.

9. The regiment should have eight (8) supply sergeants instead of seven (7). This would give one supply sergeant for each organization.

Most of the duties referred to in these changes are now performed by officers and enlisted men detailed for that purpose, but it is believed the tables should provide specifically for these positions. This would insure uniformity and trained men for these positions. - W. F. Platt, Colonel, 303rd, F.A.

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Recommend that each battery of motorized F.A. have a "motor sergt." corresponding to the stable sergt. of horsed batteries. This N.C.O. will have general charge of all motor vehicles when not actually in use. He will be assisted by such of the battery mechanics as are designated for this purpose. He will supervise all repairs and adjustments that can be made in the battery, and so far as concerns this work the drivers will be under his orders rather than under orders of the Chiefs of Section. Except in cases of emergency on the road, drivers should be prohibited from making adjustments, except when authorized by the motor sergeant. 1 Lieutenant selected for his knowledge of motors should be placed in charge of this department.

Recommend that in each supply Company of a motorized Field Artillery regiment a permanent "repair section" be organized. This section will do all motor repair work that can be done in the regiment, except the minor repaires made by the battery motor sergeants, as outlined in par. 1. The grades of men authorized for this section be such as to make the duty acceptable to highly skilled mechanics. A little extra money spent in pay here will save many times as much in the life of costly materiel. A supply company officer, especially selected, should be placed in charge of this work, and in accition to directing the work on

machines brought in for repairs, should constantly inspect all motor vehicles assigned the regiment, and see that they are properly cared for and properly handled. - R. S. Pratt, Colonel, 18th F.A.

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Recommend an increase in the personnel of the Headquarters Company to handle Liaison and Intelligence work for the regiment and the Battalion, especially men for O.P. duty. It was necessary to call on the batteries for details of men which they could ill afford to spare. Just what number to add is not exactly known, but at least twenty men, including a proportion of Sergeants, Corporals, and first-class privates should be available in the Headquarters Company for Liaison work, and at least one sergeant, three corporals, and six privates for O.P. duty should be added.

Additional officers should be provided for detail as Gas Officers. Intelligence Officers Munitions Officers, and Liaison Officers. All of these are not provided for in the Tables of Organization, as I recall. - W. H. Rucker, Lt. Col, 16th F. A.

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(a) Increase Supply Company by -
1 Mess Sergeant for Officers' Mess
2 Corporals
7 Privates, required in service when rations, fuel and forage are to be distributed; and under ordinary circumstances, dispensing with battery details. -
F. W. Stopford, Colonel, 80th F.A.

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The organization of the battery, the battalion, the regiment, and the brigade has given complete satisfaction. It is thoroughly understood and no change is recommended as far as the present units exist. - C. P. Summerall, Major General, 5th Corps

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1. The present battery is too large and proper supervision of its combat train cannot be assured. Batteries should be reduced to the 5 section firing battery. An additional unit composed only of caissons and commanded by a captain should be added to each battalion for the purpose of ammunition supply. This unit would also replace the horse section of the ammunition train which should be abolished. - J. F. Walker, Colonel, 314th F.A.

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1. Material increase necessary in communication personnel with provisions for personnel for visual work exclusively, organization otherwise adequate up to Brigade and adequate (except as noted under 4) for a Brigade if it remains with its own division but if the Brigade is detached as was frequently the case in recent operations, a Brigade Headquarters should be increased and organized similar to a Division Headquaters with a view of making the Brigade self-supporting.

2. Table of Organization should provide for Liaison Officers and their orderlies and runners.

3. Regimental Supply Officer should be a Major and have five other officers as assistants.

4. Brigade Staff should include a Supply Officer with necessary clerical assistants. This officer could well function in G-1 office of the Division but he should look after the

needs of the Artillery. The Brigade staff should include two Ammunition Officers, one clerk and two non-commissioned officers. - G. L. Wortenbaker, Colonel, 345th F.A.

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The organization of the regiment seems to be very good, with the exceptin of the Headquarters Company, which has proved quite an unwieldy organization. The battalion details are supposed to be trained by Headquarters Co., and then go for work with the battalion organizations. I have found that in this regiment the battlaions were frequently separated for sometimes as much as forty kilomenters and the discipline and organization of the battalion details depended wholly upon the battalion commander. I believe this is where they should be at all times, and never in the Headquarters Co. There should, however, be a Headquarters Detachment, for the purpose of furnishing sergeant-majors, non-commissined officers, clerks and orderlies for the headquarters of hte regiment. They should not be under a Captain, but under a Lieutenant, assitant to the Adjutant. - C. D. Winn, Colonel, 306th F.A.

In the 21st Regiment Field Artillery the battalion headquarters sections have been separated from regimental headquarters and turned over to the battalion Commanders.

The result is a dificiency in enlisted strength in the regimental section.

To make up for the dificiency two men from each battery have been attached to the regimental detail. - R. H. McMaster, Colonel, 21st F.A.

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A D D E N D U M

To

ANNEX 2

Recommendations of Artillery Officers,

American E. F.

BATTERY, BATTALION, REGIMENT, BRIGADE.

Received after the Dissolution of the

Board

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1. With reference to a conversation with Col. Cubbison, on February 18th, and a letter of the same date, I wish to submit the following brief report.

2. All of the batteries of my battalion (1st Bn., 10th F.A.) were equipped with but 6 caissons per battery, hence I have had no actual experience with the 6th, 7th and 8th Sections, except in the form of park wagons, which were never gotten very close to the battery positions. The following are my experiences with separate battery echelons and with the caissons actually with my batteries:-

3. When my battalion went into position on the Barne near Cresancy, on July 11th, all the battery echelons of the regiment were combined in one location, about 12 kilometers in rear of our position and were generally supervised by the regimental and battalion commanders. There was one officer at the echelon, who was directly responsible to the battalion commander. In other owrds, in the battalion there were three separate units with no connection.

4. Upon moving from this position and throughout all of the advance until about July 28th, each battery commander handled his echelon individually. The first moves were made successively, by battery. The battalion commander would select a battery position and the battery commander would, at his discretion, bring his echelon nearer his battery or leave it in the position it had occupied at the privious battery position, depending upon the length of the move, cover, etc.

5. This practics sometimes brought the battery echelon nearer to the battery than a battalion echelon could have been placed, both on account of cover and the fact that a battalion echelon should be contrally located for the three batteries. But on the other hand, it made the supply problem extremely difficult; there was little supervision of the echelon by an experienced officer - the battery commander almost almost invariably kept with him his best officers - and there was extreme lack of uniformity in placing the echelons. At one time my three battery echelons were placed approximately as follows:

(1) One kilometer from battery position.
(2) Three kilometers from battery position.
(3) Six kilometers from battery position.

Each battery commander had reasons for his location, but this system of separate echelons with its lack of supervision and uniformity was entireley unsatisfactory.

6. At this time I consolidated the three echelons into a single unit - tactically -consisting of four sections; one section for each battery and one section for battalion headquarters. Each of the battery sections was commended by an officer from that battery and the battalion section by a sergeant. I selected the best 1st Lieutenant in the battalion (no Captains available) and placed him in command of the unit. This change was satisfactory for the few days we rmained in the line after it was made.

7. Upon being withdrawn from the line and sent to training near Gondrecourt, I formed my battalion as noted above and carried out two weeks' training accordingly, that is, I had four tactical units in the battalion with a Captain or Senior Lieutenant commanding each.

8. The battalion, of course, administratively consisted of the three batteries and a headquarters detachment, but upon taking the read or upon any tactical work it was formed into four units, the fourth unit being arbitrarily called the "Combat Unit," and it consisted of the battalion headquarters section and practically all of each battery except the firing battery.

9. Upon making a reconnaissance, three battery positions were located and a fourth position was located for the combat unit. The combat unit was placed as close to the battery positions as possible and all limbers, animals and spare men were returned from the battery - after its position was occupied - to the combat unit. The combat unit commander was responsible to the battalion commander for the prper care of the men, animals and material of the four sections and for the supply of the firing batteries and of the battalion headquarters from the combat unit. Where the position was probably to be occupied for some time, the caissons with the firing battery were emptied and sent back to the combat unit commander who had them refilled and haul with them to the battery most needing ammunition.

10. This tactical formatin of the battalion was a great improvement over the loose-jointed organization which I had on the Marne, where there were really two separate units in each battery, and two - though very small ones - in the battalion headquarters. The battalion was employed in this way throughout the St. Mihiel and Meuse-Argonne operations.

11. I am convinced that the battery should be a unit consisting of the firing battery and as little additional encumbrance as possible. The officers available for the command of batteries at a time of considerable expansion, are of limited experience and the efficient handling of our present war strength battery in the field will demand the services of at least two well-trained and experienced officers per battery; one with the battery, and one with the battery echelon.

12. A better arrangement, I believe, would be to form a battalion, consisting of three firing batteries, out to a minimum in strength and material consistent with the preservation of their present status as administrative and self-supporting units, and a combat unit consisting of four sections, namely, a battalion headquarters section and a section for each of the three batteries. The battalion headquarters section should include all of the battalion headquarters transportation and personnel and in addition a small supply personnel. Each battery section should include three caissons sections, with its personnel and possibly the ninth section also. - J. W. Anderson, Lt. Col., 10th F.A.

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(1) REGIMENTAL HEADQUARTERS

Change Captain and Adjutant to Captain, Operations officer, and Captain Personnel Adjutant, to Captain Adjutant.

Add:
1 Captain: Intelligence officer
1 Captain: Liaison officer (To infantry brigade)
1 Lieutenant: Orientation officer.

THE REGIMENT
Regimental Headquarters
Headquarters Company
Supply Company
2 Battalions.

BATTALION HEADQUARTERS
Add:
1 Lieutenant: Orientation Officer.

THE BATTALION
Add:
1 Ammunition Battery: to consist of
1 Captain
3 Lieutenants
9 Ammunition sections with properly organized enlisted personnel.

(2) No change.

(3) Omit 6th, 7th and 8th sections, less one 2nd Lieutenant. Make Chief Mechanic "Sergeant" Mechanic. Add 1 Munitions Sergeant.

HEADQUARTERS COMPANY:
Add to Headquarters Section:
1 Lieutenant; Munitions officer
1 Lieutenant; Linison officer to Artillery Brigade.
1 Sergeant; Munitions Sergeant
Add to each Battalion Section:
1 Lieutenant; Battalion Munitions officer.
2 Lieutenants; Liaison officers to Infantry regiment.
1 Sergeant; Munitions sergeant

Note: All telephone details to be doubled. - C. M. Bunker, Colonel, 808th F.A.

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1. Organize light regiments into three (3) battalions of two (2) batteries each. Such an organization provides greater flexibility and permits more readily of the detachment of accompanying pieces and infantry artillery in suitable force, with less loss of concentration and control in the hands of the divisional artillery commander, a noticeable defect in some recent operations.

2. Motorize the 6th, 7th, and 8th Sections of batteries of light guns (3-inch and 75 mm.) even in horsed regiments. These sections are transport pure and simple and should be equipped according to modern transport methods.

3. Attach a machine gun detachment to artillery brigade headquarters for aircraft defense. Such headquarters have been attached by airplanes and driven to cover in open operations for lack of any defense. - Edward Burr, Brigadier General, 62nd F.A. Brigade.

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1. BATTERY: If machine guns are to be continued as a part of the equipment, permanent provision in the organization should be made for their service. It is suggested that there be one gun with the firing battery and one with the combat train with a sergeant in charge assisted by two corporals.

Eliminate the 6th, 7th and 8th sections as caison sections and substitute three three-ton trucks with appropriate crews, i.e., one N.C.O. and six men. The caissons could well be formed into an additional organization giving a permanent combat train to each regiment (and battalion).

Provision should be made for an ammunition sergeant, a gas sergeant, a machine gun sergeant, a camouflage sergeant and a liaison sergeant; with a suitable member of privates.

Increase the number of men trained in work as telephone men and linemen, using them as relief and reserve but not carried in the Special Detail.

2. THE BATTALION: Larger battalion details and more linemen are needed. The principle of considering all the details as being in the "common pool" is alright in theory, but in practice there is more than enough work for all and there is no way of running a system of relief The necessity of being ready and doing every minute of the twenty-four hours of the day makes it imperative that the organization function with maximum efficiency at all times. This efficiency is hard to obtain when men fall asleep at the switchboard or while waiting for a splice to be made in a wire.

3. THE REGIMENT: There should be a small increase in the precent member of signal men.

The practice of using a trained artilleryman, and a captain, as Personnel officer, seems to be a waste of training.

4. THE BRIGADE: The services of supply should be climinated from th brigade. -H. M. Bush, Colonel, 134th Field Artillery.

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1. In the organization of the battalion it is recommended that the caissons of the battalion be formed into a caisson company. This arrangement will greatly facilitate the administration and supply. In open warfare the batteries of the battalion nearly always go into action in the same vicinity and change positions together. It has been found very convenient to group the combat trains of the different batteries of the battalion and send them to the dump for ammunition. When occasion arises for sending a battery on detached mission, or when conditions render it necessary to have the batteries go into position some distance apart as in trench warfare, the proper caissons can be attached to the batteries from the battalion combat company.

2. The present unequality in the pay of non-commissioned officers as compared with that of privates is a serious handicap to procuring the highest efficiency on the part of non-commissioned officers. The absurd law which raised the pay of privates almost to that of non-commissioned officers and failed to raise that of non-commissioned officers is very detrimental to the best interests of the service. Many men do not desire to take upon themselves the added responsibilities in view of the very small increase in pay. Moreover, many non-commissioned officers do not take as much pride in their positions as they would if their positions were better recognized in the way of pay. It is not so much the additional pay involved, but the value which the Government places on their services and the value placed on the services of privates serving under their orders.

3. It is recommended that the policy of attaching squads of men of the Ordnance Department to regiments be discontinued. With the facilities of the M.O.R.S. available it is not believed to be necessary to have this additional personnel in the regiment. If the man of this ordnance personnel were expert mechanics they would be of considerable assistance, but those furnished have not been of this class. Moreover, the battery mechanics are ordinarily able to handle all matters which do not require the attention of the M.O.R.S. The presence of the ordnance squads in the battery tends to take away the initiative of the battery mechanics.

4. I do not believe that bands are a profitable investment for regiments engaged in campaign. In peace time, and during the stay of troops in training camps, they are useful in promoting the morale, furnishing recreation, etc. The same may be said of troops after campaigns have been finished. I strongly recommend that when troops enter the theater of operations that bands be broken up, instruments turned in, and the personnel assigned to other duties. Of course, the reorganization of the bands after the conclusion of peace is a large task, but I consider that the disadvantage of having bands in fighting unite in the field is so great as to warrant breaking then up, as recommended above. During active campaigns in the field the hand is a dead weight on an organization. It requires considerable transportation to transport their instruments and their impediments. During the campaigns

through which this regiment passed from March to November, 1918, the periods of training out of the line were rare and of very short duration. It was only on rare occasions that any considerable part of the personnel of the regiment was able to enjoy the music of the band. - J. R. Davis, Colonel, 15th Field Artillery.

5. The present organization of the divisional artillery meets very well the present organization of the infantry division, that is, a light artillery regiment for each infantry brigade, which affords a light artillery battalion for each infantry regiment, the heavy artillery regiment being kept under orders of the divisions artillery commander. - J.R. Davis, Colonel, 15th Field Artillery.

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1. More linemen on Regimental and Battalion Headquarters details.
2. Assignment of personnel, animals and vehicles for rolling kitchens, water and ration carts, now with Supply Company, to batteries.
3. Elimination of two caissons sections per battery. - A. G. Fisher, Colonel, 307th F.A.

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1. The 6th, 7th and 8th Sections (Caisson Sections) should be eliminated from the light battery. The commissioned personnel of the light battery should be decreased by one second lieutenant.

2. The present organization of the Heavy Battery is believed to be correct.

3.

a. The battalionof Light Artillery should consist of three firing batteries of six sections, namely; the four gun sections and the present 5th and 9th sections. In addition to the firing batteries the battalion should have an ammunition battery made up of the 9 caisson sections eliminated from the firing batteries of the battalion, together with the properly organized 9th section containing the battery and store weapons, kitchens, etc. This Ammunition Battery should be commanded by a Captain. The reset of the commissioned personnel should be the three Second Lieutenants taken from the firing batteries as recommended above. Whenever possible, horses and limbers of the firing battery should be echeloned by battalion and the Captain of the Ammunition Battery should supervise the administration of the battalion of the battalion echelon, his lieutenants each commanding a platoon of the Ammunition Battery, and each normally serving a particular firing battery but all available to serve any battery. This plan gives the echelon an organization which is self-supporting, including the facilities for messing, supply, etc.

b. The Battalion Headquarters of the Light Regiment should consist of the Battalion Commander, one Captain as Operations Officer, one Lieutenant as Tleephone Officer, one Lieutenant Radio Officer, one Lieutenant Reconnaissance and Orientation Officer, one Lieutenant Munitions Officer, and three Lieutenants for duty as Liaison Officers to the Infantry. Enlisted personnel should include the necessary details for the Liaison Officers, a clerk for the Munitions Officer, and an increase in the signal personnel in order to permit of the establishment of visual signaling stations.

4. The Heavy Battalion should consist as at present of two batteries. Battalion Headquarters of the Heavy Regiment should consist of the Battalion Commander, one Captain as Operations Officer, one Lieutenant as Telephone Officer, one Lieutenant as Radio Officer, one Lieutenant as Reconnaissance and Orientation Officer, one Lieutenant as Munitions Officer.

5. The regiment of Light Artillery should consist of two battalions, organized as recommended above, a Supply Company, and a Headquarters Company as at present. The Regimental

Headquarters of the Light Regiment should consist of the Regimental Commander, one Lieutenant Colonel, second in command, one Captain as Adjutant for all administrative work including personnel, one Captain Operations Officer, one Lieutenant as Intelligence Officer, one Lieutenant as Telephone Officer, one Lieutenant Radio Officer, one Lieutenant Munitions Officer, one Lieutenant Reconnaissance and Orientation Officer, one Lieutenant Liaison Officer and one Lieutenant commanding Headquarters Company.

6. The regiment of Heavy Artillery should consist of three battalions, a Supply Comapny and a Headquarters Company as at present. The Heavy Regimental Headquarters should consist of the Regimental Commander, one Lieutenant Colonel, second in command, one Captain as Adjutant for all administrative work including personnel, one Captain Operations Officer, one Lieutenant as Intelligence OFficer, one Lieutenant as Telephone Officer, one Lieutenant Radio Officer, one Lieutenant Munitions Officer, one Lieutenant Reconnaissance and Orientation Officer, one Lieutenant Liaison Officer, and one Lieutenant commanding Headquarters Company.

7. The Divisional Field ARtllery Brigade should consist of two light regiments and one heavy regiment as at present, and should have in addition a battalion of two batteries of Mountain Artillery; an Ammunition Train of two sections, one motor drawn and one horse drawn; a Mobile Repair Shop. The Headquarters of such Brigade should consist of the Brigade Commander, one Major as Chief of Staff, and four Captains and six Lieutenants whose duties should be as shown in the attached table.

8. The armament of the Divisional Artillery should be for the two light regiments, 3" guns. The 75 mm. gun used in the presnet war has proven satisfactory but should be changed in some details. From the standpoints of operation of the gun some type of panoramic sight should be adopted, as well as a range quadrant which will permit of various settings without the use of the range table. Types of ammuniton for this gun are too numerous and should be subjected to a thorough revision to include fuses. From the standpoint of construction of the gun, attention is invited to the mechanical and technical defects mentioned in the attached report by the Commanding Officer of the Repair Shop.

9. The armmeant for the Heavy Regiment should be the 6" Howitzer until a lighter Howitzer which can do the same work has been developed. The only advantage in the lighter Howitzer would be in the supply of ammunition and even in this perticular, artillery power should not be given away, becuase in our experience, the difficulties of supply of ammunition for the 155 mm howitzer were always overcome. No change should be made until a lighter Howitzer is developed which has equal or greater range. The 155 mm Howitzer used in the present war has proven very satisfactory. Certain recommendations as to the construction of the gun contained in the report of the Ordnance Officer mentioned in the last sentence of the preceding paragraph are approved.

10. Proper organization and armament for Corps Artillery and Army Artillery cannot be commented upon as a result of any experience this Brigade hs had. - C. C. Bearn, Brigadier General, 153rd F.A. Brigade.

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It is recommended that the battery be organized as follows:

4 gun sections
1 caisson section
1 fourgon or similar wagon to carry signal equipment and instruments
1 reel cart
2 escort wagons for equipment and ammunition when necessary
1 forge limber, Saddler's equipment, etc. to be carried in third escort wagon

1 spring wagon
1 rolling kitchen
1 ration cart
1 water cart.

Field Artillery Battalion caisson train organized as a separate organization to haul extra ammunition. In practice in notion the caissons necessarily fall under the control of the Regimental munitions officer, and he is often compelled to use them as a unit. Better results could be obtained by having them so organized. Officer in command of train would be able to do the same work with better economy of men and horses than individual battery trains. If necessary for a battery to work independently extra caissons from the train could be assigned to it, but, in any serious action the battalion in the smallest effective unit and organization should be based on this principle. Some caissons should be left with the battery to enable it to function for a short time separately from the battalion train.

Fourgon wagons, not entirely satisfactory in design. Some similar wagon with the running gear of an escort wagon should be substituted for carrying signal equipment and fire control equipment.

Escort wagons should be included in the organization, at least two; four would be better. Present equipment manual fails to realize that much additional equipment must be carried for a long stay in the field; for example, office equipment, horse covers, gas equipment, etc. Also present equipment manual provides no transportation for machine-gun and Browning automatic ammunition. Failure to provide sufficient wagon transportation results in overloading of caissons, use of crates, etc. This results in a loan of mobility, unmilitary appearance, and loss and damage to equipment.

The 9th Section at present is heavy and cumbersone, forge limber is only necessary part: remainder would be better replaced by an escort wagon.

A possible modification of this organization would be the addition of two or more guns, forming a six-gun battery. As the number of omissions is decreased this would not render the battery unwieldy. Advantage of allowing one or two guns to be detached for harassing fire, anti-team game, etc. without seriously weakening the battery. - A. I. Benderson, Capt., 7th F.A.

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I recommend that the organization of a Battery be changed from its present status to the following:-

HORSES	ORGANIZATION
48	4 gun sections
24	2 caisson sections
4	1 fourgon
6	1 forge limber and excort wagon containing saddlers equipment and harness
8	2 escort wagons containing ammunition and rations.
2	1 spring wagon
2	1 water cart
4	1 rolling kitchen
98 draft horses.	

(b) This would in effect cut down the ammunition carrying capacity of the battery from 1160 rounds to 968 rounds. It would cut down horses from 126 to 98, with increased carrying capacity for materiel. In addition it would substitute easy pulling escort wagons from the

heavy ninth section and slat wagons. The loss in ammunition would be more than compensated for by increased mobility and saved equipment.

There are no table disadvantages to hauling material in slat wagons and ninth section wagons. The slat wagon is of such a narrow wheel base that the wheels readily cut into the turf: with the center of gravity so high it is easily overturned. The fixed double tree causes it to swerve on the raod. The ninth section wagons are nearly as heavy while they offer a small carrying capacity. The extra wheels fit only the American carriage so are useless to the remainder of the Battery. The saddlers case of equipment could be as well carried for immediate use in any other type of wagon in addition, you would be able to remove it from the carriage at a halt.

Three escort wagons would amply replace the four 8th and 9th section carriages. The idea in taking many a caisson section, or even two, would be merely to save equipment. A battery can not depend upon the shells it carries; it must rely entirely upon the hauling of the Dividion A.T. using the battery caissons to haul from its dump. The ammunition carried gives it a start at best. A haul has to be made immediately in any case so it becomes almost immaterial whether the start is 600 rounds with 1 caisson section or 1000 rounds with three. Escort wagons can haul nearly twice the number of 75 ms. rounds that a caisson does, and although not so mobile they could well be used in case of neccessity.

If it were considered necessary to constantly haul much ammunition or to retain the capacity of a F.A. Battalion in some measure to replace the D.A.T.; it would seem more advisabl to join a Battalion caisson train rather than add caissons to the battery units where they are less easily worked in cooperation for the Battalion. The battalion is the tactical units, its ammunition is hauled in bulk. The caisson train should be a unit. As well, a large battery echelon is a clammy organization. It has sometimes to be divided into three parts: rear echelons for stores, caissons echelon and limbers near the guns. With a Battalion train there would be two battery echelons at most.

In substituting three escort wagons for 7th caisson section, 8th slat wagon section and 9th section all but forge limber, you have decreased your horses materiel and organization (2) substitute mobile for heavy vehicles (3) increase your carrying capacity; without decreasin your effective ammunition capacity. The Battalion A.T. is a side issue. It would materially assist the D.A.T.: but whether or not it in no way effects the desirability of its battery change. - Lensing McVicker, 1st Lieut., 7th F.A.

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If the present Infantry Divisions are to contain the same number of rifles as are now organized, I recommend that the Divisional Artillery in time of war contain 4 regiments of 3 Battalions of 3 Batteries each. In time of peace these organizations can be maintained as at present, i.e., 2 Battalions of 3 Batteries each, the 3rd Battalion in each organization to be added and the personnel supplied from the 2 active Battalions. Experience has shown in the major offensives that this amount of artillery can be profitably used, and was used in the Argonne and in Belgium in the support of Infantry Divisions. - W. G. Price, Jr., Brig. Gen., 53rd F.A. Brigade.

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(1) Regimental and Battalion Headquarters.

The published organization does not give the personnel actually used and required. The following Staff is needed: Adjutant (Administrative); Personnel Adjutant; Operations Officer (Commander, Bdgrs. Co.); Intelligence Officer, Wireless and Gas Officer; Telephone Officer; Munitions Officer and Liaison Officer.

Note: Camouflage Officer was used but is not considered necessary to be an additional officer. The art of camouflage should be taught all officers and special non-commissioned officers before taking the front. The Administrative Adjutant or other Staff Officer can see that the work is kept up.

(2) Supply Company. Satisfactory.

(3) Batteries. Satisfactory.

(4) Medical.

I concur fully in the recommendation of the Regimental Surgeon as to a Brigade Surgeon for supervision and handling reports, etc., also that four (4) junior Medical Officers be assigned to the regiment and the commander select one as Sanitary Operations Officer.

The Brigade Surgeon would be the representative of a higher commander and could make inspections, even the numerous ones considered necessary during training. The surgeons with the regiment would feel themselves a part of the organization and possibly this would remove any tendency to evolve command within a command and would certainly remove some friction and the present requirement that surgeons be critics of their own commanding officer.-E. G. Sarratt, Colonel, 309th Field Artillery.

Battery--

1. Provisions for recognition of importance of Chief Mechanic by giving him non-commissioned rank at least of Sergeant.

2. With two machine guns assigned to each Battery, the Tables of Organization should provide for two machine gun squads, each under a corporal, with a Sergeant in charge of both squads, constitutiong a section.

3. Reduction in personnel due to abolishment of caisson.

Battalions--

1. Signal Corporal should be a sergenat.

2. Battalion detail should be a part of the battalion under command of the Adjutant.

Regiment--

1. Abolition of Headquarters Company and assignment of personnel to Regiment and Battalions to be under direct command of respective adjutants. Proper administration and tactical conditions demand this change. - G. F. Verbeck, Lt. Col., 106th Field Artillery.

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(a) Organization of the battery to remain as at present, with the exception that the cook force should be increased by six assistant cooks, to eliminate the necessity of making details for kitchen police. Such details take no interest in their work, which is usually given as a punishment, and the result is that one of the most vital parts of the battery is cursed with unwilling and unskilled help and the efficiency of all sections is reduced by furnishing the details. A permanent detail would result in better prepared food and better sanitation in the kitchen.- G. A. Wingate, Brig. General, 52nd F.A. Brigade.

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ANNEX 3.

Recommendations of Artillery Officers

American E. F.

ARMAMENT.

B.

ORGANIZATION AND ARMAMENT

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The bulk of our experience in the recent war has seemed to indicate that there is no necessity for divisional artillery since it has been found wisest to handle the artillery brigade entirely separately from the division of which it forms part. I am told that the British have had similar experience. In the French army there are but nine batteries in divisional artillery and these have generally been kept with their divisions. It appears certain, that under the conditions of service of infantry troops, either in mobile or stabilized warfare, the infantry division must be relieved from first line duties oftener than is necessary in the case of artillery. It has been suggested that the artillery assigned to the artillery division be limited to what might be called accompanying artillery only, that is, batteries of 75's which are to go forward to the infantry front line. A serious objection to this is the difficulty of training and equipping such small units. Further, the brigade of divisional artillery is now insufficient for the barrages on the divisional front when the division is heavily engaged.

My own opinion is that the artillery brigades should be organized, equipped and trained separately from infantry divisions, but that every effort should be made to bring the artillery brigades into intimate contact with the infantry troops which they are to support, and that in training periods battalions or regiments should frequently be divided up and assigned to duty as accompanying artillery. - R. S. Abernathy, Colonel.

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The organization of the divisional artillery brigade as now constituted by law is satisfactory and should be continued with the exception above noted, as follows:

Brigade Headquarters.
2 regiments of light field guns.
1 regiment of light field howitzers, consisting of two battalions of three batteries each.
1 ammunition train.

It is believed and recommended that the division artillery commander at all times and that the Field Service Regulations should be modified in this respect.

The provision that the ammunition train shall be under the commander of trains until the division commander's entry into active operations, after which it passes to the control of the Chief of Artillery, gives a divided responsibility which does not produce efficiency.

To place the train under the control of G-1 of the division is pernicious and automatically must relieve the Chief of Artillery of all responsibility for the supply of ammunition.

Armament of the divisional artillery should be as follows:

2 regiments of light artillery of 3-inch or 75 mm. calibre.

The French 75 has given complete satisfaction on the battlefield, both as to power, accuracy, and rapidity of fire, but it is recommended for our future field artillery that it be provided with split-trail carriage and truck wheels with roller bearings for rapid transport over the roads.

Experiment should also be made tending toward the development of a low truck carriage for all-round fire similar to the which has been developed by the French for anit-aircraft work.

The howitzer regiment should be equipped with a light howitzer of about 4 inch (10 cm.) calibre, firing a projectile of about 40 pounds.

The 155 mm. howitzer with which the division artillery is now equipped is too heavy for a divisional gun, and properly belongs to the corps artillery.

A divisional gun should be primarily for barrage and for the destruction of enemy personnel, whereas this piece, though of high quality, is more properly fitted for the functions of counter-battery and destruction.

It is a point to be noted that, with the exception of special high power pieces of long range, the 105 mm. German howitzer was the most harrasing gun that our infantry had to encounte and that to it may be attributed a larger proportion of our losses from artillery fire than to any other piece. The lack of such a piece in our artillery system has been felt throughout our participation in the war.

The effective range of all divisional guns should be extended by improvements in the material and by giving higher ballistic qualities to the projectiles to a maximum effective range of not less thatn 10 kilometers.

CORPS ARTILLERY. The functions of corps artillery are primarily those of counter-battery and the neutralization of enemy guns.

For this purpose the 155 mm. howitzer is admirably fitted, and in addition thereto, there should be a gun of approximately 4-inch calibre. The range of these pieces should be extended to about 15 kilometers and this extension in range should be a simple matter in view of the adoption of motor transport which removes the prohibition as to weight of gun and carriage hitherto imposed by the limitations of animal draft.

Corps Artillery should be organized into regiments as now constituted by law, but the amount to be assigned to any army corps in operations should not be fixed.

While an army corps holding a defensive position might require but two or three regiments of corps artillery, another corps operating on the offensive would require two or three times as much artillery.

ARMY ARTILLERY. The army artillery should consist of the following:

(1) Long range, high power artillery capable of covering with its fire more than the zone occupied by the army corps and deeper into hostile territory than the range required for enemy counter-battery. The mission of such pieces are distinctly counter-battery, long range harassing, and destruction. They should normally remain under the direction of the Army Chief of Artillery and operate in close liaison with the Corps Artillery.

(2) Heavy artillery for the destruction of fortifications or similar establishments Such pieces are generally of moderate range, but of great power. They are not necessary as a permanent adjunct to army corps or divisions, but pooled in the army and assigned to corps or division for special missions.

(3) Railroad Artillery for fire against very distant objectives, such as depots, railroads, enemy headquarters, etc., that are well within the hostile lines.

(4) Anti-Aircraft Artillery.

(5) A reserve of divisional guns and howitzers utilized wherever required for the reinforcement of the divisional artillery.

The present divisional artillery is about sufficient for defensive purposes, but it is not adequate for a successful offensive against serious resistance.

Advances under the support of the divisional artillery, not reinforced, have generally been very costly in casualties to the infantry, whereas attacks with a strongly reinforced artillery have been successful with little loss.

A general reserve of artillery makes it possible to strongly reinforce attacking divisio without stripping other portions of the line and without keeping the divisional artillery on the front for such long periods that personnel and animals become completely exhausted, as has frequently been the case in our operations during the war. The strength of this reserve should be at least 50 per cent of that of the total artillery of the divisions. - D. E. Aultman, Brigadier General, Army Artillery, 2nd Army.

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The heavy regiment of divisional artillery should consist of two battalions of howitzers and one battalion of rifles, of about the same mobility as the howitzers - as for example - 2 battalions of 6" Howitzers and one battalion of 4.7 rifles. Similarly, consideration should be given to adding two batteries of light howitzers to at least one of the light regiments.

The undersigned had opportunity to observe Corps and Army Artillery very closely only in the St. Mihiel offensive. In the 5th Corps each of the divisional areas were divided into three sectors, the outermost assigned to the Army Artillery, the middle to the Corps Artiller and the innermost to the divisional artillery, an arrangement that apparently worked very satisfactorily and avoided the possibility, and indeed the probability, of what later occurre in the Argonne - the needless firing of both Corps and Divisional Artillery on the same objective. Further in the 5th Corps at St. Mihiel, some Army Artillery was assigned to the Divisional Artillery commander for the reduction of strongly organized positions within the divisional sector. This is believed to be exceedingly good practice, as the Divisional Artillery Commander is thereby made responsible for all the artillery work in his sector, and there is no difficulty upon whom to call for artillery support within a given area.

The undersigned has had little opportunity to study the operations of railroad artillery but in the few cases noted it was considered relatively inefficient. The same amount of money and energy spent in more mobile materiel would have been more effective. A few guns of this type, and of large calibre, are undoubtedly necessary for special occasions, and should always be available, but their use will be very infrequent in a war of movement.

In the beginning of the Argonne offensive two regiments of Corps Artillery, of their own volition reported to the undersigned as their communications with the Corps were not establis or more uncertain; one regiment, a French 105, and the other an American regiment of 155 G.P.F.'s. Both of these rendered good service. - E. B. Babbitt, Brigadier General, 4th Brigade.

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The 155 mm. C.S. howitzer when horse drawn, is in my judgement too heavy for divisional artillery. I have not had sufficient experience with the motor equipment to report thereon. I further recommend that the magazine rifle be replaced by a limited number of automatic rifles. -H. S. Berry, Colonel, 115th F. A.

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(a) Divisional artillery.

The 75 millimeter gun has been throoughly satisfactory. In some ways, however, it is not sufficiently strong. In the 2nd Field Artilery Brigade there were several cases of the bursting of guns, sometimes due to weakness in the tube, sometimes due to premature explosion. It is my belief that our own 3" gun if given a proper carriage and a greater range will prove a more satisfactory gun than the 75. This, however, can only be determined by experience. The range of the light field pieces must be increased; at least 11 kilometers should be attained. A special light or medium weight gun with a range of at least 16 kilometers would be extremely useful for interdiction fire. The present 155 millimeter howitzer is a magnificent weapon. The supply of ammunition, however, for this howitzer is an extremely difficult matter. I believe that a lighter howitzer with a slightly longer range than the 155 would be more serviceable in general for divisional artillery. I further believe that one battalion of two batteries of each divisional heavy artillery regiment should be made up of 4.7 guns, having a range of at least 16 kilometers. A suitable number of mountain guns should be furnished each division for use as accompanying guns.

(b) Corps Artillery.

The 4.7 gun with increased range and such other heavy howitzers and guns that are necessary should constitute the corps artillery. The number and calibers of guns and howitzers should be determined by army artillery commanders after consultation with corps artillery commanders, depending upon the tactical situation.

(c) Army Artillery.

See subparagrpah (c) paragraph 1 above. As to the suitable calibers and type of guns and howitzers I can make no definite recommentation. Trench mortar batteries should form part of the army artillery park. They should be assigned to divisions when needed.

(c) The organization of present army artillery is faulty. The chief of artillery of the army is too far to the rear to efficiently handle the guns under his command. The corps is the center of information. The corps artillery commander is therefore in better position to direct the employment of the heavier guns. I believe that the divisional artillery should remain a fixed part of a division. The pooling system of divisional artillery is detrimental to team work, esprit de corps and general efficiency. The corps is a fighting unit and therefore should have the control of what is now classed as army artillery, with the possible exception of long range railway artillery. I suggest the organization of an army artillery park under the command of the army artillery commander. This park should contain a suitable number of light and heavy guns and howitzers for the reinforcing of divisional and corps artilleries. I have purposely avoided the use of the term "Army Artillery Reserve" because of the tendency to make use of this term for the purpose of keeping guns out of action. The term park is used for want of a better expression. In case of any problem of attack or defense the army artillery commander should assign to each division such additional guns and howitzers as reinforcement, as the needs of such divisions require. Likewise he should assign to each corps additional units of heavy guns to reinforce the corps artillery. He should not interfere with the employment of these guns, except to coordinate the work of two adjoining corps or to establish a general system of employment for a particular action. The heavy railway artillery might well remain under his command, but in some cases even this artillery might better be given to the corps for use. Such employment of army artillery would materially reduce the staff of the army artillery commander. - Am. J. Bowley, Brigadier General, 6th Corps Artillery.

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In-so-far as Division Artillery is concerned no change is recommended, except as indicated in (g).

The Divisional Artillery, as provided is not sufficient to support its Infantry in an attack against determined resistance on a front greater than one kilometer. It would appear that the greater economy in Artillery would be achieved if the Corps were equipped so that the Front of the Division would be covered at the rate of one 75 or 3 in. gun to the 20 meters, and one 155 or 6 in. howitzer to the 50 meters. In this connection, I believe that the principle that guns should not be kept in reserve is sound. If the reliefs are porperly handled, our organizations are ample so that the personnel will not become exhausted, and the necessity for withdrawing the guns when the Infantry wants its own Divisional Artillery behind it and this moral effect is well worth consideration when the Infantry is withdrawn and its Artillery stays in and is shifted from place to place. - E. W. Butner, Brigadier General, 1st Brigade.

Divisional Artillery.

3" gun.
4.7 howitzer (a good one).

These calibres are approximate but it is believed they should not be larger as even the smallest increase in weight of projectile will decrease the effectiveness of the arms.

They should be easily supplied with large quantities of ammunition. Further it is believed that there is no normal mission for Division Artillery that cannot be accomplished with these calibres. Ammunition supply in the Corps must be considered and the G.P.F. projectile is as heavy as can be quickly handled.

Corps Artillery.

A good 6" howitzer with a range at least as great as the Div. Artillery gun for counter-battery. Fire for destruction that may be necessary.

The present G.P.F. gun is considered nearly ideal. It has ample range for Corps interdiction. It has sufficient power for any bombardments that come as normal corps missions. But greater accuracy at nearly extreme ranges would help for long range C.B. that might be necessary.

Army Artillery.

Such heavy howitzers and guns as might be necessary for special missions according to nature of war expected or prepared for. Howitzer and guns of Div. & Corps Calibre and organization mounted so as to be moved quickly to reinforce Div. & Corps. Artillery units. - Army Center of Artillery Studies.

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Division Artillery should wherever possible be a part of and function at all times with the same division. The continual changing of artillery units from one division to another, creates confusion and is extremely bad for liaison, which will be called attention to in a later paragraph. - S. L. Cox, Colonel, 113th F. A.

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It is believed that the Divisional Artillery should consist of light artillery guns and medium howitzers, the brigades to consist of 3 regiments, and each regiment to have both horse-drawn and motor-drawn guns, with extra mounts for general utility. The organization of the Corps Artillery should be similar to that of the Divisional Artillery - the armament to consist of medium long-range guns and heavy howitzers, all motorized. The organization of the Army Artillery should be similar to the Corps artillery and consist of heavy long-range

guns--meaning by this 6" and above, and extra-heavy howitzers, all motorized. There should be some individual mounts in all motorized units.

There should be a general artillery reserve consisting of homogeneous units of the various calibres to be used for reinforcing the various elements of an operating aray when the necessity arises. - R. P. Davis, Brigadier General, 151st Brigade.

It is recommended that the trench mortar battery be taken out of the divisional artillery and assigned to corps artillery, in order to make the divisional artillery more of a mobile force, as trench mortars were seldom given the opportunity for use in the war of movement. - C. J. Deems, Colonel, 57th Brigade.

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The organization and armament of the Divisional Artillery is satisfactory. The only point that occurs to me in this connection is that in all of the offensives extra artillery is usually required above all that of the Divisional Artillery and put to purely Divisional Artillery work. A few extra Brigades of Artillery would meet this need without having to call on the Corps Artillery for assistance. Artillery can remain in the line during active operations for a period of time considerably longer than the Infantry of the Division. Utilization of this power will in a great measure supply extra Artillery for offensives from the Infantry Divisions that are resting or reequipping. However, the morale effect upon Infantry of being supported by its own Artillery is a factor that must not be overlooked and the private soldier will go forward when he knows that he is backed by his own guns while he will hesitate, or at least not advance with the same confidence if he has strange artillery in support no matter how efficient they may be. - W. H. Dodds, Colonel, 6th F. A.

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Divisional Artillery.

It is rather radical but the idea is presented that an artillery brigade might consist of the present three (3) regiments (each battery of 4 guns each) and another regiment. This fourth regiment would furnish the forward guns and accompanying batteries.

Corps Artillery.

No comment.

Army Artillery.

No comment. F. C. Doyle, Colonel, 305th F. A.

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The 155's of the divisional artillery have constantly been called upon to fire at objectives at the limit of their range. While counterbattery work is a function of the Corps Artillery, it was most often necessary for the 155's at extreme range. I am of the opinion that one battalion of rifles would be a valuable addition to the Divisional Artillery to perform this duty. - R. H. Dunlap, Colonel, 17th F. A.

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No suggestions, except that the functions and authority of Chiefs of Corps and Army Artillery, especially the former, should be defined. In two different Corps I have received

orders from the Chief of Corps Artillery (French officers in both cases) at variance with those of the Division Commander. - A. S. Fleming, Brigadier General, 158th F. A. Brigade.

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That Trench Mortar Batteries, now an element of the Divisional artillery, be organized into regiments and used as occasion requires, and not attached as an element of Divisional artillery. In the war of movement the trench mortar, as an offensive weapon, has very little value. There have been long periods during which the Trench Mortar Battery of this Brigade have been practically useless. Had they been a separate organization, and available for service with any Division, they might have been utilized at some part of the front where their services would have been valuable. It is recommended that trench mortar artillery be so organized as to permit of their use where required and not permanently assigned to Divisions G. G. Gatley, Brigadier General, 67th Brigade.

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Recommend that the number of officers assigned be increased in order to provide the necessary Liaison, Battalion Munitions, Battalion and Regimental Gas Officers, Intelligence Officers, etc.

Additional non-commissioned officers be provided for duty as Regimental, Battalion and Battery gas non-commissioned officers. - C. A. Gillmore, Colonel, 112th F. A.

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The Organization of the Divisional Artillery to be composed of two regiments of light artillery and one regiment of heavy artillery. The regiments to operate directly with Division headquarters, the Artillery Brigade ceasing to exist. The present Division Staff to be increased by one Brigadier General of Artillery as Division Chief of Artillery; one major of artillery as Divisional Artillery operations officer to work with the Division Operations Officer and one Captain of Artillery as Divisional Artillery Ammunition officer to work with the Division Ammunition officer. This Staff to be used primarily in an advisory and inspecting capacity by the Division Commander to insure the proper functioning and efficiency of the Artillery, but the operations to be controlled from the Divisional operations office directly with the regiment. In this same manner additional artillery might be called for and utilized by the Division through their operations officer upon the adivce of the Divisional Chief of Artillery. E. St. J. Greble, Jr., Colonel, 76th F. A.

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Divisional artillery to be:

2 Regiments Lt. Art. (horse-drawn).
1 Regiment 155 mm. Howitzers (tractor-drawn).

Corps Artillery should have plenty of motor drawn or transported artillery to allow quick reinforcements from one division to another over long distances.

Corps should have heavy rifles motor drawn, at least three regiments of light artillery motor drawn, and two regiments mountain artillery.

The Army artillery should include all heavy guns and howitzers of the largest calibres and special mounts such as used on railroads or on concrete implacements.

In Corps and Army Artillery, the Brigade should not consist of more than two regiments. - T. N. Horn, Brigadier General, 7th Brigade.

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(1) Divisional Artillery:

Organization should be one brigade of field artillery. Armament should be two regiments of 75 mm. guns and one regiment of 155 mm. howitzers. A regiment of 75's should have two battalions of three batteries each.

(2) The Corps Artillery should consist of 1 regiment of 75's, 1 regiment of 105's or similar caliber, 1 regiment of 155 mm. howitzers. The mission of the Corps Artillery is principally counter-battery and reinforcing Divisional Artillery. The 155 mm. long gun is not suited for counter-battery work and should not be used for that purpose. The Corps Artillery should be organized as a brigade and commanded by a Brigadier General. The Commander of the Corps Artillery should not have command of the Divisional Artillery. The Commander of the Divisional Artillery should be responsible directly and alone to the Division Commander. The Divisional Artillery is the Artillery that wins battles or helps the infantry to win them. If, in the future as it was in the last days of this war, the Corps Artillery Commander can order harassing fire by Divisional Artillery, the Division Commander order same and the Infantry Sub-sector Commander order same, there would not be enough transportation in an Army to supply the necessary ammunition.

(3) Army Artillery:

Am not qualified to make a recommendation. This Artillery was usually placed well to the rear and I saw but little of its activities. J. T. Kennedy, Lt. Col, 5th F. A.

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On account of the mobility of the 37 mm. gun, it is thought that about two of these should be a part of the armament of each Battalion of Division Artillery. These small guns could be advantageously used in forward positions support of the infantry in such places where it would be impossible to take the 75 mm. gun. - C. R. Lloyd, Colonel, 10th F. A.

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The organization and armament of the divisional artillery, with the exceptions noted, i.e., making the ammunition train a part of the brigade, or relieving the brigade commander from responsibility for the ammunition supply, and the elimination of the trench mortar battery, is satisfactory. There is no question but that howitzers should form a part of the divisional artillery, and it is believed that the more powerful the howitzer, without sacrificing too much mobility due to the weight of materiel and difficulty of ammunition supply, the more valuable it will be. I believe the present armament to be satisfactory.

With respect to the corps and army artillery as at present organized, I am not in a position to express a definite opinion based upon actual experience. - A. McIntyre, Brigadier General, 154th Brigade.

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For every light artillery regiment there should be added to the divisional artillery, one battery armed with the mountain gun or other light gun for use as accompanying guns. In trench warfare these could be changed into trench mortar batteries having the same close liaison with the infantry. It is believed that for those batteries very close liaison with subordinate infantry commanders, rather than command by infantry commanders is the solution.

Providing an additional unit for this purpose avoids breaking up the organization of the Field Artillery regiment, and the additional unit is needed. - C. McKell, Colonel, 12th F. A.

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In a great many operations need of a portable gun such as our 75 mm. mountain gun was felt, for the so-called sniping gun - the accompanying gun, etc. These in limited number should be provided for the divisional artillery. A battalion of our 75 mm. mountain artillery with its pack mule transport would have been invaluable. The divisional artillery was found insufficient in number of guns. Instead of an inknown extra regiment of battalion being attached, as was invariably done, at least the light regiments should, for campaign purposes, be increased in power by making them 9 battery regiments, or by increasing to 6 the number of guns per battery, or by increasing the number of regiments of light field artillery to 4, thus agreeing with the remainder of the divisional organization. The divisional artillery as organized is believed sound in principle; it is also believed that with increased reliance on motor transport, the personnel of the present battery is ample for manning an enlarged battery, should that means be adopted to increase the power of the divisional artillery. The sudden assignment of an unknown regiment or battalion to the so-called groupement is not considered sound in principle and has led, in our service, to a diminished reliance on the part of our infantry upon our artillery, with a consequent loss in their morale. - J. A. Mack, Colonel 102nd F. A.

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As long as the organization of the division remains as it is the three regiments of the divisional artillery should be of the same calibre. This will permit each brigade to have the direct support of an artillery regiment and the third regiment will be at the disposal of the brigade commander to direct as most needed. This supposes that corps artillery is to be organized and is available for its usual duties. When a division is acting by itself a proper amount of Corps artillery can be attached. If the Corps artillery is not to be organized on the peace footing one of the regiments could be equipped with the marteriel to be used by the Corps artillery in order that means of instruction in this materiel is available. E. A. Miller, Brigadier General, 6th Brigade.

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Magazine rifles should be called in and pistols or revolvers substituted. It is understood that this is the intention. Machine guns and automatic rifles should, however, also be furnished. - W. P. Platt, Colonel, 303rd, F.A.

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It is recommended that one battalion of three batteries, motorized, of 4.7 or 6" rifles be added to the divisional artillery. This is deemed necessary in order to cover back areas which could not be reached, or for which corps artillery was not at all times available, when it was badly needed. - W. H. Rucker, Lt. Col., 16th F.A.

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The armament of the divisional artillery should be increased by the addition of one regiment of 3.8 in. or 105 mm. Howitzers organized like a regiment for 75 mm. artillery. This howitzer is indispensable in all classes of warfare, and it especially adapts itself to positions in wooded areas and ravines. With the same mobility it has practically twice the destructive power of a 75 mm. gun, and it is a most suitable type of ordnance for harassing fire and for giving depth to the barrage. As long as it is omitted from our system we shall be at a great disadvantage in any military operations, as we have been in the operations of this war.

The armament of the corps artillery should consist of 105 mm. or 4.7 in. rifles, 155 mm. or 6 in. rifles, 8 in. howitzers and 9½ in. howitzers. This armament should be organized into regiments of each caliber, and the regiments organized into brigades. It is of little importance whether a battalion is composed of two or three batteries, but it is believed for such work the two battery battalion will give better results. The brigade should be composed of a regiment of each type of guns and a regiment of one type of howitzers. The mixture of types in a regiment is not recommended.

The army artillery should consist of batteries of all of the types existing in the divisional and the corps artillery and in addition a considerable apportionment of guns and howitzers heavier than the 9½ in. howtizer and the 155 mm. gun. These heavier types will in general be taken from the naval and the coast defence armament and especial carriages should be constructed for them.

The quantity of corps and army artillery should be sufficient in all cases to give the requisite density of fire when added to the divisional artillery available in case of a frontal attack. The quantity of artillery required bears no relation whatever to the number of infantry employed, but depends entirely upon the front to be attacked. Without entering into any length discussion, experience has shown that the following proportions are a minimum for a frontal attack upon any organized position:

One 75 mm. gun for each 15 yards of front.
One 3.8 in. or 155 mm. howitzers for each 45 yards of front.
One 105 mm. gun or 6 in. gun for each 100 yards of front.
One 8 in. howitzer or 9.5 howitzer for each 50 yards of front.
At least 40 super guns or howitzers for each army.

The armament, therefore, must depend upon the front which it is proposed to assign to an army corps. In this war American divisions have habitually attacked upon a front of about from three to four kilometers. In some cases it amounted to six kilometers, and in at least one case a division attacked over a front of nine kilometers. An army corps has usually occupied a front of two divisions, with one division in support. It is believed that divisional artillery should remain in action twice as long as the infantry of the division, and that corps and army artillery should remain in action throughout any continuous operation. If the above figures are accepted as a guide it can be assumed that the artilllery of at least three divisions can be constantly in action in a corps. The remainder of the artillery required must be provided by the corps and the army. Of this amount the corps should have at least one brigade of each type. Army artillery should then be added and all types below the super-heavy should be placed under the Chief of Corps Artillery as an addition to his command. Each brigade of Corps artillery should have its own brigade commander and staff, and it is believed that a counter-battery officer with a corresponding staff is also desirable. - C. P. Summerall, Major General, 5th Corps.

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Throughout most of the operations there were at least two Artillry Brigades attached to each Infantry Division and throughout the above mentioned period this Brigade was associated with three other artillery brigades. This matter of continually damaging artillery brigades from Division to Division made the question of supply and administration most difficult. If it were considered necessary to have the armament of two Artillery Brigades with each Infantry Division every effort should have been made to keep the same two in one Divisional sector. In addition to the difficulties experienced in getting supplies and making proper returns and records, the marching of Artillery Brigades back and forth, in the rear of the line added largely to the wearing out of animals, particularly as these changes were made by marching at night and going into bivouac in wet woods towards morning, with the result that after two or three nights without sleep, the personnel were unable to give animals the extra care needed during the day.

With the exception of the weapons of the Trench Mortar Battery, the number and caliber of the guns of an Artillery Brigade appear to meet the usual requirements.

While in general two Brigades were attached to each of the Infantry Divisions during an advance against the enemy when well entrenched, I am of the opinion that one Field Artillery Brigade as now organized is the largest artillery unit that should be permanently assigned to a Division.

As I have stated elsewhere, I do not consider the armament of our Trench Mortar Batteries suitable for open warfare and Trench Mortar Batteries should not be permanent unit of the Field Artillery Brigade.

A weapon suitable for a close up attack of machine gun nests should be devined and its personnel organized and controlled along the lines of the Machine Gun Units. - N. D. Todd, Jr., Brigadier General, 58th Brigade.

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The Divisional Artillery could well be composed of three 75 mm. regiments, two 155 mm. howitzer regiments and one regiment of 155 mm. long. - G. L. Wertenbaker, Colonel, 345th F. A.

(b) Organization and Armament of the Divisional Artillery, the Corps Artillery, the Army Artillery.

1. Divisional Artillery.

(a) Two regiments of 24 guns each of about 75 mm calibre, each regiment to consist of two gun battalions of six sections each and one ammunition battalion.

(b) One regiment of 24 howitzers, 16 of about 155 mm. calibre and 8 of about 120 mm. calibre; to be organized into two heavy howitzer battalions and one light howitzer battalion; also an ammunition battalion.

2. Corps Artillery.

One regiment of 155 mm. G.P.F. guns.
One regiment of guns of about 120 mm. calibre.
One regiemtn of howitzers of about 155 mm. calibre.

3. The functions and authority of Chiefs of Corps and Army Artillery should be more clearly defined. In two different cases I have received orders from the Chief of Corps Artillery (French Officers in both cases) at variance with those of the Division Commander. - A. S. Fleming, Brigadier General, 158th Brigade.

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Divisional Artillery - Three regiments two of these being lights and one medium heavy howitzer.

I should like to have the howitzer regiment consist of two battalions of about caliber 4.7 and one battalion 6 inch. - R. H. McMaster, Colonel, 21st F.A.

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A D D E N D U M

To

ANNEX 3

Recommendations of Artillery Officers,

American E.F.

Received after the Dissolution of the

Board.

ARMAMENT.

Divisional Artillery should consist of two regiments of 3 inch guns and one regiment of 4.7 howitzers with range of at least 12,000 yards (calibers approximate).

Corps Artillery should consist of 6" Howitzers and 6" guns (calibers approximate).

Army Artillery should consist of same calibers and organization as Divisional and Corps Artillery and such other heavier calibers as may be needed for special misisons. - C. W. Bunker, Colonal, 306th Field Artillery.

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1. Detach trench artillery from divisional artillery brigades. It does not pertain to the normal operations of such brigades in open warfare (war of movement) and was developed in this war on its present scale to meet conditions of stabilization and of position. As Army or Reserve Artillery, it can be provided and assigned when and where needed with far greater efficiency and probably with less personnel and equipment. Trench artillery should be organize as battalions or regiments for training and general administration.

2. From some reports it would appear that small caliber guns permanently assigned to infantry have not been effectively used. These guns might be organized and trained with divisional artillry and might be supplemented by standard caliber (3 inch or 75 m/m) guns for short range work as accompanying guns. The objection to providing special pieces for special conditions is appreciated, but such an arrangement might partially solve the difficulties as to accompanying guns with less strain on transport, and without diverting long range guns from their units and general purposes--ammunition (reduced charge) to be interchangeable.

3. The allotment of two regiments of light artillery and one of howitzers to the divisional artillery seems satisfactory, and at least is not excessive for divisions as large as are ours. The 75 m/m gun will, no doubt, be improved in range to correspond with the new German 77 m/m. The155 m/m howitzer is a wonderfully effective weapons--powerful, accurate, long range and mobile with motor traction. I strongly favor its retention and even if, following the views of some authorities, smaller howitzers (4.5 inch, for instance) are adopted, there should be a reasonable proportion of 155 m/m or 6-inch howitzers in the divisional artillery. Weight of ammunition is one of its drawbacks, but with the further development of motor transport, this can be met better in the future than in the past. -Brigadier General Bde, Burr, Commanding 62nd Field Artillery Brigade.

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In general the organization and armament of the divisional artillery brigade is quite satisfactory with two exceptions: First, that one of the three battalions of the heavy regiment should be equipped with high power long range guns, of about 4.5 inch caliber and of mobility equal to the 155 m/m howitzer. As a rule one battalion of 155 howitzers was placed in close support of each of the two infantry brigades with a regiment of 75's. The third battalion of 155's was usually held for special missions for which a long range gun could be better utilized. This battalion should not as a rule attempt to take on missions pertaining to the Corps Artillery, but a few long range guns could be employed to great advantage by the divisional artillery, especially during an advance. There was always too great a tendancy to employ the 155 howitzer at ranges which were highly detrimental to the materiel and which also resulted in an over-accumulation of B.B.P. powder. Secondly: The Stokes/Newton trench mortar battery is out of place with the divisional artillery. A lighter and highly mobile weapon of this kind is necessary, and must be developed. A light and mobile trench mortar, mounted preferably on wheels, and with a range of 1200 to 1800 meters would be far more useful to accompany the infantry than 75's or even the 3-inch mountain gun. For accompanying guns the 75 with its flat trajectory and great visibility is totally unsuited. If a suitable trench mortar can be developed, there should be two batteries with each brigade of divisional

artillery; one to support each infantry brigade, - P. D. Glassford, 51st Field Artillery Brigade.

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I would recommend a motorized Brigade Headquarters with perhaps ten mounts as has already been adopted, and that the organization and armament of the Divisional Artillery should contain 2 regiments of horse-drawn 75 mm. guns, 1 regiment of 75 mm. guns mounted on trucks, with trucks for the personnel, and to this regiment be assigned a number of light caterpillar trucks similar to the tanks containing 1 pounders and rapid fire gun to be transported on other trucks: the heavy regiment to consist of 1 Battalion of caterpillar drawn 155 howitzers, and 2 Battalions of 4.7 horse drawn howitzers. I believe that the Divisional organization of artillery should be continued and all under command of Brigade Commander, and while I have heard suggestions that the Brigade organization be abolished and that a Brigadier General be assigned to the staff of Division Commander as Chief of Artillery, yet I cannot agree with this arrangement being practical. In the first place where artillery is used with one division and another, as circumstances require, a group of three regiments as at present or four as suggested should be under on head, not alone for tactical purposes, but for perhaps as importan administrative purposes, and in my judgment a Brigade staff should be so organized that when detached from a Division it could immediately and with smoothness function as administrative headquarters. The constant changing of regiments as units from one Division to another, thus constantly coming under new commanders using different systems, will never permit of the successful team work, the maintenance of lines of communication and ammunition supply as can be expected of a Brigade unit properly organized and working together. This should be earnestl considered in making any change from the present Brigade organization. - W. C. Price, J., Brigadier General, 53rd Field Artillery Brigade.

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Armament of the divisional artillery.

1. The substitution of pistol for rifle in the personal arms of the howitzer of the divisional artillery is suggested. Batteries in these regiments are already armed with two heavy machine guns, each as anti-aircraft guns--with the addition of four auto-rifles, it is believed that adequate protection of the emplacements could be maintained for as long a period as with rifles. - G. F. Verbeck, Lieutenant Colonel, 108th Field Artillery.

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Organization and Armament of Divisional Artillery. Arm two regiments of divisional artillery with 75 m/m guns and one regiment with 155 m/m Schneider howitzers for two battalion of two batteries each, and with a light field howitzer similar to the Corman 105 m/m for one battlaion of two batteries. This will provide a weapon capable of moving off roads and also sufficient heavy guns to get an immediate powerful fire when needed. - G. A. Wingate, Brigadie General, 52nd Field Artillery Brigade.

C. of A. F.A.
GHN

General Headquarters.
AMERICAN EXPEDITIONARY FORCES.

France, February 17, 1919.

MEMORANDUM FOR THE CHIEF OF ARTILLERY:

Subject: Armament.

1. It is believed that the following types of materiel will fulfill all needs of the artillery which will ordinarily be met with upon the field of battle:

	Type 75 mm.	gun
	Type 3"	mountain gun
	Type 4.7"	gun
	Type 155 mm.	C.S.
	Type 155 mm.	G.P.F.
	Type 220 mm.	mortar (Schneider)
	Type 240 mm.	howitzer
Railway Artillery:		
	12 "	gun
	14 "	gun
Trench Artillery:		
	155 mm.	
	240 mm.	
Anti-aircraft Artillery:		
	75 mm.	
	4.7".	

2. It is believed that the Division should have one organic brigade of Field Artillery, composed as follows:

2 regiments light Field Artillery, Type 75 mm.
2 regiment heavy Field Artillery, type 155 mm. C.S.
1 battalion 3" mountain guns.

The principal arguement in favor of a light howitzer (4.7") seems to be facility of ammunition supply. With the motorization of heavy field artillery regiments it is believed that this difficulty will be overcome. There was never any question concerning the supply of 155 mm. ammunition so long as it could be accomplished by trucks; the difficulty arose in the forward movement where the regiment had to depend upon its caissons. If the regiment has trucks or tractors, with ammunition trailers, it is believed that the ammunition supply will be satisfactory.

Another argument in favor of the 4.7" howitzer is advanced in the success that the Germans had with their 105 mm. howitzer. It is believed there is no question but that America Infantry enjoyed being shot at by 105 mm. howitzers more than they did by German 150 mm. howitzers, and if the Germans had had more of the latter weapon in their divisional organization their results would have been proportionately greater. The 155 mm. C.S. is a proven weapon. It is one which German Infantry dreaded because of its size and the charge of explosi

carried, and it was a more effective emergency counter-battery weapon than would a lighter howitzer have been.

The reason for having artillery as an organic part of an Infantry Division is in order that the Infantry and Artillery may work out a smoothly running machine in which each has confidence in the other. This team work is secured through liaison and personal contact of the respective artillery and infantry commanders. While one brigade as constitued above is not sufficient artillery power for an attack over a front of four kilometers, there will always be available the artillery of the divisions in support and reserve, and if the command in the different echelons of the artillery be allowed to rest with the officers who belong to the organic brigade of the division there should be no trouble encountered in the satisfactory support of the Infantry.

3. It is recommended that each Corps have an organic heavy Field Artillery brigade composed as follows:

1 regiment 4.7" guns
2 regiments 155 mm. C.S.

The principal mission of the Corps Artillery is the destruction or neutralization of the enemy artillery. For this purpose the 155 mm. howitzer is eminently fitted. Distant interdiction and harassing fires are certainly a secondary mission to that of counter-battery, and a single regiment of guns would suffice. Improvement in shape of projectile will give the necessary range to these guns. Missions beyond their range would be performed by type 155 mm. G.P.F. furnished from the G.A.R. It is believed there should be more howitzers than rifles in a Corps Artillery brigade, because a howitzer can supplement interdiction or harassing fire much better than a gun can supplement counter-battery missions.

4. In the General Artillery Reserve there should be guns of all the types indicated in the first paragraph above, which could be used for the necessary reinforcement of divisional and corps guns, and for allotment as Army Artillery.

/s/C. H. Nance,
C.H.NANCE,
Lt. Col., F.A.

hb

C. of A. F.A.
GHN

General Headquarters.
AMERICAN EXPEDITIONARY FORCES.

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Type	155 mm.	G.P.F.
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Type	240 mm.	howitzer
Railway Artillery:		
	12 "	gun
	14 "	gun
Trench Artillery:		
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	240 mm.	
Anti-aircraft Artillery:		
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4. In the General Artillery Reserve there should be guns of all the types indicated in the first paragraph above, which could be used for the necessary reinforcement of divisional and corps guns, and for allotment as Army Artillery.

C.H.NANCE,
Lt. Col., F.A.

hb

December 5, 1918.

SUBJECT: Organization of a board of officers to make a study of the armament and types of artillery materiel to be assigned to a Field Arny.

1. I recommend that a board of officers be appointed to make a thorough study of the armament and types of artillery materiel to be assigned to a Field Army.

2. The reasons why this study should be made at this time are:

(a) The need for rapid production after our entry into the war made it necessary to adopt existing designs, which in many cases were known not to be the best.

(b) The existing emergency has made it impossible to pursue a thorough study of this question during the progress of the war.

(c) The experiences of war have pointed out certain defects, duplications and deficiencies in our armament and materiel which may be overcome by the improvements that have been suggested.

(d) The present time offers the best opportunity to make this study.

3. Some of the important questions that have come up for consideration are:

(a) Our present organization for divisional artillery includes no light howitzer. The need of a howitzer of greater mobility than the present 155 mm Howitzer should be studied.

(b) The motorization of the 155 mm Howitzer on a caterpillar mount and its use as Corps Artillery should be studied.

(c) From available information it is believed that none of the present type of heavy howitzer, 8",9.2" or 240 mm is entirely satisfactory as a permanent type for our army. Further more for the sake of uniformity and simplifications of ammunition supply, it is highly desirable that these heavy field howitzers be replaced by a single type.

(d) The great acvance which has been made in motor transport indicates that a more suitable mount and means of transport can be developed for the 75 mm guns, both for Divisional and Army Artillery.

(e) Another field gun of greater power and range than the 155 mm gun G.P.F. is necessary. The need for this was recognized by the introduction of the 194 mm gun.. This project, however, has been suspended. It should be taken up again and developed.

(f) A thorough study should be made of the motorization of our field artillery. The advantages of caterpillar over tractor or horsed artillery are so great that a general study should be made to determine whether caterpillar traction cannot be applied to all artillery.

4. The board should, therefore, be instructed to make a study in particular of the following questions:

(a) Type of Light Field Howitzer for use with Divisional Artillery.

(b) Type of Heavy Field Howitzer suitable for use with Army Artillery.

(c) Type of mount and method of transport of light field gun for use with Divisional and Army Artillery.

(d) Type of medium field gun for use with Corps Artillery.

(e) Type of heavy field gun in caterpillar mount for use with Army Artillery.

(f) Suitability of caterpillar mount for all motorized artillery.

(g) Improvements in construction and design to insure greater power and range.

(h) The feasibility of motorizing all artillery assigned to a Field Army.

5. This board should be convened at once in France where it will be in a position to make a first hand study of our armament and artillery materiel, learn the experiences of those who have used it in the field and at the same time make a thorough study of the materiel in use in all the allied armies. It will also be in a position to make a study of such materiel as was in a stage of development abroad, but which had not yet been supplied to the armies. It is more probable that our allies will accord us this opportunity at this time, rather than six months of a year hence.

6. After completing its investigation in France the board should return to the United States and finish its work at our ordnance and other plants where it will have the opportunity to observe the developments in this country and the completion of the subject.

7. The following officers, each of whom is specially fitted for this work, are recommended for this board:-

Brigadier General William I Westervelt (Now assistant to the Chief of Artillery, A.E.F.) who has specialized in Artillery Materiel and was on duty for many years in the Ordnance Department.

Brigadier General Robert E. Gallan (Now commanding a brigade of Heavy Artillery in France) who was on the staff of the Army Artillery and has specialized in Heavy Artillery materiel.

Brigadier General William P. Ennis (Now commanding 13th Brigade, Field Artillery, Camp Lewis, Washington) who organized the materiel course at the School of Fire for Field Artillery and has specialized in both horse and motor transport.

Colonel James B. Dillard, O.D. (Now in charge of Engineering Bureau, Ordnance Department) who has specialized in gun and carriage design and construction.

Colonel Ralph McT. Pennell, Field Artillery (Now commanding 34th Field Artillery, Camp McClellan, Alabama) who was in charge of materiel matters in the office of the Chief of Field Artillery.

Lieutenant Colonel Walter P. Boatwright, C.A.C. (now in charge of materiel, Heavy Artillery Section, Office Chief of Field Artillery, A.E.F.) who has specialized on Heavy Artillery materiel.

Lieutenant Colonel Webster A. Capron, Ordnance Department (now in charge of Motor Equipment Section, O.D. and at present in France) who has specialized in motor transport.

8. It is therefore recommended:

(a) That an order be issued appointing a board of officers to consist of the above named officers, this board to meet at A.P.O. 706, France, at the earliest practicable date.

(b) That upon the assembling of this board, a letter substantially as per annexed draft be transmitted to the president of the board.

(c) That a letter be transmitted to the Commander in Chief, A.E.F., France, with instruction substantially as per annexed draft.

9. The Chief of Ordnance (Major General Williams) and Chief of Coast Artillery (Major General Coe) have been consulted and concur.

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

December 5, 1918.

MEMORANDUM FOR THE ADJUTANT GENERAL:

The Secretary of War directs that substantially the following order be issued:

"A Board of officers to consist of:-

Brigadier General William I. Westervelt
Brigadier General Robert E. Callan
Brigadier General William P. Ennis
Colonel James B. Dillard, Ordnance Department
Colonel Ralph McT. Pennell, Field Artillery
Lieutenant Colonel Webster A Capron, Ordnance Department
Lieutenant Colonel Walter P. Boatwright, Coast Artillery Corps

is appointed to meet at A.P.O. 706, France at the earliest practicable date, to make a study of the armament, calibers and types of materiel, kinds and proportion of ammunition, and methods of transport of the artillery to be assigned to a Field Army.

During the time that the board is in session abroad, it will be under the direction of the Commander in Chief, A.E.F., France, who will issue the necessary travel orders.

After completing its investigations abroad, the board will return to the United States to finish its work at such ordnance and other plants in the United States as may be necessary.

The travel directed is necessary in the military service."

Instructions in substance as follows will be communicated to the board:-

"Referring to an order made this date, copy of which is enclosed, appointing a board of officers to meet in France to make a study of the armament, calibers, and types of materiel, kinds and proportion of ammunition, and methods of transport of the artillery to be assigned to a Field Army, the following instructions are communicated to you by direction of the Secretary of War for the guidance of the board:-

The board, in addition to a general study of the armament, calibers and types of materiel, kinds and proportion of ammunition, and methods of transport of the artillery to be assigned to a Field Army, will consider and determine:-

(a) Type of light field gun for use with Divisional Artillery.
(b) Type of light field howitzer for use with Divisional Artillery.
(c) The advisability of assigning the 155 mm Howitzer, as a medium field howitzer, to the Corps Artillery.
(d) Type of medium field gun for use with Corps Artillery.
(e) Type of heavy field gun for use with Corps Artillery.
(f) Type of heavy field gun for use with Army Artillery.
(g) Type of heavy field howitzer for use with Army Artillery
(h) Suitability of caterpillar mount for any or all motorized artillery.
(i) Improvements in construction and design of projectiles to insure greater power and range.
(j) The feasibility of motorizing all artillery assigned to a Field Army.

The board will be convened at A.P.O. 706, France, where under the direction of the Commander in chief, A.E.F., France, it will make a first hand study of our armament and artillery materiel, learn, the experiences of those who have employed it in the field and as

far as facilities are provided, make a thorough study of the armament and artillery materiel in use in all the Allied armies. It will also make a study of such materiel as was in process of development abroad but which had not yet been issued to the armies in the field.

After completing its investigation in France, the board will return to the United States to finish its work at such ordnance and other plants as may be necessary."

Instructions in substance as follows will be communicated to the Commander in Chief, A.E.F., France:

"Referring to an order made this date, copy of which is enclosed, appointing a board of officers to meet in France, to make a study of the armament, calibers and types of materiel, kinds and proportion of ammunition, and methods of transport of the artillery to be assigned to the Field Army, the following instructions have been communicated by direction of the Secretary of War, for guidance of the board:-

The board in addition to the general study of the armament, calibers and type: of materiel, kinds and proportion of ammunition, and methods of transport of artillery to be assigned to a Field Army, will consider and determine:

(a) Type of light field gun for use with Divisional Artillery.
(b) Type of light field howitzer for use with Divisional Artillery.
(c) The advisability of assigning the 155 mm howitzer as a medium field howitzer, to the Corps Artillery.
(d) Type of medium field gun for use with Corps Artillery.
(e) Type of heavy field gun for use with Corps Artillery.
(f) Type of heavy field gun for use with Army Artillery.
(g) Type of heady field howitzer for use with Army Artillery.
(h) Suitability of caterpillar mount for any or all motorized artillery.
(i) Improvements in construction and design of projectiles to insure reater power and range.
(j) The feasibility of motorizing all artillery assigned to a Field Army.

The board will be convened at A.P.O 706, France, where u[illegible]er the direction of the Commander in Chief, A.E.F., France, it will make a first hand stud[illegible]f our armament and artillery materiel, learn the experiences of those who have employ[illegible]t in the field and as far as facilities are provided, make a thorough study of the armam[illegible]t and artillery materiel, in use in all the Allied Armies. It will also make a study of such [illegible]teriel as was in process of development abroad, but which had not yet been issued to the Arm[illegible]s in the field.

After completing its investigations in France, the board will return to the United States to finish its work at such ordnance and other plants as may [illegible] necessary.

In connection with the above instructions to the board, it is requested that you provide every facility for this baord to perform its functions. It is further requested that you obatin the necessary authority for this board to visit such ordnance and other plants in France, England and Italy as may be considered desirable."

General, U.S.A.
Chief of Staff.

8 December 1918.

REPORT ON THE SUBJECT OF THE ARMAMENT OF THE FUTURE
by
General Sainte-Claire Deville.

1. ARTILLERY MATERIEL ON CATERPILLAR MOUNTS.

In a letter dated July, 1916, addressed to the Commander-in-Chief, in reply to a question concerning the mobility of heavy artillery, I have written that for this type of artillery, a gun firing from caterpillar mount seemed to me to be the solution for the future. This opinion did not meet with much success for the moment, inasmuch as more detailed information which I had offered was not requested, at any rate, by the services at G. H. Q. The Under-Secretary of State for Armament, however, having been informed by my letter, did me the honor some months later to call upon me for fuller explantions. Following this conference and as a result of his instructions the study of the 220 mm. mortar on caterpillar mount was undertaken by the St. Chamond firm.

Since that time ideas on this subject have developed to such a point that it appeared useless to me to repeat all the arguments which had been developed in the various documents emanating from the first I. G. A., the Commission of Experiments and the Direction of Inventions Studies and Technical Experiments of Artillery.

For myself I have come to the conclusion that a greater extension of this system of artillery mounting was useful, although at first I had only visualized the employment of caterpillar mounting for guns of the heavy artillery.

It is my opinion now that all artillery materiel, with the exception perhaps of the large guns of the A.L.G.P., can be advantageously mounted on caterpillar carriages.

If horse-drawn batteries should be retained, it can only be as a measure of precaution so as to be able to utilize a certain minimum number of guns in the event that gasoline should be lacking. It must be, however, admitted that modern war is impossible without gasoline, and that the nation which shall have omitted the making of provisions for this supply of gasoline will be destined to defeat. Thus I do not visualize here the complete lack of gasoline, but a small supply necessitating its economical use. In any case, tractor artillery seems destined to disappear.

In all cases it would be convenient to organize the materiel on caterpillar mounts in such a way as to make it possible to put it on rubber-tired wheels for the road. This problem is being studied and apparently can be solved except perhaps for the largest calibers.

Artillery on caterpillar mounts is more mobile on varied terrain than horse-drawn artillery and very much more mobile than the artillery tractor-drawn. The maintenance of the motors is not more difficult in the field than the maintenance of horses, and the motor consumes nothing when it is not working.

Without doubt when in battery, the vulnerability is somewhat greater for materiel on caterpillars than for the others, but this inconvenience is compensated for by the very great ease with which a change of position can be made when it is found that the battery has been located. Taken as a whole, there will be less danger to be anticipated from the enemy's fire.

It is obvious that if it is possible for certain materiel to leave in battery only the elements without gasoline motors their vulnerability will be diminished in this way. This solution is being studied by certain manufacturers.

For this system of artillery a frequency of breakdowns and the premature fatigue of the vehicle can be feared. This is a question of what details and dispositions should be made for assuring a periodic renewal of the various elements.

The technical progress in war materiel has always brought with it new mechanical complications, and these complications have always developed at first lively opposition. Experience shows, however, that in all cases where the end to be attained presented a real interest, progress has come about by force of conditions, and it has been necessary to accept the complications involved.

The first tanks were disappointing in some particulars, and it has always been the same with all new inventions. Automobiles of all sorts, and aeroplanes had to pass through the same development. But for all these machines, the causes of the break-down have been studied as they were produced, and at the end the necessary correction and changes have always been realized in a satisfactory manner.

The weak point in the course of this war has been the necessity for producing and outting into service with the briefest delay, without sufficient preliminary experimentation, any and all new designs of materiel. Another consequence of this speed in production has been the lack of standardization and the lack of interchangeability and supply of parts. In particular, dispositions have never been made to have a full supply of parts on hand so as to permit the renewal of materiel on the road with a view to maintaining always the full effectiveness of the materiel.

In ordering new materiel it is necessary to be sufficiently foresighted and to maintain as spares a proportion of the complete elements equal to one-fifth of this number. In a general way, the tendency which always exists to increase the number of units at the expense of their good maintenance should be combated.

A - HEAVY ARTILLERY.

(a) Long Guns.

Long guns are necessary for harassing and interdiction fire at long ranges. This cannot be omitted, altho it has serious defects. For mean ranges, guns have an accuracy of fire considerably less than in the case of howitzers. They are time poor weapons for counter-battery use. They are quickly used up. Consequently in program of manufacture, a primary stock of two or three spare guns should be provided for each carraige, and the rate of manufacture should be proportioned to the rate of manufacture of projectiles. This has not been the case during this war.

For the calibers of the long guns, 220 mm., and perhaps the 155 mm. can be adopted. These last two guns can be mounted on the same caterpillar carriage. It can further be questioned if for harassing and interdiction fire, it is at all necessary to have the 155, if the 194 is available. In limiting the caliber to 194, a valuable economy will be effected in spares and special tools. Furthermore, the caliber of 155 mm. being only retainted for howitzers, it will be useful to make provision for projectiles designed for greater destructive effect.

The subject of A.L.G.P. guns I leave untouched. It is strongly possible that they can be mounted on caterpillar mounts, at least up to a certain caliber, but I desire only to cite definite realizations, and this is not the case for the very heavy guns.

I should even make certain reservations on the subject of the 220 mm. gun on caterpillar mount, as up to the present time it has not been subjected to experimental firing.

(b) Howitzers.

Howitzers should form the preponderating part in the organization of heavy artillery. They are the only weapon which can fire with sufficient accuracy for counter-battery work and are excellent for this purpose. If they are of ample caliber (at least 155) and if their projectiles have proper forms, howitzers give excellent ranges with muzzle velocities included between 500 m and 550 m (except for the 280). The rapid erosion of guns is hardly manifest except for velocities greater than 550 m.

The 280 mm. mortar on caterpillar mount is to be retained. It is an excellent caliber for destructive work, but they should be supplied in limited numbers.

An excellent caliber of howitzer is the 220 mmm. St-Chamond type, designed for firing at the maximum range of 15 km.

155 mm. howitzer firing with muzzle velocities indicated below would be equally good for counter battery work and for destructive firing. These guns have easily a life of from 6000 to 8000 shots before becoming worn out.

I do not care much for howitzers of caliber less than 155 mm. With the caterpillar mounting the question of mobility does not exist, and, there is every advantage from the point of view of return to be expected per ton of ammunition used, to retain the large calibers

B - LIGHT ARTILLERY.

The question can be asked if in the system of artillery on caterpillar mount it is necessary to retain the two calibers of 105 mm. and 75 mm. as small caliber guns. This question can only be solved as a result of very complete experiments carried out under war conditions.

If a 105 mm. gun on a caterpillar mount gives entire satisfaction from the point of view of mobility and is able, in all circumstances and on all terrain, to conform to the movements of the infantry in the offensive as well as in the defensive, is it indeed necessary to parallel it with at 75?

A most useful simplification would be accomplished in service of ammunition and supply of spare parts, if in addition to the A.L.G.P., the calibers were limited to 220, 194, 155, and 105 mm.

The objective which is most frequently made to heavy projectiles is the very great difficulty of ammunition supply. This objection would only be valid if it should be proved that the material and tactical return for a ton of ammunition were greater with the small projectile than with the large one. The weight of the 75 and 105 projectiles are about in the ration of 1 to 2. If it were found then that in all circumstances the 105 shell was worth at least two 75 mm. shells, there could be no hesitation, for with an equal muzzle velocity, one would have always a greater range with the 105, and in addition it would be possible to count on a greater moral and material effect in certain cases. If, on the other hand, the preference should be given to the 75, it will be perhaps rational to suppress the 105.

With the scale: 75 (or 105), 155, 194, 220, and 280, everything can be done, and the reduction in the number of calibers should be considered from the moment that the question of mobility no longer prevents.

It will be possible to attempt to increase the range of small caliber guns by increasing the muzzle velocity of 600 or even 650 m. With caterpillar mounts, this would always be easy to secure, inasmuch as we always have in such cases complete stability of the carriage. But before adopting this solution it would be necessary to compare seriously the advantages and disadvantages. These latter include those of all high power guns and are those which I have already noted relative to guns of heavy artillery. The principal objection is the high rate

of erosion. If the small caliber gun were able to fire only 3000 to 4000 shots on the average, it would be necessary to visualize the manufacture of spare tubes, which might easily exceed the industrial possibilities of the ordnance establishments. Furthermore, the difficulties already mentioned would appear in curved fire for short ranges.

On this subject, it may be questionable if, for the 75, it is desirable to retain the fixed type of ammunition. The cartridge case lends itself badly to the use of multiple charges. In addition, with the shells having a conical base, it is difficult to secure sufficient rigidity between the projectile and the cartridge case. The experience of this war proves that a very rapid rate of fire (more than 12 shots per minute) is used very infrequently. The Germans have given up the cartrigde case, and it is my opinion that they were not wrong in doing so. An advantage of the ammunition in the cartridge case is the better preservation of the powder, but the cartridge case can be closed with a metallic diaphragm, as is the case for certain types of naval guns. For firing with reduced charges, this diaphragm could be removed by tearing off a soldered-on ribbon. It would be possible to give up completely the use of the cartridge case as a system of obturation, and store the charges in individual tin boxes. To this system the objection will be raised that the necessity of tearing off the soldered band would not be compatible with a rapid rate of fire. I do not believe this objection to be valid. In the first place, dispositions can be made for making it possible to open the box practically instantaneously. Moreover, it will always be possible in the batteries to unsolder ahead of time a certain number of boxes which would remain closed simply with their diaphragms. The essential thing is that the charges should be well protected against dampness during the long periods of storage at the parks and ammunition depots. It goes without saying that the method of storage of charges in individual boxes, which gives entire satisfaction to the English, could be adopted for the ammunition of all calibers.

REDUCTION IN THE NUMBER OF MODELS OF CATERPILLAR GUN CARRIAGES AND CATERPILLAR SUPPLY VEHICLES.

One condition to be fulfilled in the organization of a system of caterpillar artillery is the reduction to a minimum of the number of models of carriages. In the St. Chamond system, there are two models, the caterpillar gun-carriage and the caterpillar caisson, the latter including the source of electric power.

On the caterpillar gun-carriage, any of the following pieces can be mounted: the 280 mm. mortar, the 220 mm. howitzer, with a range of 15 km., or the 194 mm. gun, with a range of at least 21 km.

The 220 mm. long Schneider gun on caterpillar mount has not yet been experimented with. If it should be satisfactory, its adoption would involve the introduction of a new type of caterpillar mount. Moreover, it has not been proved that the caterpillar mount for the 220 St. Chamond howitzer can withstand the effect of the fire of the 220 mm. gun. If the 155 mm. heavy gun should be adopted, it could be mounted on the caterpillar carriage of the St. Chamond design.

For the light artillery on caterpillar mount, the guns to be anticipated are: the 155 mm. howitzer, the 155 and the 75 mm. guns, and the solutions of the problem will be different according to the combinations adopted.

If a 155 mm. howitzer firing with velocities between 500 and 550 mm., and a 105 mm. gun should be adopted, the later to the exclusion of the 75, one type of caterpillar mounting would be satisfactory for both calibers. If, on the other hand, the 75 should be retained, two types of caterpillar mounts would be required, as the caterpillar mounts for the 155 howitzer would be too heavy for the 75.

Consequently, in the caterpillar system of artillery, there would be three or four types of caterpillar carriages, depending on whether or not the 75 were retained.

In addition, a caterpillar type of ammunition supply carriage would be required for heavy artillery (this would be the power carriage in the St. Chamond system), and another type for light artillery. These ammunition carriages must have the greatest part of their elements, and particularly the caterpillars the same model as the caterpillar gun carriages. For the light artillery, the caterpillar mount for the 155 howitzer would be taken as th type.

What is to be avoided in the future is the adoption of numerous types of artillery produced by different manufacturers under the pretext that our national industry must be used completely in the production of war material.

RESUME

1. The adoption in principle of the caterpillar system of artillery, at least for all calibers up to and including the 280 mm. mortar.

2. Reduction to a minimum of the number of models of guns, of caterpillar mounts and of caterpillar ammunition carriages.

3. Determine if it is not necessary to give up the fixed type of ammunition, even to give up the cartridge case entirely, and to adopt the individual powder cans of tin for the preservation and storage of the powder.

4. Standardization of spare parts and exchanges; require interchangeability by manufacture.

5. Formation of large stores of spares in such a way as to permit repairs on the road and to make it possible to maintain the units completed at all times.

SAINTE-CLAIRE DEVILLE.

CONTINUATION OF THE REPORT OF DECEMBER 8, 1918, ON THE SUBJECT OF FUTURE ARMAMENT.

On December 8, 1918, I addressed a letter to the Commander-in-Chief giving my personal ideas on the subject of the armament of the future. This subject is very extensive and cannot be developed in a few pages, giving all the arguments in favor of a new system of artillery and replying in advance to all the objections to be anticipated. Wishing above all things to be brief, I only propose to open the discussion on the subject which I believe to be of vital interest.

Certain officers to whom I sent this note observed that it would be interesting to enter into greater detail, and in addition to correct certain interpretations of my note which I had not foreseen and which had not been in my thoughts. The present note continues the discussion in the first.

I - ARTILLERY MATERIEL

First of all, it is proper to put the question on its real bases. Should we, from the present moment, for anew all our artillery materiel, adopt new types and undertake quantity production? I believe it possible to set aside this hypothesis without discussion. Should we on the contrary, consider the modern materiel constructed during the course of the war, as definitely incorporated in our armament and proceed to the manufacture of new types, if the necessities of the case require?

I admit the question should be examined and the maintenance in service could be reaonably urged by reason of economy of our present stock of materiel, and the opportunity of completing it and of only making progress by progressive improvements of existing types. It is up to the partisans of this system to defend it.

As for me, I believe that it is the same for artillery as it is for industry. Success has been and always will be for those who do not hesitate to form their tools anew when they are out of date and to procure the most perfected machines and those giving the best return in the quickest possible time.

In my opinion, it would be fitting to preserve the existing materiel, but only with a view to its provisional use, to no longer manufacture specimens of the actual types or of similar types; to completely remake and on rational bases, the plan for the future armament, to pursue actively the studies of new materiel and to take a broad view of everything which concerns the expenses involved in the studies and the experiments.

It should not be forgotten that new materiel never gives satisfaction at first and that the perfection of the materiel necessitates long experiments and much groping in the dark, which are very costly, but which are certainly less expensive than the modifications which will be necessary if the preliminary experiments have not been sufficient. The niggardliness existing before the war for funds for studies and experiments have cost us millions.

Finally, it should also be remembered that the cost of a gun, whatever it may be, is very slight in comparison with the cost of the ammunition supply which it requires in time of peace and which it consumes in time of francs worth of ammunition per gun, and three or four times that amount per carriage).

Regarding this matter, considerably economy could be effected by using a part of our ammunition supply, or at least those elements of the stock of ammunition, the preservation of which is possible. This is the motive which can lead us in the choice of calibers to retain those already existing, and it is the reason why in my note of December 8, I took as the basis of discussion the series of calibers actually in service and not some new calibers.

The study of a plan of armament ought to be made methodically, and the choice of calibers to be adopted ought to be based not on reasons of tradition or of sentiment, but after a carefully considered examination of the tactical needs and the technical means at our disposal.

THE FIRST ELEMENT WHICH OUGHT TO BE CONSIDERED IN THIS DISCUSSION IS THE SYSTEM OF TRANSPORTING THE MATERIEL.

In my foregoing report I admitted on this subject that only three types of materiel would be retained; guns firing from railroads, guns firing from caterpillar mounts, and horse-drawn materiel, that is to say that the present system of tractor-drawn materiel should be abandoned. This opinion is in conformity with that of many of the officers of the Second Division of the R. G. A.; and my opinion is the same for the artillery portee as for the tract-or-drawn artillery.

The A. L. V. F. for the most powerful materiel should be retained, since it is not probable that they can be mounted on caterpillar carriages. I leave to others the question of studying the future of the A. L. V. F. I limit myself to the hope that:

1° - this artillery, which requires considerable personnel and materiel, should not be given an importance out of proportion with its function. (A good method of operation would consist in establishing in advance the percentage of artillery personnel, officers and men, to be assigned to each of the large divisions of the artillery, to base on these numbers the units to be organized and the importance of the materiel to be ordered, and to forbid any departure from these figures in the future unless experience clearly indicates the necessity for the revision.

It must be realized that in the course of this war this rule has not always been followed, and that when one branch of the artillery has had ardent supporters it has been enough to cause its exaggerated extension at the expense of the others.)

2° - that the principles of limitations of models and of standardization must be absolutel maintained.

Caterpillar and horse-drawn artillery remain to be considered.

I said, and I maintain, that caterpillar artillery will be able to satisfy all tactical needs and that in all cases, it would be superior in mobility and flexibility to horse-drawn artillery. Thus if there could be absolute certainty of having always and everywhere and ample supply of gasoline, there would be no valid reason outside of tradition for retaining horse-drawn artillery. But I am willing to admit that is is necessary to have two strings for a bow. There may be an insufficiency of gasoline, just the same as there may be an insufficiency of hay and oats. It is, however, imprudent to put all of one's dependence in gasoline, and that is why I anticipate the retention of a horse-drawn artillery, but on condition that it should be mobile. From this point of view, only the field artillery gives entire satisfaction.

CONCLUSION: RETAIN THE HORSE-DRAWN 75, IT BEING UNDERSTOOD THAT THE CARRIAGE HAS BEEN IMPROVED SO AS TO PERMIT THE UTILIZATION OF ITS MAXIMUM RANGE. It is on this point that by my fault, the text of my preceding report could be uncorrectly interpreted. There is no difficulty in correcting this.

Assuming the preceding considerations admitted, the plan of the caterpillar artillery remains to be proposed. Referring to the principle of limitation of models and standardizatio I am led to confirm my preceding proposals, having in view the adoption of two or three types of caterpillar carriages, depending on whether or not the 220 mm. gun should be realized. This gun from point of view of range, is actually the most powerful gun to be anticipated in caterpillar artillery. In order that there may be no gaps in the combat possibilities of

the artillery, the A. L. V. F. should be able to operate with ranges extending from the limits of the caterpillar artillery with, of course, a certain amount of overlapping. Thus if the 220 cannot advantageously be mounted on the caterpillar carriage, it should pass to the A. L. V. F., or it should be replaced by a gun which can fire effectively between 20 and 25 km. I am thus brought to the study of a plan of caterpillar artillery of power inferior to the 220 gun.

I said, and I maintain, that two types of caterpillars should suffice for all our needs:-

(a) a heavy type (20 to 25 tons according to the caliber for the caterpillar gun carriage), permitting, if the St. Chamond type is adopted, as seems probable, a caterpillar gun carriage and a caterpillar power carriage and caisson combined. This heavy type should be improved by a design permitting movement on rubber-tired wheels during transportation on the roads. The study of this design has been made by St. Chamond firm; it has not been considered interesting and I am unable to explain this opinion. I will note that from the point of view of passing over bridges, the increase of weight due to the axles and the wheels, offers no inconvenience, since before starting over the bridge it will always be possible to replace the carriage on its caterpillars and to move the axles over separately, and that the operation of passing from one system of movement to the other can be carried out rapidly,

(b) a realtively light type (about 12 tons) which can pass over nearly all bridges, and including both a caterpillar gun-carriage and a caterpillar ammunition-carriage. In this last type I shall not enter into the various solutions to be anticipated, particularly as regards to the possibility of leaving in battery the caterpillar gun-carriage without motor. It is the business of the manufactureres to submit their proposal and to presnet their models in competition. What should be remembered is that the type is certainly capable of realization and that we are not in the domain of Uptopia.

Thus an important part of the plan can be considered established, i.e. the factor of mobility and the means of transportation. Assuming these points obtained, the types of weapons to be adopted for the caterpillar mounts of the heavy and light types remain to be determined. This study I made in the preceding report. I do not at all pretend to have given the best solution. I give my opinion for what it is worth and because, although a technician, I met during the war, in my inspection trips, many artillerymen--men of all ranks, and from this fact acquired numerous opinions and documents of experiences, which give me, I believe, the right to have a personal opinion on the question of the employment of the arm.

In always proceeding methodically, the problem consists in determining a scale of calibers permitting the satisfaction of all the demands of combat, without paralleling anything, and without complicating the solution by hypotheses of too exceptional cases, and matters of secondary importance.

As I already stated, we require guns for interdiction and harassing fire, and howitzers for the accurate firing needed for counter-battery and destructive firing. Each of our two types of caterpillar carriages would suffice for both guns and howitzers, and it is of importance to choose calibers with a view to using all the power compatible with the weight of the caterpillar materiel.

Finally, it is of importance, and most vitally so, not to multiply uselessly the models of weapons.

It is with these ideas that I made my proposals and I maintain them.

Three pieces proposed for the heavy caterpillar mounts (194, 280 mortar and 220 howitzer) correspond to the conditions noted, in the sense that they represent, respectively, the maximum power which can be used with the capterpillar chasis.

The 220 howitzer has fired and its behavior has shown that its power can be increased and a maximum range of 15,000 m. realized.

The 280 will most certainly function, as it does not impose a greater stress on the carriage, and its stability can be considered as attained a priori.

The 194 has been proof-fired and the results obtained guarantee its success.

Thus we have, for destructive materiel, two excellent mortars, each of which has distinct properties (range and power).

With the 194 we have the maximum range which can be obtained with the carriage. I see no value in paralleling this piece with the 155 gun, which would not utilize the capacity of stability permitted by the carriage.

If we pass to the light type of caterpillar mount, we are brought to the solution of arming it with the 155 howitzer or 155 short gun, whose muzzle velocity will be determined in such a way as to best use the mass of the carriage.

The gun which will be associated with this piece will be determined by the same considerations as those above.

I indicated as an example the 105 gun, but this suggestion is not at all absolute, and if it should be proved that the 120 gun, with a range of 15 to 16 km. would not exceed the capacity of the carriage, it would be reasonable to give it the preference. But then it would be necessary to eliminate the 105 from our armament, as it does not appear to me to be necessary to have both of them.

As for the 75, since it would exist as horse-drawn artillery, it appears to me perfectly useless to introduce it into the caterpillar artillery, as it would result in the addition of a special type of caterpillar mounting.

In my preceding report, relative to the comparison of the 105 and 75 on caterpillar mounting, I offered the opinion that a 105 shell was equal, in all circumstances considered, to two 75 shells.

I would not like the conclusion to be drawn that the tonnage alone enters into the question, independently of the caliber, for the evaluation of the effect produced. In carrying this reasoning to the limit, it is obvious that absurd conclusions could be reached.

I reasoned only with the relatively neighboring calibers. Keeping in mind the correction made in the present note in what concerns the retention of the horse-drawn 75, the question no longer enters.

Transport of ammunition. - The caterpillar ammunition carriage of the heavy type carries 8 tons of ammunition, the light type would undoubtedly carry 5 to 6 tons.

The question can be asked, if it is fitting either to place important ammunition dumps near the pieces, following the practice of the late war, and using the battery carriages to go backward and forward between the rear dumps and the battery dumps in order to assure their supply, or to limit to a strict minimum (supply for a few hours) the tonnage of ammunition left of the ground in placing the loaded battery-carriages with the echelon of the group. Ammunition columns would then be formed, the purpose of which would be to supply the echelons according to the principles which had been adopted for the field artillery before the war, and which did not admit in any case of advanced ammunition dumps on the ground.

The number of vehicles for the ammunition columns and the number of ammunition sections should be calculated sufficiently broadly to make it possible to have at all times on the vehicles, in the rear of the batteries and groups, two or three days supply of ammunition which could accompany the artillery and supply it on all terrains.

By reason of the large tonnage which could be carried on these carriages, this result could be obtained apparently withiout increasing too extensively the number of vehicles put in operation.

It foes without saying that the horse-drawn 75 could be supplied with ammunition by vehicles of the same model.

In short, these carriages with caterpillar or wheels, interchangeable, should replace the actual trucks for all services requiring movement on varied terrain.

For the ammuition service, the motor trucks would consequently be used only for removing the army dumps or the centers of supply, and in a general way, to carry out the transportation of ammunition to be taken and to be placed in the immediate vicinity of roads.

REPLY TO CRITICISMS CONTAINED IN THE NOTE OF JANUARY 16, 1919 (I.G.A.).

"UNIVERSAL EMPLOYMENT OF THE CATERPILLAR CARRIAGE."

It was not my intention to recommend the exclusive adoption of the caterpillar carriage, as I have made clear in the present Note. A.A.L.V.F. is to be anticipated, also a caterpillar artillery and horse-drawn artillery, I shall not return to this point already covered.

But the question comes up if it is advisable to retain a fraction of heavy artillery, either tractor-drawn or horse drawn.

In 1916, I saw batteries of 145 taking three days to cover a few hundred meters in order to occupy a position in the ravin of Maurepas.

In 1917, I saw in Flanders groups of 155 G. P. F. which had been able to get in battery during fair weather at 500 meters from a road, and which could only get out of this position with the greatest difficulty after rains and only with the assistance of a caterpillar tractor.

Everyone knows the difficulties which certain tractor units had in covering the area of the old front during the course of the Champagne offensive in September, 1918. Innumerable facts of the same sort could be cited.

Horse-drawn heavy artillry, even 155 howitzer, have known similar difficulties.

It is only necessary for me to recall that many of the guns which we had to abandon in the Oise and the Marne regions in the course of the German attack of 1918 would have been saved if they had been mounted on caterpillars.

As the tractor artillery consumes gasoline just as the caterpillar artillery, it has no advantage from this point of view.

The solution of retaining wheeled carriages and hauling them by means of caterpillar tractors does not seem to me to be commendable as a definite solution. There is in fact no comparison between the mobility of a gun that is drawn and a gun mounted on caterpillar.

On the other hand, one of the principal advantages of caterpillar materiel would be lost, that is the elminiation of the trail spade and 360 degrees are de traverse.

"Movement on the road of the caterpillar mounts necessitated the addition of wheels, a design which has yet been practically solved."

I am entirely in accord on this point, but it is in my opinion a reason for actively seeking the solution, and it should not be declared impossible of realization before experiments have been made.

Projects have been presented by the St. Chamond firm; other manufacturers can be called on for suggestions. A priori, no serious difficulty is apparent to oppose the realization of this important improvement.

"The width of carriages is harmful to traffic on the road."
The amount of obstruction is about the same as that caused by heavy artillery materiel tractor drawn (2 m. 50 gauge); but , on the contrary, caterpillar artillery in case of raod blockades, can temporarily leave the road entirely. This materiel can also leave the road at a certain distance from the position to be occupied and reach these positions by crossing fields, a maneuver often impossible for tractor artillery and heavy horse-drawn artillery, which cannot cross the smallest ditch.

"Heavy weights require engineering works in good condition and of considerable strength."
This is incontestable in what concerns the heavy caterpillar artillery; but the light artillery of this type will cross the same bridges as the heavy tractor artillery of the present, and in the pursuit there will always be the first echelon of heavy artillery capable of following the Infantry. The second echelon will join soon after, either by making detours, or waiting for the strengthening of the bridges.

"Difficulties of concealment from aeroplanes by reason of size of the materiel and the characteristic traces left on the ground."
The visibility of a piece on caterpillar mount is not much greater than that of a G. P. F., which has so characteristic an aspect. The camouflages of a varied nature are applicable to the former as to the latter.

I admit that the paths of the caterpillars are more visible than the others. But if a caterpillar system should be generally adopted for transportation of all kinds on varied terrain, the number of paths would create soon a net-work difficult to be used for the location of batteries, especially if care is taken to make many false paths.

"Great vulnerability." Every piece of artillery is vulnerable.
The coefficient of vulnerability will undoubtedly be a little greater for caterpillar artillery, but as I have already noted, this inconvenience is compensated by a greater mobility, which facilitates abandoning positions located by the enemy.

The number of guns put out of action by zone firings is relatively small; only adjusted firings or firings effected on a narrow zone, after accurate registration, would constitute a great danger for this materiel. But the risk of destruction is not to be considered alone, if it only exists in a small degree; it should be placed in the balance with the other advantages of the system. In other words, of a hundred pieces in battery, 5% would be hit instead of 3%; this will be acceptable if the remaining pieces are capable of a better return.

"Problem of Supply." This question is treated in the present Note.

"An artillery whose elements would be frequently moved will have difficulties in organizing its communications, commands, observations, and relations with the neighboring troops. The use of this materiel massed will be forbidden and the accuracy of fire will be dminished.

Two cases should be distinguished:

(a) Moves of short distances, in any direction relative to the front and having for its object only the escape from the effect of fire on a battery located by the enemy.

The problems of communications and observations is hardly complicated by such moves. The guns could be immediately oriented in direction, if provision had been made by the Orienteur-Officer to place acutely located stakes in a position to be eventually occupied.

The registrations carried out from one position will be satisfactory for the others.

(b) Tactical moves. It is of course evident it would not be necessary to move an artillery excessively under the pretext that it is mobile; but it should be regrettable that this mobility itself should be considered a defect.

"The automobile transport sections give an economical solution to the units of the R. G. A. for their ammunition supply."

Economical, perhaps, but not practical, at all times, unless the battery is in the immediate proximity of the road. But let us not forget what happened in 1918, and particularly in the course of the Champagne offensive.

"Radical solutions are not to be rejected a priori, but before adopting them, the questions should be submitted to as profound a study as the circumstances permit. In fact there is in existence a mass of ingenious patents which have ruined their inventors."

I am entirely in accord with this, and the principal object of the initiative that I took was to get these ideas started and to submit them to a discussion, which will never be too deep.

I rejoiced to have been criticized.

I have profited by certain observations which have influenced my point of view and if I replied in too great detail, it is because I consider that everything should be said on this subject of such vital interest.

The inventors who have been ruined are those who have not submitted their inventions to a test of sufficient experiment before starting their manufacture, and I am the first one to request that a similar fault be not committed.

"System of heavy artillery proposed."

The reply to these observations is almost completely formulated in the foregoing.

I did not deny the value of guns; I limited myself to enumerating their advantages and disadvantages.

Among these letters, I not only cited the rapidity of erosion, I noted that, at medium ranges, which should not be neglected, guns were not equal in value to howitzers. I particularly insisted on the necessity of anticipating the replacement of long tubes at a function of the number of shells to be ordered.

"Utility of the cartridge case."

I only spoke of this question to start a discussion on it, on account of the numerous opinions which have been given me relative to it.

In the system of artillery which I recommend I believe that if the cartridge case is retained it should be retained only for the 75.

RESUME.

In taking the initiative of submitting propositions which have not been asked of me, I wished to provoke discussion on certain questions which seem interesting to me, and to bring to this study the contribution of the experience which I have acquired during the course of the war.

I would wish that this exchange of ideas should result in a program of studies and a firm decision on the subject of the experiments to be carried out on the existing materiels and the orders for experimental materiels to be given to the manufacturers.

In the system of artillery which I anticipate, the heavy type of caterpillar carriage is existent and a fairly large number of this type are in course of construction. The three calibers of 280, 220 and 194 are thus taken care of.

There only remain the extensive experiments to be made to realize a very desirable improvement, consisting in making these carriages capable of movement on rubber-tired wheels also.

The study is made and an order is only necessary to be given so that the St. Chamond firm will undertake its realization.

The light type is certain of realization. I believe that St. Chamond has also prepared the study of this; at all events it can be started.

The horse-drawn 75 with large angle of elevation is already realized by various manufacturers; if I am correcly informed, experiments are being carried out. In this respect, it is only necessary to pursue the experiments.

SAINTE-CLAIRE DEVILLE.

TRANSLATION OF A GERMAN DOCUMENT.

MANUAL OF POSITION WARFARE FOR ALL ARMS.

PART II (PROVISIONAL).

SUPER-HEAVY FLAT TRAJECTORY GUNS.

(November, 1917.)

ISSUED BY THE CHIEF OF THE GENERAL STAFF OF THE FIELD ARMY.

BERLIN, 1917.

N. B.--The original is marked:--
"Not to be taken into the Front Line."
"Secret"

General Staff (Intelligence),
General Headquarters.
20th November, 1918.

CONTENTS

		Page
I.	Principles of employment	3
II.	Commander of super-heavy long-range group	5
III.	Reconnaissance	6
IV.	Construction of positions and cover	9
V.	Moving into position	11
VI.	Observation and methods of fire	11
VII.	Concealment	13
VIII.	Dummy positions	13
IX.	Reinforcements	14
X.	Supply of ammunition and material	14
XI.	Care of material	14
XII.	Cranes and special trains	14

Appendix 1. -- List of Special Manuals.

2. -- Figures 9 and 10: Gun pit and railway lines for 21-cm. Q.F. gun.

3. -- Figures 11 and 12: Railway lines for 24-cm Q.F. gun.

4. -- Figure 13: Gun pit and railway lines for 24-cm Q.F. gun.

5. -- Technical Summary.

6. -- Artillery Summary.

SUPER-HEAVY FLAT TRAJECTORY GUNS.

I. -- PRINCIPLES GOVERNING THE USE OF SUPER-HEAVY FLAT TRAJECTORY GUNS.

1. All flat trajectory guns over 15-cm. calibre are included in the super-heavy flat trajectory class.

2. When correctly employed and systematically controlled, super-heavy flat trajectory fire is a valuable weapon for the Army command. It disturbs the rest and movement of hostile troops far behind the front line, hinders the preparation and transport of war material and drives balloon observation back to the limits of its time fuze effect.

3. Super-heavy flat trajectory batteries are placed, as a rule, directly under the orders of Army HQ. Only in exceptional cases are they allotted to Corps, etc., to carry out special tasks. When the effect of super-heavy flat trajectory fire has to be supplemented by that of heavy and medium calibres, somewhat closer cooperation is necessary with the Artillery Commanders of the divisions concerned. In special cases, it may be advisable to place medium and heavy flat trajectory batteries under the super-heavy long-range group.

4. Super-heavy guns engage the following targets: -- Traffic centres, ammunition and engineer dumps, railway stations, villages which are crowded with troops, hut camps, captive baloons, occupied gun sidings and aerodromes, in so far as these targets cannot be engaged by other guns. The bombardment of large industrial centres can also be very remunerative. Since distant targets of small size necessitate an excessive expenditure of ammunition, single special guns will not, as a rule, be engaged. The engagement of battery nests is only justified when it is impossible, by any other means, to neutralize them temporarily and thus relieve our own artillery. In this case searching and sweeping fire must be reduced to the lowest limit.

Observed harassing and destructive fire should generally be used. Barrage fire and shooting purely by map only result in an irresponsible waste of ammunition and, as a further consequence, in an irresponsible waste of guns, because of the short life of each gun.

5. Flanking fire is the best method of utilizing such long-range guns, and must extend even into the areas of neighbouring armies. The mutual support of armies by means of flanking fire must be arranged by the HQ of Army groups. This requires continuous communication and personal liaison. The nature of the 50% zones of the guns renders it advisable to engage a target in the direction of its longer axis. This factor very often determines the choice of a position.

6. Mobility is the best means of ensuring the full effect of the piece and also its protection from hostile destructive fire. Thus, for all guns on railway mountings, the following points are essential: -- The construction of a carefully planned normal or narrow gauge railway system with a number of spurs for railway guns, the preparation of alternative positions with spare platforms and, further, timely supply of cranes for platform guns (Bettungsgeschutze).

7. The preparations for the employment of super-heavy flat trajectory fire must be made during quiet periods. They are controlled by the Artillery Staff Officer at Army HQ.

If there are indications of an impending hostile attack, a special staff must be detailed in order to expedite the preparations and also to control the super-heavy long-range group of the Army. For further details, see Section II (paras 26-35).

8. Army HQ are responsible for the following preparations: --

Determination of battle tasks.

Reconnaissance and preparation of positions, including the necessary railway construction.

Reconnaissance of ground observation posts (as auxiliary survey posts) and preparation of battery maps.

Construction of signal communications.

9. It is advisable for the battery commander to be present during these preparations and especially to allow him to cooperate in the construction of the railway and the emplacement. For this purpose, it is necessary that commanders of incoming batteries should arrive several days in advance of their batteries.

10. The decisive factor in the choice of a position is the task. Since the gun is virtually irreplaceable, the danger of its position must be proportionate to the nature of the target. However desirable an increase in effective range may be, special guns kept continuously within range of hostile artillery would only be unduly exposed to hostile fire. They should therefore in most cases be sited considerably to the rear.

11. For special tasks, e.g., engagement of balloons, it may be necessary to move guns forward, primarily, the more mobile guns, either those on railway mountings (E.) or those on wheeled carriages (R.L.) by means of motor traction. This also applies to night firing. Arrangements should be made to vacate the forward position before the enemy can reply with a destructive shoot.

12. Positions near usual long-range targets are to be avoided. Positions against which a systematic bombardment may be expected shortly after opening fire are only to be occupied for tasks which cannot be carried out from any other position. Immediately after firing, the piece and firing platform, at least, must be brought under cover. If the enemy has registered a position, it must be seriously considered whether even an immobile gun should be left exposed any longer to hostile fire.

13. Army Headquarters must ensure that the introduction and activity of super-heavy guns are not hindered by consideration for resting troops and staffs, or ordnance, or other stores and the like, and the tactical employment of the gun thus depreciated. The effect of fire must be given precedence over all other considerations.

14. The existence of previously prepared alternative positions will be of assistance in coming to a decision when considering the advisability of moving a gun. Experience has shown that, even during the artillery preparation for an attack, the enemy systematically bombards not only the occupied positions but also the alternative positions and their approaches by rail. Such neutralization can only be avoided by a well planned and continually tested camouflage of the actual positions and by the use of dummy positions.

15. Gun positions, which presumably can remain in use for a long time, may be provided with concrete or mined dug-outs; but, for short tasks, temporary arrangements must suffice. The enemy also furnishes his gun spurs with dug-outs. Since the armour plating of a railway gun is only splinter-proof, protective arrangements, especially for cartridges, are advisable.

16. The grouping of several guns in one battery must be exceptional. A gun spur with several lines is hard to conceal, increases the area of the target and entails the danger that a direct hit on the common switch would render all the guns immobile. Even the guns of 17-cm railway gun batteries should often be used as single guns. The enemy's method of massing guns is inadvisable for defence. Concentrated fire effect can be obtained better by firing simultaneously from separate positions.

17. The expenditure of valuable ammunition must depend entirely on the results to be expected. In consumption of powder, one 24-cm round equals 80, one 38-cm. round equals 320 field gun rounds.

18. Thus, orders giving a battery its tasks days beforehand must always leave considerable latitude as regards not necessarily carrying them out in the event of there being obviously no prospect of obtaining effective results. Orders to a battery to fire a given number of rounds in a given number of weeks or months are forbidden.

19. The storage of more than the absolute minimum of any kind of ammunition in the position can only be justified when it seems probable that the transport of ammunition from an unexposed dump will be rendered impossible by hostile fire. The construction of field tramways and the allotment of special motor lorries by Army HQ will always pay.

20. Fire for effect must always be observed. Earlier registration of targets, which are to be engaged later with fire for effect in cooperation with other batteries, does not do away with the necessity for checking the range again.

For the necessary means, see Section VI., paras. 73 et seq.

21. It is the duty of Army HQ to place at the disposal of the Commander of the super-heavy long-range group the necessary auxiliary forces, such as aeroplanes, balloons and survey posts, and the means of communication, such as telephones and lamp signalling apparatus, wireless sets and motor lorries for personnel and material, etc.

22. Camouflage is absolutely essential for continued activity. It is of especial value in the case of super-heavy guns, since their position and activity are hard to conceal (cf. Section VII., para. 88 et seq.). Material for dummy positions and smoke screens should, therefore, be allotted in particular to super-heavy gun batteries, so that their already limited scope of activity may not be further restricted through the lack of such important means of defence.

23. The local allotment of super-heavy gun batteries, having regard to billets, sanitation, rations, supply of material, horse lines, etc., must be specially regulated by Army HQ, who should pay proper attention to the needs of the batteries which usually remain in line without any relief.

24. If rear positions are being constructed in an Army area, preparations must also be made for the employment of super-heavy gun batteries.

The following points should be attended to: -- Reconnaissance of battery positions, construction of platforms or at least digging pits for platforms, construction and surveying of gun sidings, preparation of battery maps, establishment of observation posts, means of communication, ammunition dumps and field tramways. All preparations must be preceded by consideration of intended tasks; cf. paras. 4 and 10.

25. The Staff Officer for Super-Heavy Flat Trajectory Guns and his staff are available at all times to advise the Army Groups and Armies, etc., on all matters concerning these guns.

His instructions are as follows: --

"The Staff Officer for Super-Heavy Flat Trajectory Guns at GHQ collects all experiences with super-heavy guns from 17-cm calibre (inclusive) upwards and brings questions of principle to the notice of GHQ, through the Inspector-General of Schools of Gunnery at GHQ; GHQ will decide as to the further issue of this matter.

"According to the instructions of GHQ he cooperates in an advisory capacity with the various headquarters on questions of employment, siting and action of super-heavy guns.

"He issues information on technical and ballistic questions, and, for this purpose, deals directly with the super-heavy batteries and long-range groups.

"He makes suggestions as to the allotment and movements of cranes.

"He keeps GMQ informed as to progress in the construction of positions and railways for super-heavy guns; for this purpose, he communicates with Army Groups and Armies who forward the necessary information.

"He promotes the training of the batteries in connection with the depot units and holds conferences at the batteries as required, or, on the instruction from the Inspector-General of Schools of Gunnery, he gives courses of instruction and reports to him on the state of training and aptitude of the battery officers.

"Motor cars or other means of transport are to be placed at his disposal by the authorities in charge of the area in which he may be working.

"He must report his arrival in each case to the competent authority."

II. -- DUTIES OF THE COMMANDER OF A SUPER-HEAVY LONG-RANGE GROUP.

26. For this purpose, GHQ will attach to the Army a captain or major and his staff (a heavy artillery battalion commander).

He exercises the powers of an independent battalion commander over the batteries. In those Armies which do not have a commander for their super-heavy long-range group, the Staff Officer for Artillery exercises these powers.

The temporary attachment to his staff of an artillery survey officer, an officer of the railway troops and a trigonometrical observer is advisable whenever an attack is imminent (cf. para.7) or numerous preparations for a battle are impending. The special nature of the material and the great variety of ammunition require the services of a specially trained ordnance officer with large groups.

27. After consultation with the advisory artillery staff of the Army, he makes proposals regarding the employment of his batteries, drafts the Army orders for super-heavy guns and supervises the execution of orders issued.

28. In order to be in a position to make proposals as regards the future, he must be kept continually informed as to the tactical and strategical situation, and furnished with information regarding the enemy and neighbouring Armies (for flanking supporting fire). On the other hand, he must personally gain up to date information from the artillery commanders of divisions (intelligence officers) and also from the reports of his own batteries and neighbouring artillery groups, as to the appearance and activity of hostile long-range artillery, new enemy positions and gun sidings, and any other important changes in the enemy's dispositions.

29. In order to promote a mutual exchange of opinions, he should communicate verbally with the Corps, Artillery Commanders of divisions, the Aviation Commander, the Commander of the Anti-Aircraft Guns and the Commander of the Railway Troops, the survey section commander and the Army signals officer, and the observation groups and sound ranging sections.

30. He controls reinforcements and technical and training questions in cooperation with the Staff Officer for Super-Heavy Guns, to whom he must also report any special experiences.

31. Every task must be so thoroughly discussed with the artillery survey sections, aviators and balloon observers, and the targets must be allotted to batteries sufficiently long beforehand, as to ensure that, even during a battle, when a temporary breakdown of communications may be expected, the tasks can be carried on receipt of a code word.

32. If an Army has a large number of super-heavy gun batteries (8-10), it is best to form subgroups.

33. The following are the duties of the group commander in detail: --

Reconnaissance and construction of positions and gun sidings, preparation of battery maps.

Preparations for the possible use of super-heavy guns in rearward positions.

Allotment of the available positions (alternative positions) for guns on platform mountings, and of the gun sidings for guns on railway mountings, to individual batteries; conduct of the fight on mobile principles.

Construction of the telephone system in cooperation with the signal service; visual signalling, wireless and dispatch riders.

Establishment of communication with Corps and Divisional Artillery Commanders and issue of information regarding targets and activity of super-heavy guns; ascertaining what is required.

Supervision of fire control orders and fire control practices.

Allotment of battle tasks and distribution of the available aviators to individual batteries; ensuring cooperation between aviators, balloon observers, artillery survey sections and ground observers.

Regulation of the sequence of fire when employing observation in common or registering on a common target.

Utilization of reports from field meteorological stations and artillery correction sections (Berichtigungstrupps).

Arrangement of ground observation and the necessary means of communication.

Compilation of maps for distant targets, utilization of air photographs of his targets, using for this purpose the photograph files of the Artillery Commanders, reconnaissance flights, artillery survey and balloon sections.

Checking and compiling the battery target books.

Establishment of an independent compilation centre, under the direction of an officer of the observation groups specially detailed by Army HQ, and also of auxiliary observation stations for air burst ranging, making use of battery personnel.

Preparation of reports on our own artillery activity and also on hostile construction of gun sidings as a basis for conclusions as to the enemy's intentions.

Further training of batteries in gunnery and survey work.

Collection of auxiliary labour and material for repair of railway lines damaged by shell fire (in cooperation with an officer of railway troops).

Control of camouflage, and arrangements for taking photographs of our own positions; construction of dummy guns and other dummy arrangements.

Control of the expenditure of ammunition, the use of smoke screens and the return of empties.

Supervision of the care and maintenance of material.

Supervision of the interior economy of the batteries and recommendations for honours and awards.

Control of personnel recommendations regarding changes in battery commanders through the Staff Officer for Super-Heavy Guns to the Inspector-General of Schools of Gunnery.

Control of the anti-gas service and training of rescue squads; anti-aircraft arrangements.

Compilation of a war diary and supervision of those of the batteries as a basis for later historical and technical purposes.

34. The choice of the accommodation and battle headquarters for the commander of a super-heavy gun group will be influenced mainly by the necessity for his being able to control his widely scattered batteries by personal observation. Even although the requirements of personal liaison with the Army Staff may require his frequent presence at Army HQ, yet in most cases a really efficient fire control in accord with the tactical situation, and especially the sudden engagement of his guns in a battle, will only be possible from a much more advanced headquarters.

35. In all questions dealing with the further development of super-heavy gun tactics he must keep in immediate touch with the Staff Officer for Super-Heavy Guns at GHQ.

III. -- RECONNAISSANCE.

36. If the battery commander himself does not supervise the reconnaissance and construction of the super-heavy battery positions, the cooperation of an officer with some experience of super-heavy guns is advisable. For such purposes the Staff Officer for Super-Heavy Guns is available. Representatives of the railway troops and Army survey section should take part in the reconnaissance.

37. The choice of positions depends on the nature of the guns, according as these are: --

(a) Guns on wheeled carriages ("R.L.")

(b) Guns on a concrete or sectional iron platform (B-Geschutze or Bettungs-Geschutze).

(c) Guns on railway mountings (E-Geschutze or Eisenbahn-Geschutze).

(d) Guns on railway mountings with arrangements for firing as in (b), or semi-mobile railway guns (E/B-Geschutze or Eisenbahnbettungs-Geschutze).

38. Guns on wheeled carriages have motor tractors and require: --

(a) Good roads from railhead to their position. Bridges must be tested as to their carrying capacity.

(b) Cover against air observation (aeroplanes and balloons) when in position.

(c) Solid ground.

They are built in without a crane, i.e., with the battery's own lifting gear. The conditions necessary for heavy artillery positions hold also for these guns.

39. For guns on platform mountings the following point should be noted: --

(a) The guns must be brought right up into their positions on normal gauge railway trucks.

(b) The positions must, therefore, be near a normal gauge railway*, in working order, from which a siding must be run into the position.

(c) The gradient of the siding should not be more than 1 in 50, except for small sections, which may be 1 in 30.

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*Metre-gauge railways may be used to bring up "Peter-Adalbert" (21-cm.) and "Karl Theodor" (24-cm) guns on platform mountings.

The loaded normal gauge trucks must be run into a special bogey-pit (Rollbockgrube) and placed on metregauge bogeys (Rollbocke) and then moved over the metre-gauge railway into the position.

The necessary bogeys and crew should be indented for from the Staff Officer for Super-Heavy Guns.

The 17-cm railway gun can fire from the metre-gauge railway without further preparation. But, in this case, the maximum possible switch is 10° to either side, with a minimum elevation of 10°.

(d) Curves should not, as a rule, be less than 150 metres radius, and never less than 110 metres; the guns should be taken slowly round the curves in order to avoid being detailed. If the curves are to be used for railway guns to fire from, the radius must be at least 180 metres.

(e) The position must be such that it will be as difficult as possible for the enemy to locate it exactly; consequently, it should not be near conspicuous features, such as the corner of a wood, cross-roads, etc.

(f) Cover against observation (balloons, aeroplanes) must exist or be easily constructed. In this connection, special regard must be had to the unavoidable large flash and smoke cloud accompanying the discharge. A steep hil in front affords good cover.

Large woods (especially mixed woods), villages and factories have proved better cover than small woods, parks and farm buildings. If necessary, moveable camouflage or structures resembling barns must be built over the gun; shadows are avoided by means of gently sloping sides. With their help, a battery may avoid detection even in the open.

(g) The ground must be solid--capable of bearing a load of about 2 kilogrammes per square centimetre (284 lbs. per square inch)--and if possible free from water to the depth of the gun pit. Marshy ground and water-bearing sands are not good.

40. Railway guns fire from trucks in the direction of the rails, and provision is made for only a very small amount of traverse on the mountings, as shown in the following table: --

"E. /B. Theodor Karl" .. .. (24-cm. semi-mobile gun)	1° to each side
"E -- Theodor Karl" .. .. (24-cm. gun on railway mounting)	2° to each side
"E-Samuel" .. .. (17-cm. gun on railway mounting)	About 12°* to each side

Thus the gun truck must be moved round a curve to obtain the approximate line, in such a way that its longitudinal axis coincides with the tangent to the curve which points in the direction of the target.

41. All curves in working order can be used for firing from without alterations, provided that: --

(a) Their tangents point to suitable targets.

(b) Their radius is at least 180 metres.

(c) Their gradient is not greater than 1 in 100.

(d) The super-elevation of the outer rail is not more than 10 cm. (4 inches).

If, after continued firing, the rails show a tendency to sag, the provision of additional sleepers or heavier rails may help.

42. New curves must be concealed as far as possible from hostile balloon observation. Too much care cannot be paid to concealment.

43. If the radius of curvature is constant throughout, it will be much easier to lay out the curve, to construct the battery maps and to lay the gun.

44. The curves should be built without a gradient and without a difference in level of rails, but with the customary increase of gauge.

The sleepers should be laid 1 ft 8" to 2 ft apart, from centre to centre.

The rails should be screwed down.

45. Curves may be classified as follows: --

(a) Single spurs (see Figs. 1-3).

Advantages: Easily built and inconspicuous.

Fig. 1 Fig. 2 Fig. 3

*For a switch of over 12°, the elevation must be at least 20°.

(b) Multiple spurs (see Figs. 4-5).

Advantages: (Can be used simultaneously for several guns, or as alternative positions for one gun.
Disadvantages: Difficult to build, use much material (switches), difficult to hide.

(c) Loops (see Fig 6).

Advantages: Easily built, inconspicuous, and are also available for shunting.
Disadvantages: Can only be used if the main line runs approximately towards enemy.

(d) Triangular siding (see Fig. 7).

Advantages: All-round arc of fire and the possibility of turning the gun and moving off in either direction.
Disadvantages: Difficult to build and necessitates much material.

46. The curves marked out by the railway troops should be measured by a survey section both before and after construction, and the tangential points for each degree should be distinctly marked on the outer rail and numbered.

The best way to do this is to mark the side of the upper portion of the rail with a file and paint the number beside this mark in a conspicuous oil colour.

Intermediate painted marks should show quarter degrees.

47. The Army survey section constructs the battery map for the curve; on this map, the tangents are drawn and numbered correspondingly. Each degree will be further divided into sixteenths from left to right and the length of curve in metres for each degree will be given.

The scale will be selected at discretion. If the scale is 1/25,000 or 1/20,000, in order to keep the battery board easy to handle, the lower limit of the map should be chosen at the range beyond which the targets for this position would lie.

As far as local topographical conditions permit, the relation between each point (degree) on the curve and an auxiliary aiming point at least 2-3 kilometres distant should be determined. The battery commander will enter the angles to the aiming point for each degree in a special table.

48. Semi-mobile railway guns ("E/B" guns, see para. 37d) may be used either as guns on railway mountings or as guns on fixed platforms.

IV. -- CONSTRUCTION OF POSITIONS.

For 17-cm. Q. F. Gun L/40 on Wheeled Carriage.

49. If the position is to be prepared prior to the arrival of the battery, the platform pit may be excavated as in Fig. 8 if the ground is solid. If there is no cover in front, the gun pit may be dug 7' 6" deeper, depending on the height of the muzzle in firing position. The remaining construction will be carried out by the men of the battery according to the special manual.

It is advisable to construct drainage trenches, or, if there is no possibility of running water off, to construct pumping shafts or sump holes, so that the gun pit may not be rendered unserviceable by flooding.

50. Very careful camouflage -- suited to the surrounding country -- is absolutely necessary, especially against air observation.

51. It is unwise to place the guns close to one another.

For 21-cm. Guns on Platforms.

52. When using a 32-ton crane, the railway line leading to the position must lie in the direction of the main line of fire (longitudinal axis of platform) (see Figs. 9 and 10, Appendix 2).

The use of a 40-ton crane allows greater freedom of movement. In this case, the instructions for 24-cm. guns apply. (See Fig. 11, Appendix 3, and paras. 60-63.)

53. It is desirable to cover the siding leading to the position from observation. Very careful camouflage of the line, even while building it, it is absolutely necessary, otherwise the construction of the line will betray the future position. Stress must be laid on the construction being carried out with due regard to active service conditions and the necessity for concealment being adequately considered.

54. Natural growth may only be removed in so far as it is absolutely necessary for building and access to the position.

The tops of trees on either side of the lines should be drawn together with wires.

Along the branch line from the main line into the position itself, everything should be covered up with the naeural vegetation of the surroundings up to the lower edge of the top of the rails.

The rails must not shine, but must be kept dull either by painting or by inducing rust.

Embankments, ditches and cuttings are to be avoided as much as possible, since their shadows show up in air photographs. If they are absolutely necessary, the slopes must be as gradual as possible. Drainage trenches should be filled in with brushwood or covered over with the natural vegetation of the surrounding ground.

Railway signals must not be used, but must be replaced by sentries.

55. For the position of crane lines and platform pits, see Figs. 9 and 10, Appendix 2.

56. The crane lines must be perfectly level and both rails must be laid at the same height throughout their whole length, and they must be securely laid. This must always be carefully tested by an officer before using the line.

Inaccurate lie of the crane rails has often led to damage to the cranes, which are hard to replace.

If considerations of cover necessitate shortening the crane lines to a length of 26 metres (the absolute minimum), measured from the front of the platform, it will be necessary to have holdfasts (pickets, or stout trees) in continuation of the centre of the crane line to which a block and tackle can be attached. The battery commander must decide whether local conditions demand a still further shortening of the crane rails.

57. The pit should be dug as shown in Fig. 9, and must be kept dry by constructing drainage trenches, pumping shafts or sump holes.

To prevent impermeable soil from becoming greasy on the surface, the pit should be dug 8 to 16 inches deeper, and then filled in uniformly to this depth with ballast, rough gravel and sand, which must be well stamped down.

58. Careful camouflage is absolutely necessary even when building the position. It must be continually kept in order. Frequent air photographs should be taken to determine whether the camouflage of the whole position is sufficient and whether the general aspect has not altered; this applies especially to the construction of the line. The method of carrying out this camouflage must be left to the inventive powers of the battery commander and his men.

For 24-cm. Guns on Platforms.

59. The relative positions of the line leading to the position and crane rails are shown in Figs. 11 and 12.

60. The line leading into the position and crane rails should as a rule be on the same level. It is, however, permissible to have the crane rails up to 2 ft 8 in higher than those of the line leading into the position. Otherwise, the conditions for the crane rails mentioned in para. 56 apply in this case also.

61. The gun pit must be dug in at least 1 ft 8 in, but on no account deeper than 10 ft 6 in. In any case, the upper edge of the crane rail must lie at least 4 ft 3 in above the floor of the pit.

It is, however, advisable to adhere to the type drawing shown in Fig. 13, where special difficulties of ground do not render this impossible. For further details, see Fig. 13, Appendix 4.

62. For the rest, the instructions laid down in paras. 53 and 54 are applicable.

63. Special instructions when using the semi-mobile railway gun as a platform gun: --

(a) The pit for the gun platform must be dug 1·888 metres (6·2 feet) below the upper surface of the rails of the line leading to the position (see Figs 11, 12 and 13, Appendices 3 and 4).

(b) The sectional iron platform should be built in, without pivot and sand box, with the help of a 40-ton crane.

(c) Already built platforms can be used if the upper surface of the movable rails lies 16·8 cm (6·6 inches) below the upper surface of the rails of the line leading to the position. If this is not the case, then either the level of the latter rails must be altered or the platform rebuilt.

(d) The spaces between the front and back girders should be filled with sand bags.

(e) The line leading to the position must end 8·804 metres (29 feet) -- measured horizontally -- from the centre of the platform and then be prolonged at least 6 metres (19·7 feet) from a point 8·804 metres (29 feet) beyond the centre of the platform. The shortening of existing lines leading to positions is best done when building in the rail connections.

In order to allow the truck to be run out again, it will be best to arrange a switch on the crane rails with a radius of curvature of at least 60 metres (see Fig. 14).

(f) The 2 x 8·804 metres (58 feet) gap in the line leading to the position will be bridged over by a rail forming part of the platform.

(g) After building in the platform and rails, the crane should be dismantled and removed.

(h) The gun is driven over the platform.

(i) The railway truck is lifted from its bogeys by jacks built into the platform.

(k) The bogeys are then drawn away by hand and moved to a place of safety.

(l) The gun is then lowered by means of the jacks until its pivot rests on the platform.

(m) The forward portion of the platform is covered to a depth of 1 metre with sand bags in place of the sand box.

(n) Further details are given in the special manual.

(o) Dismantling is carried out in the reverse order.

64. The large dimensions of the position require special measures of camouflage. If any deforestation is necessary, similar clearings must be made at several places in a wood which consists of one kine of tree only. Otherwise, any cutting down of trees must be forbidden for a considerable distance round the gun.

The construction of the position is carried out by specially trained personnel with the aid of unskilled labour.

66. In view of the very large dimensions necessary, cover cannot always be built for the guns. If the gun is only to fire in one direction (e.g., against a hostile factory), cover in the form of a rampart faced with logs, with a deep embrasure, may be suitable. Provision must be made for defence by rifle fire and obstacles. Since high wire entanglements betray any position to aviators, it will be best to use trip wire.

67. All shelters must, on principle, be provided with at least two widely separated entrances, one of which must be easily accessible. The shelters must be connected with one another. Several small shelters are better than one large shelter. If covered shelters cannot be built through lack of time and material, deep trenches, well camouflaged and provided with breastworks and traverses, should be constructed immediately and extended later.

68. The battery officer and telephonists should be in shelters next door to one another.

The shelters for the detachments must be kept away from the ammunition shelters. The latter require special arrangements for ventilation.

69. The cartridge shelters must be at some distance from the other shelters; not more than 20 cartridges may be kept in one shelter.

70. With reference to thickness of walls and roofs, see "Manual of Position Warfare," Part 1b.

71. Special provision must be made for storing all the valuable instruments and spare parts in special shelters while the position is under construction.

V. -- MOVING INTO POSITION.

72. The special instructions for moving the gun into position must be strictly followed. Arbitrary alterations have already, in many cases, led to damage of these guns, which are so hard to replace. The instructions of the commanders of the crane detachments should be followed, since they have had considerable experience.

VI. -- OBSERVATION AND METHODS OF FIRE.

73. The more thorough the preparations for any shoot, the more likely will be its success. It usually only leads to unfortunate results if a gun is called upon to open fire hastily in a few minutes.

Every gun differs somewhat in its behavior from all other guns of the same type. Thus the battery commander must ascertain the special characteristics of each gun by making very careful as to the working of the piece, the size of the cartridge chamber, nature of ammunition used, weather and other influences, etc., which will enable him to draw conclusions as to the ballistic conditions and to lay down definite rules (target books).

74. Telephones, wireless, lamp signallying and carrier pigeons must be thoroughly exploited as means of communication.

A necessary prerequisite for good fire control is a well constructed telephone system with independent connections to the super-heavy long-range group and all places which may be used for observation. For this purpose, the battery must be equipped with exchanges, 8-10 Army telephones and 25 miles of cable, and the group commander must be allotted a wireless station for sending and receiving messages.

75. Observation is carried out by aeroplanes, balloons, ground observers and artillery survey sections.

Verbal consultation about targets and methods of fire, making use of air photographs, will form a sound basis for carrying out all tasks which may arise. It is also advisable to detail officers of the battery for temporary duty as balloon observers and with the artillery survey sections.

76. The success of a shoot depends on the careful calculation of and correction for the error of the day and loss of muzzle velocity of the gun. Arrangements must, therefore, be made with the field meteorological stations for accurate data and their prompt transmission.

77. The special characteristics of the guns, the expensive ammunition and the usual great extent of the target may render it advisable to depart from the accepted methods of fire, i.e., to cut down the rounds for establishing and verifying the bracket. It may be justifiable to make corrections from the observations of single rounds. For this purpose, the battery commander must not only know how the first two (warming up) rounds from his gun differ from later rounds, but must try to work out some system for allowing for variations in the volume of the chamber. Cartridges which are left a considerable time in the heated gun increase the intial velocity considerably. As a rule, in a shoot which begins with a cold gun, the rounds will tend to fall short at first and then over and finally short again.

All the methods mentioned below have certain disadvantages. All possible forms of observation, as far as they are available, should therefore be employed to obtain the best possible results from each expensive round.

78. When firing with aeroplane observation (see Part 5 "The Employment and Duties of Artillery Aeroplanes in Position Warfare, "Appendix 1, 4b), the battery should lay stress on working always with the same observer. The necessity for remaining for a long time far behind the enemy lines calls for great endurance on the part of the observer and places certain restrictions on his employment.

79. When firing with balloon observation (see Part 5, Appendix) the best results have been obtained by the use of two balloons a considerable distance apart. Of these, one should lie, if possible, in the line of fire in order to observe for line, and the other to one flank to

observe for range. It is desirable that the same balloon observers should be continually employed when engaging particular targets.

80. Arrangements must be made to employ ground observation in case targets have to be engaged at closer ranges during a hostile offensive on a large scale. Ground observation stations which have been accurately surveyed may also be used as auxiliary observation stations if manned by properly trained personnel from super-heavy gun batteries.

81. If the topographical conditions in any way permit, the artillery survey sections should be used for observation, since this is the most accurate method of locating the rounds fired. As it is based on accurate measurements, it forms an absolutely reliable, and therefore always desirable, basis of observation.

It is often of most use in the very cases where other methods break down and may be used even at night. As a supplement to ground survey posts, the balloon is very valuable as a high survey post. For details as to method of procedure, see "Methods of Intersection from Balloons."

82. If ammunition with time fuzes is available for registration with the same trajectory as ammunition with percussion fuzes, registration with high air-bursts is preferable to all other methods (see manual "Employment and Duties of Artillery Survey Sections," paras. 170-181).

Intersections on the points of burst will be obtained either by the artillery survey posts or the above mentioned auxiliary posts of super-heavy groups. If no vertical plotting-board is available, the small vertical plotting-board with trajectory graphs, which all batteries possess and should be able to use, may be employed. The mean point of impact may be determined from 2-4 rounds, depending on the size of the 50% zone and the extent of the target. Corrections for range and line will then be made in accordance with the distance of the mean point of impact from the target.

83. The method described above has proved particularly effective against balloons. As the enemy makes very considerable alterations in the height and position of his balloons directly they are ranged on, their engagement requires special preparations and rapid work. When employing shrapnel, effect is sought by means of rounds burst short of and above the target, while with H. E. shell every round which bursts short of and either above or below the target may have effect.

84. If fire for effect does not immediately follow registration, as is often the case in battle tasks, the following method may be employed with good results.

Registration will be carried out with high air-bursts. It must be observed from a point near the battery and should serve to determine line at least. In the event of no other observation being available when fire for effect is carried out later, a round with time fuze fired under the same conditions as the registration will serve to check the line. Such a system of observation for line from a point near the battery is also important for engaging balloons, and should therefore be arranged for in every battery position.

85. If registration with time or percussion fuze is carried out on a datum point, particular attention must be paid to corrections for the error of the day and loss of muzzle velocity in switching on to the target. Registration on a datum point requires 4-6 rounds, which do not count as far as fire for effect is concerned.

86. The nature of the target will determine whether to employ shell with base fuze (maximum delay), or with nose fuze (less delay), or with nose fuze and projecting striker rod (extreme sensitiveness on impact), or with time fuze.

As a rule, a change in the nature of the fuze will give the desired results against both personnel and material. For registration, besides the time fuze, the instantaneous fuze, owing to its minimum penetration, gives the best conditions for observation.

87. As a rule, the effect of fire can only be determined by air observation and photography; in most cases, this is desirable. It must be taken into consideration that an energetic enemy will endeavour to conceal the effect as quickly as possible and to cover up the shell craters.

VII. -- CONCEALMENT.

88. The very great flash and the large quantity of smoke caused by firing usually necessitate the employment of special means of concealment.

The method mentioned in para. 87 -- concealing the shell craters caused by the enemy's fire -- must always be employed.

89. The following are suitable means of concealment in connection with super-heavy gun fire: --

(a) Regulation smoke generators (in particular the "Nebeltrommel") and anthracite or other means of producing smoke, such as bonfires of tarred felt, wet branches, straw, etc.

(b) Flash reducers.

All these means should be indented for through the proper channels from Army HQ (as with ammunition).

Smoke clouds are also useful to hamper the enemy's registration or to mislead the enemy by employing them elsewhere (e.g., in abandoned or dummy positions).

The smoke cloud is successful only when a sufficient number of smoke generators are used. An insufficient smoke cloud only draws the enemy's attention to the position, without effectively concealing it, and is thus disadvantageous.

The employment of smoke generators is dependent on the ground and the weather and especially on the wind. The best method is to distribute them chequerwise, in such a way that, in the spaces between the smoke generators, are placed the anthracite fires, large numbers of which are required in order to obtain a sufficiently dark cloud. A gentle wind is most favourable, a strong wind prevents the cloud from rising and a calm prevents the cloud from spreading out. The latter result may be obtained by moving the smoke generators about on a wagon. Woods and groups of trees are useful in keeping the cloud in position; open country allows it to move away.

There must be good means of communication between the battery and the men working the smoke generators.

For further details as to the various smoke generators, see the manual "Methods of Smoke-producing."

90. Moist flash reducers increase the smoke at the muzzle, but prevent the flash and give the smoke a whitish tinge, somewhat similar to that of the smoke from smoke generators. They increase the probability zone and attack the bore, and should therefore be used during the day, rather more than is the case at night, only when tactically necessary.

91. Smoke generators used in conjunction with flash reducers or with the dummy positions mentioned in para. 92 will be specially effective in deceiving the enemy as to the actual gun position.

VIII. -- DUMMY POSITIONS.

92. Dummy positions should always be sited in places where battery positions might be expected and should not be too obvious. Movement must be simulated in these positions. Railway connections and tracks leading to them from various directions increase the probability of deception. Camouflage must be slightly over-emphasized.

Old abandoned battery positions, which have already been located by the enemy, may be used to good purpose as dummy positions.

The use of smoke rings ("Rauchringrohren") and of dummy guns is recommended. The use of false bursts, and sound camouflage by means of gunfire, mines or medium flat trajectory guns, may often mislead the enemy for weeks. Special precautions must be taken to protect the men from our own dummy fire and from hostile bombardment.

IX. -- REINFORCEMENTS AND TRAINING IN THE HOME TERRITORY.

93. The Ersatz Battalion of the 7th Foot Artillery Regiment is responsible for: --

Re-arming heavy flat trajectory batteries.
Training of personnel in accordance with the experience gained at the front and passed to it by the Staff Officer for Super-Heavy Guns.
Further training of assistant artificers and battery artificers.
Replacement of stores as laid down in para. 94.
Employment of the specialist artificer as described in paras. 96 and 99.
Administration and dispatch of all material, including cranes, which is stored in Fort 8 at Cologne.

X. -- SUPPLY OF AMMUNITION AND MATERIAL.

94. The supply of ammunition is arranged by Army HQ.

Empties, especially the cartridge cases and smoke generators, which are so difficult to obtain, must be returned as rapidly as possible (rewards for salvage). See the manual "Methods of Smoke-producing."

The supply of material is carried out as follows: --

(a) Tools and building material: by engineer parks or store depots.

(b) Accessories and spare parts: by store depots, engineer and artillery repair shops, and, for rolling stock, railway repair shops.
Indents should be made through the channels laid down by each Army, as a rule through the commander of the super-heavy gun group, to the L. of C. Inspectorate.
Accessories and spare parts which belong exclusively to super-heavy guns, can be orderd direct from the Erstaz Battalion, 7th Foot Artillery Regiment, or from Krupps, or may even be fetched after giving notice by wire.

XI. -- CARE OF MATERIAL.

95. The life and shooting of a super-heavy gun depends on careful treatment and this is more so than with any other kind of gun. The battery commander is personally responsible that all regulations with regard to care and maintenance are most strictly observed.

Special stress must be laid on the care of the bore and the cradle, including buffers and recuperators, and their condition must be tested before, during and after firing.

All work on these important parts must be supervised by an officer. Uneven working of the piece usually comes from incorrect adjustment of the cradle.

96. The most important matter in the care of the bore is checking the coppering which occurs after prolonged firing. This must be removed as soon as possible, and after every shoot if possible. The removal of mild coppering (a copper film) may be undertaken by the battery artificer by means of "Barbara paste" which, if mixed with soft soap and laid on while the bore is warm is nearly always sufficient. After 48 hours, the bore should be cleaned out with paraffin or hot water.

"Barbara paste" must be kept in hermetically sealed cases, as the effective part of the paste (Sal ammoniac) soon evaporates.

If the coppering has gone too far, it must be removed by the prescribed "decopperer." This must be stored according to the instructions of the commander of the super-heavy gun group or the Staff Officer for Artillery. If necessary, the services of the artificer of the 1st Ersatz Battery, 7th Foot Artillery Regiment, may be requested through the Staff Officer for Super-Heavy Guns. When he has completed his work he must be at once returned to his unit.

97. The appearance of annular cracks up to 100 mm. (4 inches) or the creeping of the A-tube are of no importance so long as the distance between the front of the breech block and the end of the A-tube does not as a result exceed 6 mm. If this is exceeded, the piece must be sent to Krupps for repair.

98. The fire efficiency of super-heavy guns is as much dependent on the careful and conscientious handling and preparation of ammunition as on the uniform loading of the shell according to the manual. An absolutely essential condition for this is the strict supervision of the battery officer.

99. Minor repairs may be carried out by repair or artillery workshops, if this cannot be done by the battery or by the artificer of the 1st Ers. Battery, 7th Foot Artillery Regiment.

100. The Army Groups must apply for major repairs and exchanges of pieces to GHQ, at the same time notifying the Prussian War Ministry, Section A5. These repairs and exchanges will be undertaken by Krupps. In order to avoid unnecessary transport, the Staff Officer for Super-Heavy Guns should be called upon for a decision in doubtful cases.

XII. -- CRANES AND SPECIAL TRAINS.

101. Cranes and special trains for moving 21-cm. and 24-cm. platform guns are available with each Group of Armies, and should be indented for when required.

They are manned by detachments who are specially trained in the handling of the cranes. They should as far as possible be given a free hand in carrying out their work.

102. When they have finished their work, the crane detachment should be immediately returned with the crane properly entrained, and the necessary entries should be made in the register of the crane detachment.

103. The crane detachments are under the orders of the battery for which they are working. While not working for a battery, the Staff Officer for Super-Heavy Guns allots them to an artillery workshop or the like.

Appendix 1.

LIST OF THE "SPECIAL MANUALS" FOR SUPER-HEAVY GUNS.

Notes on the 17-cm. gun on wheeled carriage (17-cm, K.i.R.l.).

Notes on the 17-cm. gun on wheeled carriage mounted on a railway truck.

Provisional drill manual for the 17-cm. W.F. gun L/40 on wheeled carriage mounted on a 35-ton railway truck.

Notes on the 21-cm. Q.F. gun L/40.

Description and drill manual of the 21-cm, Q.F. guns L/40 and L/45 on mounting.

Instructions for mounting and dismantling.

Manual for care and maintenance of the 21-cm. Q.F. guns L/40 and L/45 on mounting.

Notes on the 24-cm. platform gun.

Notes on the 24-cm railway gun.

Notes on the 24-cm. platform guns on railway mountings.

Description and drill manual of the 24-cm. and 28-cm. guns.

Manual for the care and maintenance of the 24-cm. or 28-cm. guns.

Instructions for mounting and dismantling.

The 40-ton building crane for building gun mountings.

Instructions for mounting and dismantling a railway platform for 33° and 123° switch for the mounting of a 38-cm. Q.F. gun L/45.

Manual of military survey.

Employment and duties of artillery survey sections.

Balloon observation.

Employment and duties of artillery aeroplanes in position warfare.

Corrections for error of the day for 17-cm., 21-cm., and 24-cm. Q.F. guns.

Collection of extracts from range tables and tables for error of the day for 17-cm, 21-cm, 24-cm, 28-cm, etc., Q.F. guns.

Manual on smoke-producing.

Figure 9

GUN PIT FOR 21-CM Q.F. GUN

Dimensions in Millimetres

Figure 10

RAILWAY LINES FOR 21-CM Q.F. GUN

Figure 11

RAILWAY LINES FOR A 24-CM. Q.F. GUN

Figure 12

DIAGRAM SHOWING POSSIBLE POSITIONS OF LINE LEADING TO POSITION

Figure 13

GUN PIT AND RAILWAY LINES FOR A 24-CM PLATFORM GUN

TECHNICAL SUMMARY

TYPE OF GUN (CODE NAME)	# OF GUNS IN A BTRY	THE PIECE				AVG LGTH RE-COIL	WEIGHT OF CRADLE	TOTAL WEIGHT OF GUN IN ACTION		FOR RAILWAY MOUNTING							
		LENGTH		WEIGHT						NORMAL GAUGE TRUCKS				MAX AXLE LOAD		MAX RADIUS	
										NR	TYPE	LOAD	NR OF AXLES	WHEN TRAVELLING	WHEN FIRING	WHEN TRAVELLING	WHEN FIRING
		ft	in	ton	cwt	in	ton cwt	ton	cwt			tons		tons	tons	feet	feet
17-cm. Naval Q.F. Gun *L/40 (tractor drawn) ("Motor Samuel")	2	22	7	10	12½	15	8	18-3/4	24 2¾	--	--	--	--	4.92	--	--	--
17-cm Naval Q.F. Gun L/40 (on railway mounting) ("Eisenbahm Samuel")	2	22	7	10	12½	15	3	18-3/4	59 1	2 10	S. G.	34.44 9.84	8 24	12.79 4.92	--	360	590
21-cm. Naval Q.F. Gun L/40 (1901 pattern) ("Peter Adalbert")	1	27	7	19	14	19½	w/counter-weight 10	2-3/4	108 14	2 1 3 1	G. S.S.ml. " "	14.76 19.68 24.60 29.52	each 2 4 4 4	--	--	--	
21-cm. Naval Q.F. Gun L/45 (1906 pattern) ("Peter Adalbert")	1	30	10	16	4	20½ to 21½	7	17½	103 0	2 1 3 1	G. S.S.ml. " "	14.76 19.68 24.60 29.52	each 2 4 4 4	--	--	--	--
24-cm. Naval Q.F. Gun L/40 ("Theodor Karl B.-Gerust")	1	1897 pattern 23		13					115 1	2 5 1	G S.S.ml "	14.76 34.45 39.37	each 2 4 4	--	--	--	--

TECHNICAL SUMMARY CONT)

MAX GRADIENT WHEN TRAVELLING	MAX GRADIENT WHEN FIRING	EXCAVATION DEPTH	EXCAVATION WIDTH	EXCAVATION LENGTH	CUBIC CONTENTS	TIME REQUIRED FOR MOUNTING: FOR EXCAVATION	TIME REQUIRED FOR MOUNTING: IRON PLATFORM	TIME REQUIRED FOR MOUNTING: CONCRETE PLATFORM	TIME REQUIRED FOR MOUNTING: GUN	DISTANCE BETWEEN OUTSIDE AXLES	MAX LGTH OF GUN FROM BUFFER TO BUFFER	REMARKS
		ft in	ft in	ft in	C yds					ft in	ft in	
--	--	2 10	1 7	19 8	7.85	1	1	--	½	--	--	
1 in 30	1 in 100	--	-- --	-- --	--	--	--	--	--	-- --	-- --	
		front 2 6 rear 4 2	front 21 4 rear 31 6	40 8	about 163.5	2	1	--	1	--	--	1 & 2 G wagons for tools. 3, 4 & 5 S.S.ml. for platform. 6 S.S.ml. for baulks. 7 S.S.ml. for piece and cradle.
--	--	front 2 6 rear 4 2	front 21 4 rear 31 6	40 8	about 163.5	2	1	--	1	-- --		
--	--	front 4 3 rear 5 10	front 30 6 middle 37 1 rear 30 6	36 1	257.7	3	2	--	1	--	--	1 wagon for gun. 1 & 2 G. wagons for tools. 3, 4, 5 & 6 S.S.ml. for platform 7 & 8 S.S.ml. for rails.

TECHNICAL SUMMARY (CONT)

TYPE OF GUN (CODE NAME)	# OF GUNS IN A BTRY	AVG THE PIECE LENGTH	AVG THE PIECE WEIGHT	LGTH RE-COIL	TOTAL WEIGHT OF CRADLE	NORMAL WEIGHT OF GUN IN ACTION	FOR RAILWAY MOUNTING GAUGE TRUCKS NR	TYPE	LOAD	MAX AXLE LOAD NR OF AXLES	MAX AXLE LOAD WHEN TRAVELLING	MAX RADIUS WHEN FIRING	MAX RADIUS WHEN TRAVELLING	WHEN FIRING
24-cm. Naval Q.F. Gun L/40 "Theodor Karl E.- und B.-Gerust")	1	31 4	1898 & 1899 patterns 25 4-3/4	23½	10 19½	On railway mtg. 101 13½ on platform mtg. 55 16	2	Bogey	96.45	total of 8	13.78	26.57	360	590
24-cm. Naval Q.F. Gun L/40 ("Theodor Karl E.-Gerust")	1		24 8¼			108 9¼			78.74	8	14.66	29.03	360	590
24-cm. Naval Q.F. Gun L/40 ("Turm Theodor Karl")	--	-- --	-- --	--	-- --	-- --	--	--	--	--	--	--	--	--
24-cm. Naval B.L. Gun L/30 ("Theodor Otto E.und B.-Gerust")	1	23 7	with counterweight 18 14	38½	17 0½	on railway mtg. w/shield 101 7½ on platform mtg. 55 16	2	Bogey	96.45	total of 8	13.28	18.70	360	590
28-cm. Naval B.L. Gun L/40 ("Kurfurst E.-und B-Gerust")	1	36 9	48 16-1/3	36-3/4	19 --	146 13 146 13 55 16 for platform	2		119.08	total of 10	14.76	18.20	360	590

TECHNICAL SUMMARY CONT)

MAX GRADIENT WHEN TRAVELLING	MAX GRADIENT WHEN FIRING	EXCAVATION DEPTH	EXCAVATION WIDTH	EXCAVATION LENGTH	CUBIC CONTENTS	TIME REQUIRED FOR MOUNTING FOR EXCAVATION	TIME REQUIRED FOR MOUNTING IRON PLATFORM	TIME REQUIRED FOR MOUNTING CONCRETE PLATFORM	TIME REQUIRED FOR MOUNTING GUN	DISTANCE BETWEEN OUTSIDE AXLES	MAX LGTH OF GUN FROM BUFFER TO BUFFER	REMARKS
1 in 36		front 4 3 rear 5 10	front 30 6 middle 37 1 rear 30 6	36 1	257.7	3	2	--	¼	52 0	60 5	1 wagon for gun. 1 & 2 G. wagons for tools. 3, 4, 5 & 6 S.S.ml. for platform 7 & 8 S.S.ml. for rails.
1 in 36			-- --	-- --	--	--	--	--	--	54 9	64 7	
--	--	-- --	-- --	-- --	--	--	--	--	--	-- --	-- --	--
1 in 36		Same as for "Theodor Karl E.-und B.-Gerust."				--	--	--	--	52 0	60 5	1 wagon for gun. 1 & 2 G. wagons for tools. 3, 4, 5 & 6 S.S.ml. for platform 7 & 8 S.S.ml. for rails.
1 in 36		front 4 3 rear 5 10	front 30 6 middle 37 1 rear 30 6	36 1	257.7	--	--	--	--	62 8	70 11	1 waton for gun 1 & 2 G. wagons for tools.

TECHNICAL SUMMARY (CONT)

TYPE OF GUN (CODE NAME)	# OF GUNS IN A BTRY	AVG THE PIECE LENGTH	AVG THE PIECE WEIGHT	LGTH RE-COIL	TOTAL WEIGHT OF CRADLE	NORMAL WEIGHT OF GUN IN ACTION		FOR RAILWAY MOUNTING GAUGE TRUCKS NR	TYPE	LOAD	MAX AXLE LOAD NR OF AXLES	MAX AXLE LOAD WHEN TRAVELLING	MAX RADIUS WHEN FIRING	MAX RADIUS WHEN TRAVELLING	WHEN FIRING
28-cm. Naval Q.F. Gun L/40 (1897 pattern) ("Bruno E.-und B.-Gerust")	1 or 4	36	9	44	11-3/4	30-3/4	14	18½	147 55 for platform	12½ 16	2	Bogey	119.08 total of	10	14.76	29.16	360	590
35·5-cm. Naval Q.F. Gun L/52·5 ("Konig August")	1	61	3	77	8½	49½	25	6	196	16½	--	--	--	--	--	--	--	--
35/38-cm. Naval Q.F. Gun L/45 ("Konig Luitpold")	1	54	4	77	17	49½	26	17½	--	--	--	--	--	--	--	--	--	--
38-cm. Naval Q.F. Gun L/45 ("Max B.-Gerust")	3	56	1	76	5½	49½	26	17½	215	0½	--	--	--	--	--	--	--	--
38-cm. Naval Q.F. Gun L/45 ("Max E.-und B.-Gerust")	4	56	1	76	5½	49½	26	17½	265	14½	4	Bogey	213.57 total of	18	14.76	29.52	328	590

* L/40 = Length of piece is 40 calibres.

+ On platform which can be dismantled.

TECHNICAL SUMMARY CONT)

MAX GRADIENT WHEN TRAVELLING	MAX GRADIENT WHEN FIRING	EXCAVATION DEPTH	EXCAVATION WIDTH	EXCAVATION LENGTH	CUBIC CONTENTS	TIME REQUIRED FOR MOUNTING: FOR EXCAVATION	IRON PLATFORM	CONCRETE PLATFORM	GUN	DISTANCE BETWEEN OUTSIDE AXLES	MAX LGTH OF GUN FROM BUFFER TO BUFFER	REMARKS
1 in 36		front 4 3 rear 5 10	front 30 6 middle 37 1 rear 30 6	36 1	257.7	--	--	--	--	62 8	70 11	1 wagon for gun. 1 & 2 G. wagons for tools. 3, 4, 5 & 6 S.S.ml. for platform 7 & 8 S.S.ml. for rails.
--	--	10 10	54 1	54 1	850.2					-- --	-- --	
--	--	-- --	-- --	-- --	--		about 3 weeks including excavation.	about 7 weeks		-- --	-- --	There is no special mounting for the 35/38-cm. gun. The piece may be mounted on the following mountings:-- 1. "Konig August." 2. "Max. B." (45°). 3. "Max. E. & B." (17° or 55°).
--	--	26 0	circular pit Diameter = 80 ft.		5493.7					-- --	-- --	
1 in 36		14 9	39 4	39 4	850.2					-- --	-- --	For concrete platform.
		6 7	circular pit Diameter = 34 ft 9 ins.		261.6							For iron platform.

++ On platform which can be dismantled or on concrete platform.

Not yet determined.

Type of Gun (Code Name)	Conventional Sign	Nr of Guns Per Btry	AMMUNITION — SHELL — Type of Shell	Length in Calibres	With or Without False Cap.	Weight	Bursting Chg	Designation of Fuze	CARTRIDGES — Weight of Charge — Full	Medium	Reduced	Maximum Height of Trajectory
						Lbs	Lbs		Lbs	Lbs	Lbs	Yds
17 cm. Naval Q.F. Gun L/40 "R. L. Samuel"		2	H.E.	3	Without	141	7.37	Kz.f. Spgr.m.K.	38.14	31.52	24.91	6,693
or "E. Samuel"		2	H.E.	4.7	With	138½	15	Kz.m.K. u.St.				9,722
21-cm. Naval Q.F. Gun L/40 "Peter Adalbert L/40"		1	H.E. H.E.	3.1 4.9	Without With	238) 253½)	15.1	Bdz.f. Spgr. m.K	65.04	--	--	7,403 9,865
21-cm. Naval Q.F. Gun L/45 "Peter Adalbert L/45"		1	H.E. H.E.	3.1 4.9	Without With	238) 253½)						7,787 10,236
24-cm. Naval Q.F. Gun L/40 "B. Theodor Karl"		1	H.E.	4.1	With	333	34.4	Bdz.f.) Spgr.) m.K.)	99.87	--	82.67	10,466
"E.B. Theodor Karl"		1	Steel Shrapnel	4.1	With	333	4	Dopp.Z) C/16)				5,11
"E. Theodor Karl"		1										
24-cm. Naval B.L. Gun L/30 "E.B. Theodor Otto"		1	H.E.	4.1	--	333	34.4	Bdz.f. Spgr. m.K.	64.15	--	--	6,93
28-cm. Naval B.L. Gun L/40 "E.B. Kurfurst"		--	--	--	--	633	--	--	--	--	--	--

Type of Gun (Code Name)	Conventional Sign	Nr of Guns Per Btry	AMMUNITION									
			SHELL						CARTRIDGES			
			Type of Shell	Length in Calibres	With or Without False Cap.	Weight	Bursting Chg	Designation of Fuze	Weight of Charge Full	Medium	Reduced	Maximu Height Trajecto
28-cm. Naval B.L. Gun L/40 "E.B. Bruno"		1	H.E. H.E.	2.9 4.4	Without With	529 633	35) 54)	Bdz.f. Spgr. m.K.	135.58	--	--	8,202 10,193
35·cm. Naval Q.F. Gun L/52·5 "Konig August"		1	L.H.E. H.E.	4.1 4.6	With With	758½ 1179	61.1 104.5	Bdz.f. Spgr. m.K.	577.61 496.04	-- 429.90	542.34 363.76	30,512 22,693
35/38-cm. Naval Q.F. Gun L/45 "Konig Luitpold"		1	H.E. H.E.	4.2 5.1	Without) With)	1323	125.3	Bdz.f. Spgr. m.K.	370.38	--	242.51	12,467
38-cm. Naval Q.F. Gun L/45			H.E. H.E.	4.1 5.4	Without With	1653½) 1638)	145.5	Bdz.f.) Spgr.) m.K.)	403.45	--))	264.55	14,65 16,91
"Max"		1	Steel Shrapnel	3.4 or 3.6	Without	1653½	14.7	Dopp.Z. C/16	--	--		5,07
			L.H.E.	4.1	With	882	72.3	Bdz.f. Spgr. m.K	451.95	--	--	22,02
"E.B. Max"			--	--	--	--	--	--	--	--	--	--

ARTILLERY SUMMARY (CONT)

Maximum Time of Flight	Maximum Range With Full Charge	Maximum Range With Reduced Charge	Rate of Fire of Gun in Rnds Per Minute	Building Platform	Time Required For Bringing the E.B. Gun Into Action: On Rails	Time Required For Bringing the E.B. Gun Into Action: On Platform	Dimensions of 50% Zone at Maximum Range: Full Charge Length	Full Charge Breadth	Reduced Charge Length	Reduced Charge Breadth	Arc of Traverse	Maximum Elevation	Heig of Axis of Piec
Secs	Yds	Yds		Days			Yds	Yds	Yds	Yds			Ft I
66.7	17,498 15,201*	13,233	1	2½	--	--	151	17.9	177	14.9	360°)	47½°)	8 2
81.9	26,269 22,004*	17,607	1	--	10 Minutes	--	340.1	17.9	177	13.6	26°)	)	
70.5	19,576	--)	1½	2-4	--	--	183.7	14.5	--	--)	85°	45°	9 4
83.4	27,975	--)					235	23.6					
72	20,450	--)					170.6	20.5	--	--			
85.4	28,872	--)					198	28.75	--	--			
86.8	29,090	23,239	2	3-6	--	3 hours	280	43.1	196.8	35	180° as E.=36/16)	as E.= 9	10
--	25,263	21,983		--	--		240	--	153	--	) 45° as B.=180°)	as B.=10	
					10 Minutes						4°		9
70	20,450	--	--	--	--	--	145	30	--	--	as E.=58/16 as B.=180°	45° as E.= 9 as B.=10	
--	--										as E.=64/16 as B.=180°	45° as E.=10 as B. 10	

N.B.--In the designation of the mountings:--
R.L.=Rad-Lafette or wheeled mounting.
E.=Eisenbahn or railway mounting.
B.=Bettung or central pivot mounting (on concrete or iron foundation).

E.B.=Eisenbahnbettung or railway mounting provided with central pivot on to which gun can be jacked down off the bogeys.

ARTILLERY SUMMARY (CONT)

Maximum Time of Flight	Maximum Range With Full Charge	Maximum Range With Reduced Charge	Rate of Fire of Gun in Rnds Per Minute	Building Platform	Time Required For Bringing the E.B. Gun Into Action: On Rails	Time Required For Bringing the E.B. Gun Into Action: On Platform	Dimensions of 50% Zone at Maximum Range: Full Charge Length	Dimensions of 50% Zone at Maximum Range: Full Charge Breadth	Dimensions of 50% Zone at Maximum Range: Reduced Charge Length	Dimensions of 50% Zone at Maximum Range: Reduced Charge Breadth	Arc of Traverse	Maximum Elevation	Heig of Axis of Piec
74.6 85.7	21,928 30,348	--	2	3-6	--	--	208 416	16.9 42.3	--	--	as E.=36/16 45° as B.=180° (iron platform) 360° (concrete platform)	as E.=10 as B.=11	9 11
149.4 129.3	68,024 55,665	58,509	3	Iron platform about 3 weeks. Concrete platform about 7	--	--	690 405	48.45 51.8	627.4 244.9	40.1 27.9	123°	52°	12 8
94.9 100.6	36,965 43,308	28,872 32,700	3	weeks. tion of crane	--	--	349 309	52.2 46.5	264.5 226.3	48.3 43.2	--	52° 45° 17° or 55°	--
103.2 111.7	37,402 42,323	27,669 31,387	3		--	--	388 465	43.2 51.6	244.9 294.1	30.5 37.6	360°	45°	3
--	--	24,716 (with 32 4/16°)	--		--	--	--	--	263.4	--			
132.9	51,948	--	--		--	--	563	33.9	--	--	--	--	
--	as E., provisional 26,247 (17°)	--	--		**	**	--	--	--	--	as E. 2° as B. 360°	17° 55°	10 10

* Medium charge. Measured from rail level.

"Max B." mounting. "Konig August" mounting.

++Measured from top of longitudinal girder.

**Not yet determined.

"Max E.B." mounti

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ANNEX 4.

Recommendations of Artillery Officers

American E. F.

STAFFS

C.

ORGANIZATION OF STAFFS.

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Whether or not artillery brigades are to continue as part of infantry divisions, the conditions of their service have been such that the artillery brigades have been obliged to supply themselves separately more than fifty percent of the time. Theoretically, a part of the division staff is available to accompany a detached brigade, but actually it is impossible to detach any of the division staff for this purpose, and the artillery brigade finds itself in constant difficulties in arranging for its supply. I am convinced that each artillery brigade should have, in addition to the present staff, one supply officer with rank of major, one motor transport officer with rank of captain, one finance officer with rank of captain, at least three assistants with the rank of lieutenant and the necessary enlisted clerical assistance to carry on their work. In addition there should be provided for the artillery brigade separate supply and ammunition trains. There has been some complaint that the chances for the promotion in the staff of the artillery brigade are insufficient since there are but one major and two captains to eight lieutenants so that the proportion in the higher grades is very small. The remedy proposed by higher authority is to promote brigade staff officers to vacancies within the regiments. This has been found to be utterly impracticable in the National Army since under the conditions of rapid development, each officer became a specialist almost at once, and neither the brigade staff, nor the regiment, would be benefited by the promotion of an efficient operations officer to command a battalion. In this connection it would appear that as the artillery brigade is usually a self-supporting unit the adjutant might well be a lieutenant colonel and G-1, and G-3, majors, the proportion of the other grades to be similar to that in the regiments - R. S. Abernathy, Colonel, 165th F. A. Brigade.

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1. Division Artillery.

Division Artillery Commander - Brigadier General.
One Adjutant - Major.
One Operations Officer - Captain (Assistant - one Lieutenant, A.D.C.).
One Artillery Information Officer - Captain (Assistant - one Lieutenant A.D.C.).
One Administration & Personnel Officer - Lieutenant (Commanding Headquarters Detachment)
One Communications Officer - Lieutenant.
One Munitions Officer - Captain (Division Munitions Officer).
One Assistant - Lieutenant.

2. Corps Artillery.

Chief of Artillery - Major - or Brigadier General.
One Chief of Staff - Lieutenant Colonel.
One Operations Officer - Major.
One Assistant - Captain.
One Assistant - Captain or Lieutenant, A.D.C.
One Artillery Information Officer - Major.
One Assistant - Captain.
One Assistant - Captain or Lieutenant, A.D.C.
Two Assistants - Lieutenants, for study of aerial photographs.
One Communications Officer - Captain.
One Administration and Personnel Officer - Lieutenant (Commanding Detachment)
One Munitions Officer - Captain.
One Assistant - Lieutenant.

3. Corps Heavy Artillery.

Corps Heavy Artillery Commander - Brigadier General.
(Same staff as that of Division Artillery Brigade Commander).

4. Army Artillery.

As per accompanying table.

Each staff should be provided with a suitable detachment composed of a clerical force and the necessary technical and administrative personnel, and should be endowed with its own transportation in every case.

Pooling of transportation has usually resulted in the inability of the artillery staffs to obtain necessary transportation.

NOTE: (1) In the organization of the staff of the Chief of Artillery, of a Corps, or the Chief of Artillery of an Army, advantage is herein taken of the several sections of the Corps or Army Staff for supply, and for the functions pertaining to the major staffs, thus limiting the artillery staffs, as far as possible, to purely tactical functions, with only the necessary representatives of supply staffs for efficient liaison with the Corps and Army Staffs. - D. E. Aultman, Brigadier General, Army Artillery, 2nd Army.

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In the Argonne offensive the front of a division was seldom more than three kilometers, - a front entirely too small for the proper use of the divisional artillery. As a rule it resulted that the great advantage of enfilade fire was denied the artillery, and what was equally unfortunate the divisional artillery was almost invariably denied the privilege of firing on any adjoining sector, even though there were enemy positions, which, while not dangerous to the division in whose sector they were, were exceedingly annoying to the infantry of the adjoining division. Moreover, in an attack on an Army, or even a Corps front, the objectives are usually such that one Division will have more artillery than it needs, while its neighbor will not have enough. Perhaps it may be stated that this should be handled by the Chief of the Corps Artillery. I have never seen the time however, when the Chief of the Corps Artillery was not sufficiently occupied with handling the general artillery situation and the corps artillery, without directly fighting the artillery of three divisions.

This leads up to the suggestion that the Chief of the Corps Artillery should concern himself actively with the divisional artillery, and should have an assistant with the rank of Brigadier General, who shall have direct charge of the Corps Artillery and of the administrative duties which now take the time of the Chief of the Corps Artillery. If this be noe done, then in a combined attack, one of the Artillery Brigade Commanders of the attacking divisions should be charged with the general assignment of handling of the artillery for the assault. - E. B. Babbitt, Brigadier General, 4th Brigade.

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1. Increase battalion staff by one munitions officer and one gas officer, both lieutenants.

2. Increase regimental staff by one munitions officer, captain. - H. G. Bishop, Brigadier General, 3rd Brigade.

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Brigade Staff, one Brigadier General commanding; one major, adjutant, chief of operations; one captain, assistant to chief of operations; one captain, artillery intelligence

service; one 1st lieutenant, communication, telephone and wireless; one 1st lieutenant, in charge of headquarters detachment; one aid, assistant to chief of operations; one aid, assistant to adjutant. This number of officers will be needed for day and night reliefs when in action. All officers should be trained in the duties of at least one other department than their own. The commanding officer of the ammunition train, under the commanding general of the artillery brigade, should act as divisional ammunition officer. All officers of the ammunition train should be thoroughly schooled in the knowledge of all types of ammunition, methods of transporting and supplying it.

Regimental staff, one colonel commanding; one captain, adjutant; one captain, personnel officer; one 1st lieutenant, operations officer; one 1st lieutenant, army intelligence service; one 1st lieutenant, ammunition officer; one 1st lieutenant, communication, telephone and wireless. This number of officers will be needed for day and night reliefs when in action. All officers should be trained in the duties of at least one other department than their own.

Battalion staff, one major commanding; one captain, adjutant; one 1st lieutenant, reconnaissance officer; one 1st lieutenant, communication, telephone and wireless; one 1st lieutenant, ammunition officer. This number of officers will be needed for day and night reliefs when in action. All officers should be trained in the duties of at least one other department than their own.

For the staff of corps artillery see attached report.

For the staff of the army artillery I can offer no details but believe that it should be reduced to a small working force.

Attached hereto is a memorandum showing the staff required for a corps artillery commander. Special attention is invited to the desirability of having a commander of corps artillery located at an advanced station in close liaison with the advanced station of the A.I.S., who will not only command the corps artillery but who will be the counter-battery officer. I believe where warfare has stabilized that this commander and his staff should remain fixed. - A. J. Bowley, Brigadier General, 6th Corps Artillery.

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Recommend one Field Officer be assigned to each Brigade as inspector of animals. This for the reason that in expanding from a peace organization to a war organization it will be found that as a rule, battalion officers and men know very little about the care of horses and that a Regimental Veterinarians are without experience in maintaining animals in a healthy condition. - H. W. Butner, Brigadier General, 1st Brigade.

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Staff Corps Artillery Organization.

There should be a chief of artillery of the Corps on the Staff of the Corps commander with assistants sufficient for getting up operations orders for employment of all Artillery (including Divisional Artillery) in the Corps.

There should be a Corps Artillery Commander and Staff permanently with the Corps, to operate units of Corps Artillery. - Army Center of Artillery Studies.

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Regimental and Battalion staffs should be cut to minimum for peace basis. The works of these officers should be subdivided in time of war and provisions for this subdivision should be made during peace. The Reserve Officers necessary for this supplemental war time work

should be definitely assigned to each organization and would proceed immediately to that organization in case of mobilization for maneuver or for war.

Supplemental Annex.

The plan would have several good results.

1. It would facilitate a difference between peace and war strength by having the necessary Reserve Officers already attached for supplemental duties.

2. It would make it unnecessary to issue a number of special orders assigning individual officers, in case of an emergency when time and lack of confusion are so essential.

3. It would give the Reserve Officer a feeling that he had a definite place in the plan and probably a definite organization. He would study more on his particular work, would keep in touch with his organization, and become acquainted with its officers.

The fact that the organization or the duty were charged each year, would not lessen the value of the plan.

4. These assignments could be worked out on a definite basis, so as to give each Reserve Officer work for which he might be fitted and also so as to give him an all-round training. - Roger S. Parrott, Lt. Col., F. A.; T. W. Hollyday, Colonel, 321st F.A.; P. H. Worcester, Colonel, 146th F. A.; S. F. Banks, Major, 321st F. A. (Center of Artillery Studies).

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1. All staff officers should be required to serve at least one year of line duty in the grade held as staff officer.

2. The first principle of efficiency is simplicity. Statistical sections of various Staffs could be so organized that duplication and complication in reports would be reduced 75%. We are continually asked for reports that duplicate information already furnished to the Headquarters from which the demand comes. This is evidence of the fact that the statistical data at the higher headquarters is not properly codified and filed.

I have never yet seen an officer in a Division, Corps, or Army statistical office, who had actual experience with and knowledge of the regimental statistical prolem as it exists in the A.E.F. Without this knowledge the statistical steps can not be properly coordinated and efficiency developed. - A. S. Conklin, Colonel, 303rd F. A.

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The divisional artillery should have one officer whose duty it would be to be present at the headquarters of the divisional commander at all times. A. L. Cox, Colonel, 113th F.A.

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The following Battalion Staff is suggested:

Adjutant (Captain).
Reconnaissance Officer (Lieutenant).
Munitions Officer (Captain or Lieutenant) (Charge or combat train).
Liaison Officers (Three Lieutenants).
Communications Officer (Lieutenant).

The Adjutant and Reconnaissance Officer will handle the usual routine work, reconnaissance, and operations. Whenever possible and it is generally possible, combat trains should be assembled by battalion and placed in charge of a responsible officer of some experience. He in my opinion should be a captain as his duties involve the care and feeding of the animals, care of harness and materiel, supply of the train and the supply of ammunition to the batteries. This duty is most important to the proper functioning of the battalion in time of action. Therefore, the officer in charge of this should be permanent and not detached from batteries. It is not necessary to have two officers in charge of communications. One officer is well able to handle both the radio telegraphy and the telephonic installations. Liaison officers should be permanent and not drawn from the batteries. Their work is hazardous and requires the highest intelligence. They should be carefully selected men.

The following regimental staff is suggested:

Adjutant (Captain)
Operations Officer (Captain)
Personnel Adjutant (Captain)
Intelligence Officer (Lieutenant)
Munitions Officer (Lieutenant)
Communication Officer (Lieutenant)
Liaison Officer (Two Lieutenants)
Gas Officer (Lieutenant)

If the headquarters company is retained as an organization which the writer believes inadvisable it follows that certain of the above officers would be assigned to the company. The headquarters company as such has no function in time of war. Its personnel is used to form the various detachments required at the different headquarters and lacking the necessary equipment to make these detachments self-sustaining units as they are required to be. - W. H. Dodds, Colonel, 6th F. A.

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Battery.
One extra lieutenant with a battery of each battalion to provide for forward guns.

Battalion.
Present staff consists of an Adjutant, Telephone, Radio and one Liaison Officer.
Recommend that Telephone and Radio be combined into one officer and that the staff be increased as follows:
Two (2) Liaison Officers (Infantry regimental P.C. and front line Battalion P.O.)
One (1) Forward Observing Officer (to keep up with advanced infantry elements.)
One (1) O.P. Officer.

Regiment.
One (1) Liaison Officer at Artillery Brigade Headquarters.
One (1) Liaison Officer at Infantry Brigade Headquarters.

Brigade.
No comment.

F. C. Doyle, Colonel, 305th F. A.

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1. Brigade Staff.

There has been no definite organization of a Brigade Staff prescribed. Various organizations have been tentatively promulgated. Table 12, Confidential Series "A", recently received, purports to be an organization for Brigade Headquarters, but nothing has been received directing that this be put into effect. Assuming that this is official the following comments are made:

a. Provision is made for one Operations Officer (a Captain) and two Assistants (Lieutenants). On at least two occasions I have been suddenly confronted with practically an unknown situation and the question of preparing an extensive artillery plan with all possible haste. It was necessary for the work to be continued uninterruptedly day and night extending throughout one night in one case and two nights in the other. The preparation of these plans was immediately followed by the operation, but even so the necessity of three Operations Officers was not developed, nor have I yet encountered an emergency sufficient to demand that three officers be provided for this purpose. By suitable reliefs between one Operations Officer and an Assistant, with such help as can be afforded from other members of the Staff, I am sure that any situation can be met.

b. Under conditions of trench warfare I am not prepared to comment on the necessity for two Intelligence Officers but the conditions which have existed since about the 20th of September have not necessitated more than one with such assistance as could be readily afforded him by some other members of the Staff.

For the reasons given in 1a I would omit one of the two Assistant Operations Officers and substitute a separate detachment commander. I also think that no specific duties should be prescribed in the tables for the Aides. Nine have been trained as general assistants to the other Staff Officers and often utilized as such, but to prescribe that one of the Aides should command the detachment virtually deprives the Brigade Commander of the services of one Aide, when those of both of them are often essential at the same time.

This Brigade has been fortunate in having had attached to it, while separated from its own Division, an Officer of the Quartermaster's Department who has been utilized as Brigade Supply Officer, i.e., looking after general matters connected with the supply of rations, forage, clothing, etc., but not Ordnance or Ammunition, which has been looked after by the Munitions Officer. Especially when Brigades are sent from one Division to another this arrangement has been found not only successful but necessary, even when a Brigade is serving in a Division. Neither the Supply nor Munitions Officer directly receive any supplies or munitions; they coordinate, arrange for an expedite delivery, and in general as go-betweens between the Regimental Supply Officers and corresponding Divisional and Corps Staff Officers.

To sum up, I would suggest the following Staff:

1.	Major,	Brigade Adjutant and Chief of Staff.
3.	Captains,	One Operations; one Intelligence; one Supply.
8.	Lieutenants,	One assistant to Operations; one Munitions; one Telephone; one Radio; one Commanding Detachment; one Assistant Adjutant; two Aides.

Other duties which some of the above officers will be called upon to perform include running the Headquarters Mess, camouflage and Engineer duties, billeting, etc., which, however, in practice can be distributed as the situation demands. - A. S. Fleming, Brigadier General, 158th Brigade.

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1. The Staff of the Brigade: It is strongly recommended that the Field Artillery Brigade complete in its existence be abolished and the conviction is firm that this would result in greater efficiency of fire, communication, liaison, and supply with an expedition of orders and elimination of strain and worry upon the Regimental Commander; worry, usually because of a misunderstanding, misconception or lack of orders due to poor or faulty transmission, and thereby enabling him to size up the situations for himself and to better employ that judgement which he, as Regimental Commander, is supposed to possess.

2. The present organization appears to be theoretical far more than practical. Its most conspicuous defect is that it takes authority from the Regimental Commander who is the man on the ground, generally a Colonel and supposedly a proficient Artilleryman, and delivers this authority into the hands of a Lieutenant or possibly Captain of the Brigade Staff usually operating away from the scene of immediate action on information which as a matter of fact he received almost entirely from the office of the Regimental Commander. The delay in the transmission of orders through Brigade Headquarters has necessarily been great due to the roundabout method of communication. An order starting at Division going through the Brigade to Regiment usually taking about two hours, which was considered fair or quick delivery. There Brigades have exercised their full authority and issued orders for the exact location of regiments, they have in many cases, due to lack of the opportunity for reconnaissance of the ground ordered regiments into positions impossible of occupancy. Usually, however, this has been left to the discretion of the Regimental and Battalion Commanders to within certain areas and this system has proved efficient. This same assigning of areas however might well have been made direct from the Division, curtailing the time of delivery of orders and permitting the Regimental and Battalion Commanders more time for the study and organizing of their particular part of the operations.

3. Where the work of Artillery has been reported most effective and satisfactory in the advances of our army, it has been mostly when regiments of light Artillery have been attached to the Brigade Headquarters of the Infantry which they are to support, the heavy Artillery remaining as Divisional Artillery. This same principle therefore might well be applied for the working of all artillery. The Chief of Artillery being constantly with the Division Commander for general advice would eliminate the at pre-top-heavy Brigade Staff and the presence of the Division Artillery Operations Officer as an assistant, as well as in an advisory capacity, to the Division Operations Officer could not help but increase the cooperation between Infantry and Artillery.

4. At no time was there any situation or operation where either in the advance of defense the work done by Brigade Headquarters could not have been readily and easily taken care of directly by the Division and Regiment. In many cases however, the work of the regiment was greatly handicapped by changes in orders initiating from Brigade headquarters, by nontransmission of orders or by such delay in this transmission as to cause unnecessary hurry and strain upon the units of the mission as to cause unnecessary hurry and strain upon the units of the regiment in order to comply. On the other hand, the Regimental Commander feels that some of the most proficient work done by his Command was at times when the Division headquarters was in close proximity to the Regimental Headquarters and the Brigade Headquarters so far distant that the maintenance of communication was exceedingly difficult, necessitating the liaison with Division Headquarters. Again when the Command was attached to the Infantry Brigade and worked direct with it. In these cases the regiment was in close liaison, not only with the Infantry, but also with the Division and was able to foresee and plan approximately the part it was to take in the operations.

5. In summing up, the Artillery Brigade is not known to have performed any duties that could not have been done at Division headquarters and in the Regiment. The Artillery Brigade has not expedited the transmission and quick dispatch of orders and might therefore well be abolished. - E. St. J. Greble, Jr., Colonel, 76th F. A.

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Regimental Headquarters Staff:-

Regimental Staff to be composed of:

1 Colonel, Commanding regiment.
1 Lieutenant Colonel, assistant in command; this officer to supervise all training and operations.
1 Captain, Regimental Adjutant.
1 Captain, Operations Officer.
1 Captain, Personnel, Adjutant.
1 2nd Lieutenant, Assistant Adjutant.
1 Medical Officer.
1 Chaplain.

Battalion Staff.

The Battalion Staff to be composed of:

1 Major, Battalion Commander.
1 Captain, Adjutant and Orientation Officer.
6 1st Lieutenants, with duties as follows:

(a) Communication Officer, responsible for all telephone, radio and visual communication within the Battalion. (b) Two Liaison officers; one of these to be on duty at Regimental Command Post of Infantry which the Artillery Battalion is supporting, the other officer to be held in reserve at Command Post of Artillery Battalion. (c) Three Aerial Observers.

4--2nd Lieutenants with duties as follows:-- (a) Assistant Adjutant and commanding Battalion Headquarters Detachment. (b) Gas and Ammunition officer. (c) Two Liaison Officers, one of these to be on duty at all times with forward Infantry Battalion; the other to be held in reserve.

1 Medical Officer.
1 Veterinarian.

E. St. J. Greble, Jr., Colonel, 76th F.A.

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Due to the importance of work to be performed by the Brigade Staff, selection should be made from officers best qualified to fill the various positions on the Staff, and since these officers should be selected from among the best available, an increase of rank of certain officers should be considered.

The rank of enlisted men should be proportionate to the skill required, special qualifications, and to the importance of the work performed. Therefore, the following organization of a Brigade Staff of Divisional Artillery, with increase in rank of certain officers and enlisted men is submitted herewith for your consideration.

The table of organization for Brigade Headquarters, Field Artillery Brigade, in the opinion of the undersigned, should be as follows:

Brigadier General.....	1	(a) Brigade Adjutant.
Major or Lieutenant Colonel...	1[a]	(b) 1 Operation, 1 Information, 1 Communication, 1 Munitions, and 1 Supply Officer.

Captains	5[b]	(If it is the policy to continue the present custom of issuing materiel, equipment and supplies to Brigades, instead of Regiments, it is the opinion that the S.O. should be a member of the Staff).
1st or 2nd Lieutenants	6[c]	
Total commissioned	13	
Regimental Sergeant Major	1	(c) 1 Assistant Operations, 1 Assistant Information, 1 Radio, 1 Telephone, 2 Aides, one of whom commands Detachment.
1st Sergeant	1	
Supply Sergeant & Mess Sergeant	1	(d) 1 Telephone, 1 Radio, 1 in charge of motor transportation, 1 orderly for Brigade Commander, 2 draftsmen.
Sergeants	6[d]	
Corporals	8[e]	(e) 1 clerk for Detachment, 2 draftsmen, 1 Radio, 1 Telephone, 1 Vis. Sig., 1 in charge of courier service.
Mechanic	1	
Cooks	3[f]	(f) 2 for Detachment, 1 for officers' mess.
Bugler	1	(g) 8 chauffeurs, 2 motorcycle couriers, 1 Adjutant's office, 1 munitions clerk, 1 Intelligence, 1 Operations, 4 Wireless, 5 telephone, 2 linemen, 1 Vis Sig.
Privates 1st Class	26[g]	
Privates	22[h]	(h) 10 orderlies for officers and care of horses. 1 officers' mess, 2 Telephone, 1 Vis. Sig., 7 for duty.
Total enlisted	70	

The Regimental Staff should be increased by one Lieutenant Operations Officer - assistant to Regimental Adjutant. - I. A. Haynes, Brigadier General, 64th Brigade.

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The divisional artillery brigade should have a staff as follows:

1 Chief of Staff	Lieutenant Colonel
1 Munitions Officer	Major
1 Operations Officer	Captain
1 Intelligence Officer	Captain
1 Communications Officer	Captain

2 Aides de Camp with the Brigade Commander.
2 Lieutenants for Headquarters Detachment and Communications.
Add Captain Munitions Officer to Regimental Headquarters. -
T. N. Horn, Brigadier General, 7th Brigade.

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Battalion Staff in addition to officers now authorized should include a Munitions Officer, whose work has been found to take all his time and one extra officer as Gas Officer, to help in reconnaissance, etc. Battalion staff should consist of six officers besides the Bn. Co., and Surgeon. - R. D. Johnson, Lieutenant Colonel, 18th F.A.

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The organization of the brigade staff has already been given. I am not qualified to make recommendations for the organization of the Army Artillery Staff. It is my opinion that

in the past they have been far too large and consequently top-heavy and with resultant divided responsibility. Many of the staff officers seen during the recent operations were absolutely ignorant of troops and troop duties, responsibilities, difficulties, etc. One Corps Staff was noted in particular where only about one officer out of four know enough to salute the unfurled regimental colors of a regiment parading thru a city. The Staff Officers of the Army and Corps Artillery never got near enough to the front to know what was going on or how it was done. One Corps staff officer told me the reason for this was the hard time they had getting back when once they got up there. - J. T. Kennedy, Lieutenant Colonel, 5th F.A.

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With regard to staffs, I think our staffs up to and including the corps are well organized. My ideas as to what the staff of the Chief of Artillery of an army should be were shown in tables forwarded to C. in C., G-1, G.H.Q., under date of 19 November, 1918, (copy of forwarding indorsement herewith). - William Lassiter, Major General, 32nd Division.

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For Regimental Staff:

1 Echelon Commander - Lieutenant Colonel
1 Adjutant - Captain
1 Operation Officer - Captain
1 Intelligence Officer - Captain
1 Communication Officer - Lieutenant
1 Ammunition Officer - Lieutenant

For Battalion Staff:

1 Adjutant - Captain
1 Echelon Commander - Captain
1 Communication Officer - Lieutenant
1 Liaison Officer - Lieutenant
1 Intelligence Officer - Lieutenant

C. R. Lloyd, Colonel, 10th F.A.

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The organization of the headquarters company of Field Artillery should be changed. The Battalion details should be under the staff officers of the Battalion and only the Regimental detail remain under Regimental Staff.

The range finder, scissors and the aiming circle operators are not needed on the regimental detail. - D. McKell, Colonel, 12th F.A.

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Maintained at authorized strength it is considered adequate; officers now assigned to Headquarters Company should be assigned directly to Regimental and Battalion staffs. - J. A. Mack, Colonel, 102nd F.A.

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It is recommended that the following number, and rank of officers constitute the staff of the Chief of Artillery in ordinary times:

1 Brigadier General General or Major General, Chief of Artillery.
1 Major or Lieutenant Colonel, Chief of Staff.
3 Captains, Chiefs of Artillery Information Service, Operations, Section, and Munition Service.
3 1st Lieutenants, assistants in each of the above sections of the staff.
1 1st Lieutenant or Captain, Supply and Signal Officer.

In case of an attack being in preparation the above staff could easily be temporarily reinforced by officers from the organizations and the corps artillery park.

(c) It is recommended the chief of artillery be either a Brigadier General or Major General in order to permit the designation of men peculiarily fitted for the duty regardless of their rank.

Two officers in the operations section are amply sufficient for the work required of them, provided the corps does not interfere with details which should properly be left to suborinate units. It is especially desirable that the Chief of Staff and the officers in the operations section be experienced in campaign and they should have had considerable service with troops in order to avoid imposing needless discomfort upon the troops. They should well understand just what the troops under their command will experience while executing the orders they prepare.

The two officers in the A.I.S. are only those required to run the A.I.S. office. It will probably be desirable in most cases to have an advanced section of the A.I.S. in charge of one or two officers in addition to those named in the above table but this can be a matter of arrangement when such need arises, for officers for this advanced duty can be easily trained.

Two officers in the Munitions office should be sufficient to handle all questions of munitions, especially if there be a corps artillery park in existence with which they may work. Reinforcement by one officer from the corps artillery park will be found necessary in more active times. The chief of this section should be a man of considerable executive ability in addition to knowing ammunition well. More trouble may be expected from this section than all the rest of the staff put together.

The supply and signal officer while not entirely essential can greatly assist all of the sections in their work by removing all their difficulties of procuring their material and generally obtaining such supplies as are necessary around the office. He concerns himself with questions of billeting of the headquarters. As signal officer he has a very important position. Corps Artillery must have an extensive installation of telephone lines, and although these are supplied by the Signal Corps yet it has been found Signal Corps officers do not understand artillery needs, and it is necessary to have an officer on the artillery staff who can arrange all questions of communications with them.

One important consideration in support of the above formation of the staff is that the number of officers has been kept down to a minimum and therefore it is both economical and efficient. Also experience has shown that the staff of the Chief of Artillery of the Corps as composed above does function efficiently. At least one of the above positions may be filled by an aide-de-camp.

This does not take into account the Heavy Artillery Commander and Counter-Battery officer, who is not a staff officer, but a line officer and who commands the troops he uses. Many organizations try to place him on the staff but he has no place there, commanding as he does the units of the Corps Artillery. Hr occupies a position comparable to a F.A. brigade commander with the added charge of counter-battery work. - S. N. Reinhart, Major, Field Artillery.

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SUGGESTED CHANGES IN TABLE 102 - HEADQUARTERS OF AN ARMY CORPS.

Artillery Section		
Brigadier General	1	
Lieutenant Colonel	1	Chief of Staff.
Majors	3	1 Operations, 1 A.I.S., 1 Munitions.
Captains	6	1 Assistant Operations, 1 Liaison, with Air Service, 2 A.I.S., 1 Reconnaissance Officer for locating dumps for Munitions, 1 Telephone Officer.
Lieutenants	3	2 A.I.S. forward report center, 1 Assistant Munitions Officer.
Total	14	

Field Clerks	2	

TRANSPORTATION

As given in tables, increased by two motorcycles, with side cars, and one truck for the telephone detail.

This should not be in Corps pool, but assigned, as the Munitions Officer and A.I.S. must have cars and motorcycles which can be sent out immediately.

Artillery Section		
Sergeants	3	2 Sergeant Clerks and 1 Interpreter
Sergeants of Ordnance	2	Graduates of Ammunition School, 1 as Clerk to Munitions Officer, 1 as Messenger to Dumps.
Sergeants of Signal Corps	2	Telephone Detail.
Corporals	2	Draughtsmen, A.I.S.
Privates 1st Class Signal Corps	26	Telephone Operators and Linesmen.
Privates 1st Class	11	5 Chauffeurs, 6 motorcyclists.
Privates	9	2 Office Orderlies, 7 mounted orderlies.
Total	55	

NOTE: It is necessary to have a telephone detail for the effective operation of the A.I.S. and Munitions. The Corps Artillery should also have its Telephone Switchboards, Telephones, wire, etc., for the prompt installation and maintenance of communication. - C. A. Selleck, Lieutenant Colonel, Field Artillery

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The organization of the staff of the brigade appears to me to be sufficient to meet the demand. - W. R. Smith, Major General, 36th Division.

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The staff of a field artillery brigade should consist of the following officers:

Chief of Staff..... 1 Major
Operations..... 1 Captain and 1 1st of 2nd Lieutenant
Munitions..... 1 Captain and 1st or 2nd Lieutenant
Intelligence..... 1 Captain and 1 1st or 2nd Lieutenant
Communications..... 1 Captain and 1 1st or 2nd Lieutenant
Camouflage..... 1 Captain and 1 1st or 2nd Lieutenant

Two officers are necessary for each of the above duties in order to provide for sickness, leave, and other conditions which from time to time reduce the personnel of the staff. It is not satisfactory to expect an officer of one section to perform the duties of another section, and this system has failed at critical times. It is a fallacy to expect one officer to perform double duty and will result in crippling the command or exhausting the officer.

The staff of the chief of artillery of a corps should be constituted similar to that of a brigade, with one degree higher rank for each officer and the omission of the communications officer, and the communications be delegated to the signal corps. - G. P. Summerall, Major General, 5th Corps

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Owing to the policy of changing Field Artillery Brigades from Division to Division - (This Brigade has served with 5 Division, has been Corps Artillery several times and has been Army Artillery twice) - the Brigade Staff must be able to perform all the functions of a Divisional Staff. For instance, this Brigade has never had at its service its proportional part of either the Divisional Supply or the Divisional Sanitary Train.

Experience has shown that in addition to the Chief of Staff, there should be two Operations Officers, an Assistant to the Chief of Staff for much of the Adjutant's work and to command the Headquarters Detachment, a Personnel Officer, a Supply Officer, a Munitions Officer, who also acts as Assistant Supply Officer, a Communications Officer, an Artillery Information Officer and two Aides-de-Camp for billeting, inspection and liaison work with superior headquarters and units of adjacent Divisions. The experience of this Brigade has shown that one of the supply officers must be an Ordnance Officer. - H. D. Todd, Jr., Brigadier General, 58th Brigade.

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1. Brigade Headquarters should have a supervisory G-1 Department with primary function of assisting regiments as much as possible in all matters of supply and equipment.

2. The regimental supply company should be organized with a field officer in charge and five assistants. The supply company irrespective of any horse drawn transportation should be adequately supplied with motor transportation, trucks for making the inevitable long hauls and two Ford or other light touring cars or vans for maintaining liaison with its own sub units, G-1, rail-head, etc., of the Division. Lack of adequate motor transportation facilities for the Regimental supply companies was an unfortunate condition and should be corrected. - G. L. Wertenbaker, Colonel, 345th F.A.

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A D D E N D U M

To

ANNEX 4

Recommendations of Artillery Officers,

American E.F.

Received after the Dissolution of the

Board.

STAFFS

Regimental and brigade staffs in their final development seem now satisfactory for active operations. The personnel officer need not be and should not be an artillery officer and trained as such. He would be better from a special service, and trained as such. - Edw. Burr, Brigadier General, 62d Field Artillery Brigade

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1. The number of officers authorized for a 3" field artillery regiment is insufficient. Existing orders require that each regiment maintain a gas officer. Also in service the regiment has a liaison officer with infantry. The detail of a liaison officer is invariably required, whatever be the unit which the regiment is supporting. It might be claimed that the radio or intelligence officer might perform the duties of the gas officer. Under some conditions this is possible, but it must be renumbered that there are many additional details, such as liaison officer with the artillery brigade and liaison officer with neighboring units. Moreover, frequently more than one liaison officer is repqired. For example, the regiment may be supporting a brigade of infantry, with one regiment in line and on in support. In such a case it is necessary to liaison with the infantry, regimental commander and with the infantry brigade commander. There are also other duties, such as Motor Transport Officer, which requires the attention of some staff officer. Then again, the regimental staff in soon depleted through casualties, evacuations for sickness, special details, etc. - J. R. Davis, Colonel, 15th Field Artillery.

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I believe there should be an artillery officer of approximately the same rank as G-3, in the same office, of each division. This would, in my opinion, have saved a great many lives, and also a large amount of ammunition in some of the later drives of the war. - A. G. Fisher, Colonel, 307th Field Artillery

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It is essential that an Artillery Brigade staff be organized as a complete administrative unit. It is thought that the number of officers allowed by the present organization table is correct, but a reqppointment of the different grades should be made so as to allow two more Captains and two less Lieutenants. The senior staff officer should be designated Chief of Staff instead of Adjutant. The increase in the enlisted personnel of the communications section is necessary in order to install and maintain the communications required by the regulations governing "Liaison for all Arms." - C. C. Hearn, Brigadier General, 153rd Field Artillery Brigade

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There could be added to the Brigade Artillery Staff as now organized a Supply Officer and an Inspector as well as an Assistant Adjutant: If the Artillery is to remain horsed by all means there should be added to the Brigade Staff an officer (not a veterinarian) to be known as the Horse Officer, who entire duties would be that of inspecting and overlooking the horses of the Brigade, this officer to advise, correct, recommend, and where necessary in the name of the Brigade Commander should order evacuation of horses, changes in their stable management or treatment, or anything that would add to the mobility of the organizations and preservation of their animals. This officer should be selected because of his knowledge and ability to handle horses, and his duties might be combined with those of the Brigade Inspector suggested.

The work of the Radio Officer as now provided could be absorbed by the Communications Officer, and 1 Assistant Operations Officer could be omitted from the present list, as my experience has shown that with 2 Operations Officers, 2 Information Officers and 1 Communications Officer these Departments can be run very satisfactorily.

It is believed that the supplies for an Artillery Brigade should be controlled by a Brigade Supply Officer, who when the Brigade is acting with the Division might simply supervise and check up the supplies of the organization, being drawn from the Division with which serving, if it is not deemed expedient to have the Brigade function separately at all times as relates to its supplies. The experience in this Brigade was such that at this time I would recommend a Brigade Supply Officer, through whom all supplies for the Brigade can be obtained. - W. G. Price, Jr., Brigadier General, 53rd Field Artillery Brigade

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The staff of the Brigade should consist of:

1 Chief of Staff, Lieutenant-Colonel,
1 Captain, Operations,
1 Lieutenant, Operations,
1 Captain, Artillery Information,
1 Lieutenant, Artillery Information,
2 Lieutenants, Communications,
2 Lieutenants, Liaison (with adjoining divisional artillery),
2 Lieutenants, Aides (one to accompany commanding general, and one in charge of mess, quarters, baggage, etc.)
1 Lieutenant to command Headquarters Company,
1 Captain, Q.M.C., Supply Officer,
1 Field Clerk.

The Commanding Officer of the Ammunition Train should act as Munitions Officer. His rank gives him the required authority, and his close touch with the Ammunition Train greatly facilitates the work of the ammunition supply.

It has been demonstrated that Field Artillery Brigades operate alone more frequently than otherwise, and a Supply Officer is essential.

The preparation of operation orders and reports was impeded by the lack of a field clerk. Capable stenographers were unprocurable.

Staffs of regiments should have at least seven liaison officers, lieutenants. Experience demonstrated that where a regiment was supporting an Infantry Brigade, it was necessary to have one liaison officer at the Infantry Brigade Headquarters and one at each Infantry Regimental Headquarters, and at four Infantry Battalion Headquarters. Liaison officers, to be of service to the Infantry and of value to the artillery, need special training and the detail of an officer who has not had such training is of little use.

One additional Captain should be provided in each regiment for artillery information work exclusively. The artillery information work, which is new, was inclined to be slighted, and cannot be properly accomplished unless an officer's entire time is devoted to it in the regiment, and he must be specially trained. - G. W. Wingate, Brigadier General, 52nd Field Artillery Brigade

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ANNEX 5.

Recommendations of Artillery Officers

American E. F.

EQUIPMENT.

D.

EQUIPMENT. SUPPLY IN GENERAL.

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Under the head of Supply in General, it is noted that once an artillery brigade became separated from its division it lost the railhead of the division, and no railhead arrangements, as a rule, were provided. This would be corrected by the organization of the brigade as a supply unit.

I noted that the horses throughout the artillery were not as well cared for as they should be. Some reasons for this, no doubt, were that there were insufficient animals provided, that forage was very difficult, if not impossible to secure, and that the personnel frequently became so depleted that there were not enough men available for work at the echelons. In my opinion the principal reason, however, was that the horses were not issued to artillery troops until after their training in other respects were completed and they were ready to go into the line. Consequently, the artillery went into active service with insufficient training for drivers as well as animals. - R. S. Abernathy, Colonel, 165th Brigade

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More modern guns and carriages than the 75 mm and the 155 mm howitzers should be adopted. The Hydro-Pneumatic recoil and counter-recoil system of those guns was successful, but in all other respects it is believed that all of this materiel was inferior to the 3" gun and the 6" howitzers of the United States service. The undersigned favors a carriage with split trail, carrying a gun capable of giving a range of about 12000 meters with a special cartridge, but normally using ammunition for a range of approximately 7000 meters. It is believed that little use will be made of the long range ammunition, but artillery capable of using this on occasion, especially where map firing is possible, will have a great advantage. This is especially true where, due to poor roads, or great congestion thereon, it is difficult to move artillery forward as quickly as desired. The different kinds of ammunition for both guns and howitzers should be reduced to a minimum.

The absence of some important materiel, both on the Vesle and in the St. Mihiel drive was a source of great embarrassment. Reels to be carried on the backs of men, as in the German service, as well as hand reels for light buzzer wire, should be provided and large quantities of light wire should always be available. Heavy wire, though much more desirable, cannot be laid in a rapid advance and forward observation is rendered exceedingly difficult under such conditions.

All Brigade Headquarters should be motorized. The chauffeurs should receive the pay of wagoners (instead of Private 1st Class as now provided) and the headquarters should be equipped with no less than 10 motorcycles with sidecars. With the present equipment it is impossible to send the Brigade Staff to the regiments and to the Infantry Brigades with anything like the frequency desirable, and indeed necessary. - B. B. Babbitt, Brigadier General, 4th Brigade

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The present reel cart is not adapted to trench warfare, nor to any condition where the horses are likely to be disabled quickly by hostile fire. The cart is all right for general use in open warfare, but in cases where the cart can not be used, spare reels that can be handled by men must be provided. In other words, wire must be carried so that it can be laid rapidly by cart or by hand according to circumstances.

A lighter type of cart that would be hauled by manpower when necessary and by a mule ordinarily would probably fulfill both requirements.

The supply of signal equipment is too limited. - H. G. Bishop, Brigadier General, 3rd Brigade

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d. Equipment, Ordnance, Signal, etc. Supply in general.

See attached report. Regarding signal equipment I firmly believe that the American buzzer telephone with its reels of busser wire should be reintroduced in the artillery. There is no danger from listening in, except in trench warfare. I do not believe that listening-in sets were used by the enemy in very many cases where the lines were merely stabilized. I do not believe they would have gained much information from our buzzer system. The buzzer telephone is much lighter and more convenient than the French. The buzzer itself with its light buzzer-wire is capable of furnishing suitable communication rapidly for long distances. This equipment is greatly needed for communication between observing posts and batteries, and between advancing infantry and battalion P.O.'s especially in war of movement. A wireless sending set should be furnished each brigade and each regiment of field artillery.

As to supply in general, supplies should be furnished and no requisitions demanded. Paper work will never win a war. Supply departments should produce the goods and not insist upon the fighting man producing requisitions, reports and other formal communications. All supplies should be furnished on demand of any sort, a scrap of paper, a telephone message, too. The organization commander making the request should be held responsible for accumulating more equipment than that to which he is entitled. I believe that commanding officers and instructors can readily handle this matter. All supplies should come from one source. An organization commander should merely ask for what he needs regardless of the department to which the supplies belong. - A. J. Bowley, Brigadier General, 6th Corps Artillery

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The howitzer regiments should not be equipped with Infantry rifles. Our reel cart is too heavy. A small hand reel cart should be provided as well as the horse-drawn cart. Ration carts, water carts and sanitary carts should be four-wheeled. Battery and store wagons should be provided which are less cumbersome. This can be done if the repair shops be kept up.

Caissons for howitzer regiments should be replaced by wagons carrying 40 or 50 rounds. - H. W. Butner, Brigadier General, 1st Brigade

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The switchboards could be improved by providing a telephone with headset so as to free the operator's hands.

Telephones should be in waterproof cases.

Wire as furnished in France was very bad, except the American Twisted Pair.

Tools - The small tool kits issued are too weak and should be replaced by more serviceable tools.

All rifles of supply company to be replaced by pistols.

That Supply Train be equipped with motors instead of wagons. -

T. Campbell, Colonel, 329th F.A.

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Equipment on improved telephone including a buzzer feature.

An improved lighting system for sights for night firing.

A suitable portable P. C. fitted for day and night work, for all units from brigade to battery inclusive.

Interchangeability of all dry cells for all F. A. equipment.

Kinds of projectiles fuzes and charges in use at present are entirely too numerous.

Lights and quadrants should be so constructed that the use of range tables to determine settings shall be unnecessary. - Army Center of Artillery Studies.

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Ordnance. Eliminate rifles, bayonets and scabbards. Supply pistols and trench knives. Equip Supply Company with the vulcanizing plant.

Quartermaster. Supply rubber coats (not slickers) with hoods and rubber boots to every enlisted men; oil skins, in addition, to every driver and assistant driver of motor vehicles.

Either in barracks or in the field a mimeograph is an absolute necessity to the regiment and should be supplied. We receive three times the necessity supply of paste and half the necessary supply of gem clips and carbon paper.

Much time and labor is unnecessarily used in the lower units through failure on the part of someone to supply printed forms. It is very inefficient, by and large, to rule or type a form that is standard.

The designing of forms shows a lack of understanding of their uses in the field in mobile units.

The binders issued are awkward and obsolete.

The questions of forms and binders should be gone over and the two considered together. With the present ones, a mobile unit is greatly handicapped; no binders can be procured to fit the forms used and without binders for forms loss and destruction are bound to arise when the unit moves.

It is believed that a uniform system of angular measurement for both vertical and horizontal angles should be adopted on all guns, howitzers and angle measuring instruments. If this is not practicable for all types of artillery, at least much could be done along this line to standardize the existing differences in the various types of light and medium calibre materiel now in use in the United States Army. - A. S. Conklin, Colonel, 303rd F. A.

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Experience has shown the range finder and the periscopic goniometer to be of no value. The battery wagons and reel carts supplied, have been far too heavy for the work they were supposed to do. There should be on extra gunner's quadrant for each battery and one extra aiming circle for each battalion. The number of telephones as shown by the tables are

insufficient. Instead of twelve telephones for headquarters company, to be used by the different details, there should be twenty-four. No hand reels have been available, but captured German reels worn on the back of wiremen, have proven most satisfactory for light wire and made possible quick installations. All radio sets should be equipped with amplifiers. -

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Rifles are considered neither desirable nor necessary. The revolver or pistol should be supplied.

Every brigade should be supplied with its ammunition train and complete equipment for operating, without calling on other authorities for assistance.

The methods of supply in vogue are satisfactory. - R. P. Davis, Brigadier General, 151st Brigade.

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Every battery should be allowed extra kitchen equipment. The battery is always split into at least two echelons and the kitchen equipment is inadequate. The rolling kitchen has not come up to expectation. It is very hard on horses and the allowance of horses for it is not sufficient. The latest type of rolling kitchen possessing fireless cookers is an improvement over the former type. It is believed advisable to include a field range as a part of the kitchen equipment of each battery. All two wheeled vehicles should be discarded in favor of the four wheel vehicle. A light four wheel cart similar to that used in the German army makes an excellent ration cart and superior to our own. A better lighting system for guns and aiming stakes than that in use at the present time should be devised as the one now in use is too fragile and rapidly deteriorates. Since much firing is done at night this is of prime importance. - W. H. Dodds, Colonel, 6th F.A.

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Replace present caissons of 6th, 7th and 8th sections with a vehicle similar to the G.S. cart (more strongly made of course). This will permit carrying more ammunition and when no ammunition is carried other things can be carried. Removable partitions should be designed so unboxed ammunition may be safely carried; also a weather proof top, designed to be removed at will, should be designed. Places on sides of carts could exist to carry the partitions and top in case boxed ammunition or rations, etc., are carried on occasions when ammunition is not carried.

9th Section. Present design O.K.

5th Section. Two covered vehicles with suitable partitions essential to carry fire control equipment and provided with locks and keys to safeguard instruments against loss. This vehicle to be arranged in two (2) parts, a limber and a body. One of these vehicles will carry wire.

Supplies in general. No comment except hard grease should be more easily obtained by batteries.

Signal Equipment. Each battalion to be equipped with a sending set of wireless in addition to its receiving set.

It has been found that telephones are needed as follows:

Regimental Headquarters

P.C.	1	Telephone
Switchboard	3	" (2 for test)
Radio	1	"
O.P.	2	
Total:	7	

One Battalion Headquarters

P.C.	1	Telephone
Switchboard	3	" (2 for test)
O.P.	2	" (1 for test)
Radio	1	"
Forward gun	1	"
Total	8	

One Battery

P.C.	1	Telephone
Guns	4	"
Switchboard	2	" (1 for test)
O.P.	2	"
Echelon	1	"
Total:	10	

TOTAL: For Regiment 83 telephones.

It is recommended that 18 of these telephones be Camp telephones as these have been found the most satisfactory for P.C.'s and switchboards.

The reel cart and instrument caisson as issued is useless for field work owing to the extreme weight and clumsiness of the whole apparatus. As it requires six horses to pull it, the drain on horse flesh is very great, and its weight also prevents its use over heavy ground.

It is suggested that some sort of a light reel cart be provided, the specifications of which would be somewhat as follows:

(a) 4 wheeled light wooden vehicle of normal gauge, drawn by 2 horses.

(b) To carry 2 drums of 1 km. T.P. wire each.

(c) Apparatus for reeling in and out.

(d) Room for 1 extra 1 km. drum of wire.

(e) Whole vehicle to be light enough to maneuver over broken ground.

3 Sending Sets Wireless)	One for Regimental
3 Receiving Sets Wireless)	One for each Battalion
2 Ground induction sets)	One for each Battalion

Except as noted above, the present authorized signal equipment for Field Artillery regiments is recommended. - F. C. Doyle, Colonel, 305th F. A.

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Retention of all the fire control equipment as at present. I believe the objection to range-finders for instance is based upon experience which did not necessitate the open or

field firing. Range finders, if properly manned, are valuable. The caissons with the 155's are horse killers and should be replaced. The system of supply has most unsatisfactory to date. On first arriving some few articles were requisitioned by Regimental Supply Officer, but this was soon stopped and it was necessary to get Army approval. The result has been, in many cases, a long delay in getting absolutely essential articles for the comfort and welfare of men and animals. It is essential that the right of final approval be vested in some authority lower down the scale where the conditions governing the requisition is better understood and where the supplies on hand in an area could be more easily determined and more quickly distributed. I suggest the Division Headquarters. - R. H. Dunlap, Colonel, 17th F. A.

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Recommend that the number of telephone allowed be doubled, and the allowance of wire be increased by half.

The Nash Quad truck has been found unsuitable for the work called for.

Recommend that sights similar to the American panoramic sights be adopted on the 115's.

Recommend that the gasoline carrying capacity of the 5-ton tractors be increased.

Recommend that water carts be included in allowance of motorized regiment. - Q. A. Gillmore, Colonel, 112th F. A.

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One reel cart to be of single horse type - small 2 wheel, such as can be easily conducted through woods and over narrow trails; reel cart to resemble in size and appearance a small machine gun cart; 6 horse store wagon to be replaced by one horse 2 wheel dutch cart; 12 caissons to be substituted for by 4 6 horse ammunition wagons 2 piece, such as English ammunition wagons, and 4 1 horse 2-wheel dutch wagons. Guns, 3" four; anti-aircraft machine guns, 2. Bicycle to be replaced by one motorcycle with side car.

Ration and water carts to be of 4 wheel type; present considered far too severe on animals. Ammunition should be supplied in wicker cases rather than wooden; this will facilitate the handling and [illegible] easier carrying in ammunition carts, and better camouflaging.

The ammunition pocket for [illegible]olvers supplied with clips of cartridges is of such poor design as to cause constant ripping or unsatisfactory appearance. Either the method of carrying these cartridges should be changed or a new ammunition pouch should be designed.

Signal Property.

It is believed that elaborate experiments should be carried on to better the telephone and to arrange for the supply and use of some light buzzer telephone in place of those now used, particularly for the advance O.Ps. The shortage of batteries, tape and wire was invariable critical, and effected considerably the good communication of the Regiment. Each battery should be supplied with at least two miles of outpost wire, and there should be sufficient of this on hand to guarantee the re-supply as soon as any of this is reeled out, as it fast becomes unserviceable. Although not received by the Regiment, it is known that the night signal lights are very good. It is suggested that these be supplied.

Supply in General.

The service of supply in general is considered as having been continually unsatisfactory. This was due principally to the method in which supplies were issued, for

example: Horses were issued without harness; horses were evacuated without any means of re-supply, or the supply was not sufficient to enable evacuation of horses at the proper time. Wagons were not available with the horses, horses were not to be had with the wagons. It is suggested that wherever the wheeled transportation is requisitioned, that the wagon complete with horses and harness be issued, and that remaining of the unserviceable wagon and team be turned in for repair and rehabilitation. There should always be in the Replacement Battalion sufficient teams and horses to guarantee that the battery commanders would always have at hand suitable and serviceable transportation; it is believed to be due the lack of transportation in general that has caused the greatest amount of waste in salvaging in the various artillery organizations at the front. - E. St. J. Greble, Jr., Colonel, 76th F. A.

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Add marking outfits in Batteries for stamping leather, also to Brigade headquarters.

Incorporate all telephone switchboards in boxes which include terminal strips.

Include small loading coil in radio receiving set.

Issue each battery one 24 on projector in addition to present allowance of 14 cm. projectors.

Equip each battalion, Regimental and Brigade Headquarters with pack saddle carrying two ½ mile wire reels of twisted pair in position to unreel, instead of duplex wire. The outside pair distribution wire is more efficient than the duplex wire which has been furnished.

Equip 12 drop switchboards with 30 feet inside cable, telephone headset and breast transmitter.

Artillery telephones should have buzzer element.

Each battery should be issued at least two breast reels.

Recommend entire Ammunition Train personnel, to be equipped with blue jeans. -

T. N. Horn, Brigadier General, 7th F. A. Brigade

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Equipment now being issued considered satisfactory except projectors which are too bulky. Small telephone wire useless for long lines. - R. D. Johnson, Lt. Col., 18th F. A.

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1. Equipment, Ordnance, Signal, etc.

Supply in general.

The light field gun should be the French 75. It did the work in the past and has not been surpassed to date for accuracy and speed of fire and recoil, stability, etc. The heavy howitzer should be the 155 mm. Schneider model. It has range, power, mobility, accuracy and stability; also long life.

2. The howitzer regiments should not be equipped with rifles. It is an encumbrance and was never used. Two machine guns per battery should be maintained.

3. Signal:

The Western Electric telephone seems to be satisfactory. Quantities of twisted wire must be manufactured and kept available. Aiming device could be improved. The telephone is the thing. It can be used day or night, rain or shine. Other means of communication are valuable auxiliaries but nothing more.

4. Regiments and battalions hould be equipped with sending sets as well as receiving sets for radio communication. The radio is most valuable but was never used to best advantage. Higher commanders did not understand or appreciate its possibilities and this means of communication was often not fully utilized. - J. T. Kennedy, Lt. Col., 5th F. A.

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A more liberal provision of wire and other signal equipment should be made; reel carts have been found practically useless; a light cart of the type of the machine-gun cart is considered practicable - C. R. Lloyd, Colonel, 10th F. A.

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Considered ample where sufficient provision is made for its maintenance. The undersigned would have preferred mules for draft under campaign conditions prevailing in this war. They possess several important advantages over the horses furnished, such as, more rugged, more reliable, more easily kept in flesh, stand climatic conditions better, less subject to disease, stand up under harder work, require less food, and are as reliable, if not more so, in an emergency. - J. A. Mack, Colonel, 102nd F.A.

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Greater attention should be paid to the supply of such small articles as aiming lights, etc. The French grooming brush is recommended, in addition to our grooming kits. - D. McKell, Colonel, 12th F.A.

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In my experience during the War of Movement of the last Meuse-Argonne offensive, it was found next to impossible to carry sufficient wire and signal equipment especially since communication lines already laid frequently had to be abandoned as the units moved forward.

No assistance whatever was received from the Signal Corps either as to supply of labor, and where battalions were compelled to lay lines to Regimental Headquarters and Regimental Headquarters in turn to Brigade, unnecessary difficulties were encountered and unsatisfactory results frequently obtained.

I recommend that communications down to field artillery Regimental Headquarters, be laid by the Signal Corps but operated by field artillery personnel; that through the Signal Corps, Brigade Headquarters be provided at all times wih an ample supply of signal equipment, especially wire, so that the needs of regiments and subordinate organizations may be promptly and fully met; that Regimental Headquarters lay and operate lines to Battalion Headquarters instead of the reverse, and that signal equipment dumps be maintained well forward so that units even as small as batteries may be able to rapidly replenish their supply of signal equipment; the Signal Corps personnel to gather up, repair and re-issue lines and signal equipped necessarily abandoned by firing units in their advance. - C. B. Mehard, Lt. Col., 321st F.A.

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EQUIPMENT.

Recommend that the use of the caisson for the 155 Howitzer be discontinued. The Chariot de Park carries more ammunition more satisfactorily. There is nothing carried on the caisson that cannot be carried on the Chariot de Park. The Regiment made no use of its caissons whatever. The Chariot de Park carried our ammunition most satisfactorily.

AMMUNITION.

All artillery schools should include a course for ammunition officers and non-commissioned officers, in which the various types of ammunition are actually handled. The work of handling ammunition should be better organized.

The organization successfully used in this regiment was as follows:

Each battery had three (3) non-commissioned officers employed in the following manner: One for the gun position to keep stock and see to the proper storing, sorting, replacement and reports of ammunition. One non-commissioned officer in close touch with the Regimental Ammunition Officer, on duty at the ammunition dump, who represents his battery in securing the proper ammunition, shell weight, powder lots, etc. The third non-commissioned officer in touch with the ammunition non-commissioned officer at the gun positions and at the dump, sees that the ammunition is delivered at the guns.

Practical exercises carried on at schools in the actual handling and delivery of ammunition, under this plan of organization will demonstrate the necessity for having at least three (3) non-commissioned officers per battery employed in this work. - P. L. Mitchell, Colonel, 136th F. A.

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(a) It is suggested that the telephone equipment for each unit of Regiment, Battalion and Batteries, be consolidated into one portable box containing switchboards, night bells, batteries and night lights; also, that a cut-in box be furnished with cables ready made. This will allow the Central Station to be set up in a deep dugout, the ready made cable being carried from the ground service into the dugout, and connections made entirely at the cut-in box without necessitating the linesmen going into the central for work upon the board in connecting their lines, which always disturbs the operation of the board. This will also lead to neater looking switchboards in a unit central.

(b) It is suggested that tools, in addition to the inspectors repair kit, be issued to the telephone details. Particularly, when the necessity for the construction of aerial board lines and trench lines are concerned, telephone men require chisels, saws, hatchets, and additional pliers are advisable. It is suggested that this repair equipment be placed in boxes which could be used as a seat in operating the switchboard described above. It is also suggested that the switchboards described above shall be equipped with folding legs, making it feasible to set up in a very few minutes. The French issue a similar station central in a box of this nature upon which many improvements could be made.

(c) It is suggested that the station centrals for Regimental and Battalion should contain twenty drops, and that additional station centrals (similar to those to be made up for the batteries) be issued each unit of Headquarters Company of a Field Artillery Regiment for use at the O.P's. In connection with station central for the battery, the present allowance of eight drops per battery is sufficient, and the battery central station should be equipped with this number (8 drops). In case of establishment of battery O.P's., in the present system of drawing extra signal equipment for the particular sector in question, could be filled without the direct issue of more equipment for the batteries.

(d) At the present time there are four phones authorized for each unit of a Headquarters Company of a Field Artillery Regiment. This allowance is altogether inadequate. Instead of four phones per unit, ten phones per unit should be issued. Phone allowances for the batteries is sufficient. No changes suggested.

(e) It is suggested that the allowance of wooden insulators be increased from 700 per regiment to 2100 per regiment.

(f) It is suggested that the detachable handle of the Westinghouse 1375-B telephone be made of steel and the threads of the shaft into which he handle screws be also made of steel. The possibility of making this handle a following arrangement, similar to that used on the camp phone, is suggested. Attention is called to the fact that the batteries of the Westinghouse 1375-B phone are so small that they burn out very quickly; if extensive modifications are to be made to this phone, larger batteries are advisable.

(g) In connection with projectors, considerable difficulty has been experienced in teaching men to properly time the dots and dashes and intervals. If it is possible to devise an automatic arrangement by which when one button is pressed, a dot would be made; and when another button is pressed a dash of the proper length would be made, this device would considerably simplify the training of the personnel. If, in addition to this, it could be arranged to make it impossible to press the two buttons closer together and a time interval closer together than the proper length of an interval, the formation of an individual sound would be simplified.

(h) It is suggested that a small but complete set of drawing equipment, instruments, paper and supplies, be issued to each unit of a Headquarters Company for the telephone detail. This will facilitate making the necessary sketches of a communication system which should be posted at every central station.

2. It is believed that the Tables of Organization should be so amended as to allow each unit in a Regiment of 3" Field Artillery a typewriter. Neatness of military correspondence and records necessitate the use of typewriters, and companies and batteries have been forced to either rent or purchase typewriters from Company funds in order to maintain this neatness.

3. It is suggested that the system of Regimental Supply can be materially improved by the following, vis:

(a) The appointment of the Unit Supply Officer and two assistants from the Quartermaster Corps who should be attached to the Regiment, similarly to the Medical Officers. In like manner, the enlisted personnel of the Supply Company should be drawn from the Quartermaster Corps and attached exactly as is presently done with the Ordnance Detachment. This would provide a personnel which should be expert in the paper work and physical details of supply. Under the present system, efficiency in either knowledge of artillery or the handling of supplies must be attained, the one at the expense of the other.

(b) The two other assistant Supply Officers, provided for in the Tables of Organization, should be artillery officers attached to the Supply Company for liaison between the Battalions and the Supply Department.

4. It is further suggested that a more comprehensive literature than is presently available be compiled on the subject of the handling of subsistence and property during action. In the past, there has been practically no instruction given those responsible for the supply of a Regiment in action prior to moving into the front line. This exceedingly important feature of battle should have as much preliminary attention as have the various technical details of artillery offensive and defense. - A. Owen, Colonel, Field Artillery.

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RADIO

Equipment as issued at present, except instead of the present spark transmitting set a continuous wave transmitting set is very much to be desired.

The number of telephones at present issued to each detail is inadequate. The Regimental Detail needs a telephone for each of the following places:

1. Colonel
2. Adjutant
3. Supply Officer
4. C. O., Hq. Co.
5. Switchboard
6. Echelon Headquarters Company
7. O. P.
8. O. P.
9. Lineman's telephone
10. Lineman's telephone

It has been found under service conditions at the front that 2 lineman's telephones are necessities. On the extended telephone system which the Regimental Detail lays out, in any kind of shell-fire at all there are certain to be a large number of breaks. To locate these breaks quickly and efficiently, it is necessary to have a telephone for test purposes. In the event of more than one break occurring at the same time, it can be seen that without an extra lineman's telephone, work would be materially slowed up.

It has been found that the batteries in the telephones wear out very quickly under service conditions, due to dampness of dugouts, hard use and internal action and polarization. - W. H. Peck, Lt. Col., 306th F. A.

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1. Some form of a buzzer should be provided.

2. A bell should be added to the telephone.

3. Spare parts in general do not receive proper consideration. Lack of spare parts frequently requires the salvaging of valuable material. - W. C. Platt, Colonel, 302nd F. A.

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In general the equipment was sufficient, excepting that the entire equipment for a regiment was not furnished my organization until the last offensive. This applied particularly to Fire Control equipment.

Some sort of contrivance for carrying a reel of wire on a man's back such as the Germans used, is suggested. We found several of these from time to time, which has been abandoned by the Germans, and which we put to good use. A small sort of go-cart, upon which a reel of wire could be mounted, and either pushed or pulled by a man over narrow trails through woods, is also suggested. Oftimes it was necessary to lay wire in wooded areas, and with the equipment which we had at the time, it was very difficult. A light truck to carry telephone and radio equipment would be much more desirable than the heavy ammunition trucks which were furnished for that purpose. A Ford truck would be too small; something between the regular motor truck and the real light Ford would be best.

A better lighting system for night firing is badly needed. Some sort of radio luminous aiming stake should be provided if we are to continue to use the present sight on the 75 gun, which latter is deemed a poor device. A panoramic sight is strongly recommended.

Field telephones should be provided with a real water-proof case as far as is possible. Our telephones were continually wet, which was a cause of much annoyance. It was practically

impossible to keep them dry, especially in small trench dug-outs, such as were used by the batteries and for O.P.'s.

A return to black leather harness and equipment, instead of tan leather, is strongly recommended. Experience has taught that black leather is more durable, and will outlast fair leather under any condition.

Breast collars were found entirely satisfactory, and the entire abolition of the steel collar is recommended.

If the present French limber is to be continued in use with the 75 gun, some sort of double-tree should be provided. The line of draft is too rigid at present, and tends to make sore shoulders, especially on wheel horses. - W. H. Rucker, Lt. Col., 16th F.A.

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The success of tractors has been very great. One (1) Regiment of 75 Division Artillery should be motorized.

There are a few things which can be adopted from the French harness; the breast-plate is one, but in general the American harness is superior to the French.

Money put into ammunition to teach ranging is better expended than in range finders.

The elimination of buzzers from the artillery equipment was a serious mistake. They should be put back at once, and the light buzzer wire furnished. It is of some value when stabilized, and of tremendous value to infantry batteries and accompanying guns.

Develop hay choppers so that this work is less onerous and so that it can be easily performed in battery. Some sort of a folding arrangement (for transportation) which can be coupled on to the wheel of caisson or wagon to use as a fly wheel, to work the cutter, should be developed and then required all hay to be chopped. - F. W. Stopford, Colonel, 80th F. A.

The equipment and the ordnance other than as above stated for armament is satisfactory. The signal equipment has been very deficient. It should either be unlimited or the allowance increased 100% in order to provide for the varying conditions and for losses and injuries incident to the service. Other supplies in general are satisfactory. - C. P. Summerall, Major General, 5th Corps

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Supplies in General - Ordnance.

This Brigade has found great difficulty in getting the service of a mobile Ordnance Repair Shop and the officers of the staff were obliged to go from shop to shop requesting assistance. The section of the M.O.R.S. that pertains to Field Artillery Ordnance should be permanently attached to the Artillery Brigade. When guns or gun carriages are injured so that their repair takes several days they should be immediately replaced and consequently guns and carriages should be kept in rear echelons for that purpose.

Ammunition.

Corps and Army Ammunition dumps were frequently so far in the rear that a great amount of unnecessary work was required. Staff officers of the Corps and Army apparrently located dumps from the map, not from a knowledge of the local conditions, particularly in reference to loading from the dumps to the trucks.

Signal Equipment.

Promper communications and liaison require a great deal of wire. This should be understood and provided for by the Signal Corps and Brigade Staff Officers should not be required to fight for wire. To continually salvage wire during a rapid advance by combatant troops is often impracticable and sometimes impossible and this fact should be understood by officers of the Signal Corps situated for in the rear of active operations.

Other Supplies.

Issuing officers at railheads and other depots generally refused to issue directly to regiments. This necessitated placing a good deal of extra work on Brigade Headquarters which if possible should have been avoided. It was found that the supplies of greases and oils for the care of guns and harness were totally inadequate. For the work required in control of fire, computation of firing data, etc., a convenient form of gasoline lantern should be devised and made an article of issue, as the small amount of gasoline thus required is always obtainable.

Motor transportation and supplies have been inadequate throughout the campaign. - H. D. Todd, Jr., Brigadier General, 58th Brigade

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The present allowance of two machine guns per battery is necessary for protection against hostile airplanes both on the march and in position. They should be retained.

The allownace of four telephones per battalion headquarters is insufficient. Ths usual disposition is: one at switchboard, one at battalion O.P., one at Battalion P.O., one with forward liasion officer with the infantry. No telephones are left for testing the line, for the echelon, or for substitutions.

There is a great need with each firing battery of a light strong compact waterproof case similar to a field desk. Such case should contain the absolute necessities for the preparation of firing data, vis; an accurate barrage-plotting board, protractor, sinc rule, maps, etc. Officers are frequently called upon to plan sheets from the shelter of muddy shell holes etc., where without a clean well supported board accurate work cannot be done.

Each battery should be provided with a light two wheel cart with limber designed to carry:

On limber: Two machine guns (one mounted) spare parts and ammunition.
On cart: Fire control, telephone, and signal equipment; reel for laying wire.

Recent operations have shown the necessity of moving quickly without combat wagons and combat train. In such cases the above mentioned equipment must accompany the battery but no transportation is provided. The result has been that guns are overloaded and much important equipment lost. This also provides a machine gun mounted for use when the battery is on the march.

Wire is usually laid by hand. The present issue is too heavy for use in this way. A light wire should be furnished at least 1000 yards of which can be placed on a small reel strapped to a man's back like a pack. Each battery should have three such reels. - J. F. Walter, Colonel, 314th F. A.

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Equipment of all kinds in general, excellent. Effort should be made however, to make signal equipment more water-proof. Wire with low insulation resistance when wet is

worthless. Supply of night lighting devices and standard flash light with liberal automatic supply of spare batteries and bulbs most necessary. Daily issue of candles very inadequate for amount of night work required.

Supply of rations was regular and excellent, supply of other supplies was painfully irregular and slow, replacement of articles worn out or lost incident to operations too slow. It is believed that suitable ware-houses well stocks and located near loading point for daily ration train would solve the problem. A telegram from Division G-1 to a supply department that certain articles were urgently needed should insure the articles going forward on next ration train to that division.

Lack of repair parts for motor equipment was a serious handicap; a standard truck and tractor should be selected and provisions made for an unlimited supply of spare parts. - G. L. Wertenbaker, Colonel, 345th F. A.

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I consider the rifle issued to 155 mm. howitzer regiments to be more of a nuisance and an encumbrance than a help. I was through a hot campaign, with hostile aeroplanes flying low, and I have yet to see the first one damaged or scared off by rifle fire. The rifles only increase the burdens of the men, and at times every ounce of strength they had was necessary in order to move the guns.

With reference to signal property, I should say that the number of telephones and amount of wire carried by each organization should be doubled. There is never enough. - C. D. Winn, Colonel, 306th F. A.

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Our service went wrong in trying to follow the advance ordnance base system and requisition system of the British. The day was saved in the 11th hour by opening advanced ordnance depots on the line of communications, within 30 kilometers of the front, but the late opening of these made it rather a hit and miss system of distribution and still put a premium on the Division Ordnance Officer who burned much gasoline but who was constantly applying at these advanced dumps for property. He had to do this daily, for if he did not do so, someone else got the property ahead of him.

Division Ordnance Officers put a great deal of thought, study and work into building up Depot Companies of Ordnance in training camps in the United States. These companies of 100 men were remarkably efficient.

In France, what finally resulted was the establishment in a time of great stress of these depot units on hte advanced lines of communication. I believe therefore that any future plans of supply should contemplate the establishment at the beginning of hostilities of Field Ordnance Depot Companies. With base organizations, field companies, and the Division Supply unit a part of the M.R.S. as outline under that heading, the service of supply of ordnance equipment would be as near perfect as is possible.

The Depot Companies built up in United States were never brought to France and used as units, which was a very great loss of organization. - P. H. Worcester, Colonel, 146th F. A.

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I am satisfied with the 155 mm. howitzer type. Of course the carriage should be strengthened in a few places.

In the howitzer regiments only the Supply Company should be armed with the Infantry Rifle. In addition two Infantry Rifles should be carried on each caisson. Each battery should have two machine guns. - R. H. McMaster, Colonel, 21st F. A.

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A D D E N D U M

To

ANNEX 5.

Recommendations of Artillery Officers,

American E. F.

EQUIPMENT

Received after the Dissolution of the

Board

There should be twelve phones for the three details of Headquarters Company instead of four. - C. B. Balch, 1st Lieutenant, 7th F. A.

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A suitable portable P. C. fitted for day and night work for all units from Brigade to Battery, inclusive.

Interchangeability of all dry cells used for all Field Artillery equipment.

Kinds of projectiles and fuzes in use at present are entirely too numerous.

Sights and quadrants should be so modified that the use of range tables to determine settings shall be unnecessary. - C. M. Bunker, Colonel, 308th F. A.

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Supply in general. It is presumed that no comment is necessary on the general shortage of Ordnance and Signal Equipment in training camps in the United States, such shortage (amounting almost to total absence of equipment) being well known. Ordnance shortage as to guns and ammunition was met in France by using French materiel, but shortage in tractors and ordnance motor transportation continued until after the armistice. Signal equipment shortage continued in France and was most noticeable in such items as batteries, which were essential if units were to function at all. Comments on Signal equipment in detail will be found below.

One general comment is pertinent. There appears to be no reason why the Field Artllery should not have some voice in determining the amount and types of Signal (communication) equipment to be supplied to it for the performance of artillery functions. In the future, if a Field Artillery Bureau is continued in the War Department, this may be the case, but during this war it seems as if the needs of the artillery were determined solely by the Signal Corps. Same comment applies with equal force to Ordnance and all other equipment.

Ordnance Equipment. See regimental commanders' reports for recommendations in detail. The Nash Quad trucks proved in service to be defective and should be replaced by a better type. This truck has good power and for work off the roads that power shows up well, but the steering mechanism is mechanically weak and caused endless trouble. A convoy could not be counted on for more than 50 miles per day, on account of breakdowns, generally in the steering connections. The rear-wheel drive feature may be advantageous in some circumstances, but on narrow and especially on slippery roads caused an excessive amount of ditching of trucks and should be abolished. The special ammunition body should be replaced by a general cargo body. All trucks, no matter by what bureau they are supplied, should be available for efficient carriage of men and of supplies of all sorts, since all trucks must at times be used to meet the emergencies of the moment and a freight truck specialized for the needs of a particular cargo has no place in army field transportation, when no absolute need for such specialization exists.

A special motor vehicle (on touring car chassis) should be provided with brigade headquarters to carry the personnel and materiel of the operations section and to serve as an operations office in the field when motor transport is practicable.

Signal Equipment. (Telephone Equipment) - At least six tool kits instead of one, also an electrician's pocket knife for each man on telephone detail. Two buzzer phones for each battery and each headquarters company for communication to forward O.P.'s. Telephone equipment to be issued to Ammunition Train, since they are not always with Signal Corps.

Reel carts are insufficient for regimental and brigade headquarters.

(a) They do not carry sufficient wire.

(b) Since they must move much faster than the rest of the unit, they should be built to be pulled behind trucks. Ordinarily, a unit, they should be built to be pulled behind trucks. Ordinarily, a truck containing a device for reeling and unreeling at least two wires at once would be much better. If the device would handle spools which would hold about one mile of wire it would be very efficient.

The W. E. 1375-B phone to be changed so the battery would be in circuit only when speaking.

(Radio Equipment) - The Divisional Artillery should have a radio net of its own, either an uncamped or a tuned damp system, with a communicating range of approximately ten miles. The present equipment is entirely inadequate and interferes with the Infantry.

Issuance of amplifiers to Artillery direct and not subject to Signal Corps, since they almost refuse to turn them over to the Artillery when they are needed.

Since the Artillery often operates independent of its own or any division, a charging set should be issued to the brigade to facilitate the upkeep of their batteries. - Brigadier General Edw. Burr, 62nd F. A. Brigade

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1. ORDNANCE: The steel pole was found to be far superior to either the old wooden one (3 inch) or the French 75.

A float should be added to the trail of the 75.

A panoramic sight (Model 1917 preferred) should be placed on the French 75.

Moisture and mud guards should be placed on the axles of this gun.

Add a trail handspike and a toolbox on the shield or trail.

Supply a light steel platform patterned after the German design.

Supply a standard form of aiming stake, two per gun and four spare.

Give each gun a light two-wheeled trailer for hauling the gun platform, the camouflage materiel and the aiming stakes, etc.

Each gun should have two quadrants.

It is suggested that the night aiming devices be permanently attached to the gun.

The materiel should be equipped with heavier and more substantial tools, such as the American pick-mattock, shove, axe and hatchet. Each telephone lines-man should also be equipped with an entrenching shovel and a small pick-mattock.

A suitable machine gun mount should be provided on the caissons, in this connection the improvised single shaft mounts have worked out very well.

The short vertical stitching in the French breast harness gave slight trouble in rubbing the horse and was removed.

The new reel carts gave excellent satisfaction even under very hard road conditions. They should not be towed behind trucks with the chain on the sprocket, except when reeling up makes it imperative then the speed must be slow.

Suitable lighting devices for night office work should be made a part of the equipment for Regimental, Battalion, Battery, Headquarters and Supply Companies and Dispensary.

2. INSTRUMENTS. A combination of the goniometer and the scissors instrument would seem to be practical and would eliminate the multiplication of instruments.

The monocular observation telescope was not found to be of much value either in France or in the United States. It could be eliminated and good field glasses substituted.

The number of field glasses issued should be increased by five.

The zinc map boards are too heavy for rapid work. The adoption of the triangular German firing board is recommended, with zinc or celluloid mil scale and range scale instead of paper as used on those found.

Accurate watches are essential for the handling of all firing. These should be issued down to include chiefs of section.

A small (instruction size) set of drawing instruments should be issued to each battery.

A reasonable supply of drawing and tracing paper and cloth should be issued down to include batteries. (Some was supposed to be issued to this regiment but several hundred francs were spent by all concerned to supply the amount required in actual practice.

3. SUPPLY. A light Ford truck should be assigned to each battery for use of the battery supply and the mess.

The present ration cart is hardly large enough for the existing size of the battery.

Rolling kitchens should have a larger limber and should be equipped for baking.

Owing to the necessary division of batteries into two, and sometimes three echelons, the issue of both the following kitchen and field range is vitially necessary. Three field ranges should be issued to the Headquarters Company for the same reason, in addition to the rolling kitchen.

The Supply Company should have three three-ton trucks and one light Ford truck.

The fourgon has more uses than the old battery and store wagons, but it does not provide the same security against loss and wastage that the battery and store wagons did. Its use as a two-horse vehicle is generally out of the question. On the whole it is a much more convenient vehicle but it should be issued to the batteries.

The allowance of oils and cleaning material even when issued in full amounts proves inadequate. The allowance of neat's foot oil, in particular, should be materially increased.

4. SIGNAL. The light wire when used for a distance exceeding two kilometres and the yellow twisted pair when used for any distance at all, proves unsatisfactory. At least four kilometres of heavy and two kilobetres of good light wire should be issued to each battery.

The service buzzer was greatly missed. The present phone is too heavy for rapid movements.

Provisions should be made for an issue of "test phones" at the rate of two per battery and six to the Headquarters Company. These are vitally necessary.

The number of telephones should be increased to fifteen per battery, one to be permanently attached to each gun. The number issued to the regiment is entirely inadequate and should be increased by fifteen.

The present number of switchboards issued is inadequate. On one occasion a battery central had to be supplied with a twelve-drop board in order to handle all the wires which were laid to it by the infantry, signal corps, heavy artillery (Corps) and to meet the demands of liaison between battalions. Three four-drop boards per battery and one twelve-drop and two four-drop boards for each Battalion and Regimental Headquarters are recommended.

The Supply Company should be equipped with a four-drop board, six phones and six kilometers of heavy wire.

The radio equipment is too cumbersome and the reliance on storage batteries is faulty in the extreme.

A good generator about the size of that used on the aeroplane should be furnished. - H. M. Bush, Colonel, 134th F. A.

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1. It is recommended that each battery be provided with two breast reels and two kilometers of light field wire, principally for use with accompanying guns.

2. The observation telescope and the trench periscope furnished to batteries are unnecessary articles of equipment. They are never used and are an incumbrance.

3. It is recommended that the allowance of motorcycle side cars be increased so as to provide one for the Supply Officer, one for the Personnel Adjutant, two for each Battalion Commander, and two for Regimental Headquarters, total eight, in addition to the one furnished to the Medical Department.

4. It is urgently recommended that each battery and each battalion and regimental headquarters be provided with a small tent, of about the dimensions of the common wall tent. Many cases were encountered where no buildings or dugouts were accessible when weather conditions were bad and battery and battalion commanders were required to do map and other paper work during action. Had each of the units indicated been provided with a small tent it would have been of the greatest service and convenience.

5. The greatest difficulty was experienced in keeping motor vehicles, especially motorcycle side cars, in commission, owing to the lack of spare parts for their repair. Proper spare parts for the repair of side cars and automobiles were never to be had in the Division motor repair shop. I cannot suggest a definite remedy for this, but it is a matter that is badly in need of being remedied.

6. Our inability to obtain some very essential articles during the whole period of the war are difficult to comprehend. Power clippers and blades for same were repeatedly requisitioned, and though they were essential to the proper care and treatment of animals, especailly with range prevalent, requisitions for these articles were never filled until about a month after arrival at our destination in the Army of Occupation.

7. See letter of Major Rudnut, hereto attached.

8. It is recommended that the allowance of twisted pair wire be as follows:

Regimental Headquarters		10 miles
Each Battalion Headquarters		10 miles
Each Battery		5 miles
	Total	60 miles

9. Liaison with infantry in open and semi-open warfare would be greatly facilitated by a more liberal supply of motorcycle side cars. It has been a rare case, indeed, where motorcycle side cars could not have been used to very great advantage in this work. I have yet to see a case where suitable roads for rapid transmission of liaison officers, messengers and messages by side cars did not exist. I consider it imperative that motorcycle side cars be provided in sufficient quantities so that each liaison officer with infantry may have one, preferably two, side cars. - J. R. Davis, Colonel, 15th F. A.

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1. Organization.

a. Use only American escort wagons and eliminate all French and English Quartermaster transportation.

b. One large, heavy reconnaissance car for each battalion headquarters.

c. Elimination of four caissons per battery.

d. Adoption of panoramic sight for 75 mm gun.

e. Resumption of use of buzzer 'phone and light wire in offensive operation.

2. Personal.

a. Heavier cloth for uniform material.

b. Issue of leather jerkins to all personnel.

c. Improvement on ordnance tin cup.

d. Adoption of some form of light gas-mask without mouth piece.

3. Supply.

a. Every attempt should be made to make ration more varied.

b. Organizations should never be without hay as was frequently the case.

c. Properly trained stable sergeants and farriers can prevent the unnecessary evacuation of animals.

d. Freer replacement of clothing with careful attention to salvage of old clothing would be desirable.

e. Ammunition distribution should not be ordinarily controlled by the supply of the various kinds on hand. Batteries should habitually carry nothing but normal charge,

short fuze, and brigade dumps for all special shells and fuzes should be established. - A. G. Fisher, Colonel, 307th F. A.

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1. On the supply situation in general, it may be said that most of the Supply Services exhibited a proper spirit of cooperation and a desire to serve. Equipment was, of course, lacking. It is believed that the supply situation in an Artillery Brigade is not thoroughly familiar to most of the officers of the Supply Services and Staff Departments. The technical nature of a large proportion of transportation necessary in relation to the number of men in the organization, and the extreme difficulty of properly supporting the Infantry without this equipment is not fully appreciated by most of the officers upon whom we are dependent for supply.

2. It is believed that in general the equipment provided in the "Equipment Manual for Service in Europe" is adequate and proper but in our experience the equipment manuals have meant nothing. There are articles of equipment which are thought to be wrong.

a. The 155 mm. caisson is one of them. This vehicle was never satisfactory and was salvaged at the earliest opportunity. Some type of vehicle must be developed which will carry more ammunition and which will be less of a burden upon the horses. It is believed that in a motorized regiment only trucks should be used to carry the ammunition. For the Horse Section of the Ammunition Train, the 75 mm. caisson is not believed to be the proper equipment. Some type of cut-under wagon should be developed which will carry any calibre of ammunition in boxes. It is a mistake to unbox 75 mm. ammunition until it is actually used.

b. All field transportation should be American escort wagon. Neither English nor French field transportation has proven satisfactory. - C. C. Hearn, Brigadier General, 153rd, F. A. Brigade

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Ammunition: Too many kinds of fuzes, and supplied in wrong proportions. The white or some similar fuze should be supplied in the largest proportion. Black fuzes might well be dispensed with. A 75 is of little use for penetration, black fuzes only useful where ricochets can be obtained. Advantages then more than offset by the necessity of using them up under unfavorable conditions. I. A. L. fuze, an excellent fuze, but troublesome to handle. Experience in this regiment has failed to show it to be any more dangerous then any other fuze, but precautions which are ordered render it troublesome.

Gas shell should be supplied in very large quantities, and should be used all the time, it has been too hard to get and has been supplied in too small quantities.

A. L. shell very useful. By adding greatly to the range of a battery, it is of great value in attacks. - A. I. Henderson, Captain, 7th F. A.

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A field gun should be a gun mobile enough to accompany Infantry and Cavalry. The present 3" gun of the U. S. Army is so heavy as to be almost out of the class of field guns. Comparison of weights:

During four years of severe tests the 75 mm. has proved to be an efficient and mobile field gun. There are, however certain improvements which can be made. This gun has not been materially changed since its adoption in 1897. It was originally designed to fire shrapnel, but the lessons of the war have shown that the proportion of shrapnel to shells is comparatively small.

The mobility of artillery is directly dependent on the road conditions. These conditions in the United States are far inferior to those in France, where improved roads are to be found almost everywhere.

a. It is therefore suggested that, in order to meet these conditions as they exist in the United States, the width of the tires of the wheels of the 75mm gun be increased one inch in order to increase the mobility over sandy or muddy roads. The design of the felloes should be changed to accomodate the increase in width of the tires. The present "dish shape" with its dish of 12 degrees (factor of strength) should not be altered.

b. The employment of a hand guard rail on the breech hoop to prevent fingers from being caught when the cannoneer misses the grasp of the breech block handle when the gun is returning "into battery". It is roughly estimated that some 500 fingers have been lost due to this one cause.

c. The present plateau and drum system of sights should be changed to an azimuth circle of 6400 mils, the present division of 200 mils on the plateau remaining as at present, but the line of sight being parallel to the axis of the bore at "Deflection 0" or "6400". A panoramic sight could be added, but its excessive cost and difficulty of replacement render it impracticalbe in time of war.

d. The angle of site drum should be altered to read both in mils and in degrees and minutes. The reasons being as follows:

(1) Graduations in mils in order that mental computations may be set off without transposition.

(2) Graduations in degrees and minutes for the reason that the quadrant angle may be set off algebraically with the angle of elevation.

e. The so-called "range drum" should be changed from units of meters to a single disc reading in degrees and minutes on the outer circle and in units of 100 meters (based on the H. E. normal shell, short fuze) on the inner circle. This would necessitate the range drum being larger in diameter in order that the figures may be easily recognized. A quadrant level (Model 1888-1900) should be made part of the gun, placed on the right hand side and in a position protected from ordinary wear and tear. This later side and in a position protected from ordinary wear and tear. This later feature would not, however, call for the elimination of the nickled facets on the breech hoop which would still be employed with the quadrant (Model 1888-1900) for more precise firing.

The reasons for the new range drum with graduations in degrees and minutes are as follows:

The 75mm. was originally intended to fire shrapnel, and such shrapnel as was made in 1897. With the present shrapnel, m/v 535 meters per sec., the graduations on the range drum are true for map ranges between 3300 and 3900 only. For all other ranges there is a difference between the gun range and the map range. Now, when one considers the projectiles of different muzzle velocities which have been used with the 75 mm., such as Vo=344, Vo=290, Vo=525, Vo=535, Vo=550 (two variations for short and long fuze), Vo=575, it can readily be seen that the range drum is useless as far as it is an indication of the range from the gun to the point of fall. Take, for example, the H. E. Shell, normal charge, short fuze, fired at a map range of 5000, it is necessary to set the range drum or gun range at 5500. Any one of the other Vo's shows practically the same thing, viz., a difference between the map range and the range drum range. We find, then, that to shoot at a target at a certain map range, with a certain projectile and a certain Vo, a certain elevation must be given to the gun, and not a range set off on the range drum. The range drum graduated in divisions of 200 meters (based on the H. E. shell, normal charge, short fuze - since shell and not shrapnel is the

most efficient projectile) is sufficient for quick field shooting, the quadrant is the best method of setting off the necessary elevation to cause the projectile to carry up to any given range. - Dean Hudnut, Major, 17th F. A. and Charles Mills Maclean, Captain, 15th F. A.

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The board recommends the following transportation for a regiment of field artillery equipped with French 75 mm. materiel.

For each Battery.

1 wagon	Rations for 5 officers and 194 men		2,300 lbs.	
	Field Range		250 "	
	Kitchen utensils other than those carried on rolling kitchen		50 "	
		Total		2,600 lbs
2 wagons	Forage for 167 horses and 20 mules		3,800 lbs	
	Stable equipment			
	Smith tools		100 "	
	Veterinary supplies		200 "	
	Shovels, brooms, etc.		50 "	
	Horse covers		200 "	
	Power clipping machine		100 "	
		Total		4,450 lbs
1 wagon	Battery office			
	Typewriter		50 lbs	
	Field desk		75 "	
	Record box		100 "	
	Fire control equipment			
	Giniometer		20 "	
	Scissors instrument		50 "	
	2 plane tables		50 "	
	Range finder		60 "	
	Trench periscope		10 "	
	Miscellaneous		100 "	
	Officers bed rolls		500 "	
	Enlisted mens blankets and surplus kits		1,250 "	
	(for men with forward battery)	Total		2,265 lbs
1 wagon	Battery Supplies (Quartermaster, Ordnance, etc.)		1,000 lbs	
	Enlisted mens blankets and surplus kits			
	(for men who stay at echelons)		1,250	
		Total		2,250 lbs

For Headquarters Company

Regimental Section

1 wagon	Rations (2 days reserve, 1 day field)		1,500 lbs	
	Field range and utensils		350 "	
	Field range for officers mess		250 "	
	Officers mess equipment		400 "	
		Total		2,500 lbs

1 wagon	Reserve grain (70-28)		2,000 lbs	
	Stable equipment and horsecovers		700 "	
		Total		2,700 lbs
1 wagon	Enlisted mens rolls (83 @ 30 lbs)		2,500 lbs	
		Total		2,500 lbs
1 wagon	Regimental Headquarters office		1,400 lbs	
	Fire control equipment (Load is bulky)		700 "	
				2,100 lbs
1 wagon	Band instruments		1,250 lbs	
	Music library, tripods, cleaning material		550 "	
	(Load is very bulky but not heavy)	Total		1,800 lbs
1 wagon	Officers bedding rolls, 12 @ 125 lbs		1,500 lbs	
	Trunk lockers, 5 @ 100		500 "	
		Total		2,000 lbs
1 wagon	Company office		300 lbs	
	Gas Service supplies		300 "	
	Company property		2,300 "	
		Total		2,900 lbs

Each Battalion Section

1 wagon	Rations and reserve rations for 60 men		1,100 lbs	
	Field range and utensils		500 "	
	Officers mess equipment		400 "	
	Small field range for officers mess		250 "	
		Total		2,250 lbs
1 wagon	Reserve grain, 58 animals		1,250 lbs	
	Stable equipment		450 "	
	Detachment equipment		800 "	
		Total		2,500 lbs
1 wagon	Officers bedding rolls, 7 @ 125 lbs		875 lbs	
	2 trunk lockers		200 "	
	Enlisted mens rolls		800 "	
	Battalion office		275 "	
		Total		2,150 lbs

1 wagon (spring) for telephone and radio equipment
1 water cart and 1 ration cart

For Supply Company

1 wagon	Reserve rations and grain	
1 wagon	Regimental Supply office (property)	
	Regimental Supply office (Ration section)	
	Company office and Supply Sergeant's office	
1 wagon	Ordnance office, spare parts and cleaning material	
	Officers rolls	
	Mens rolls	

2 wagons Dental office, chaplains outfit, mail and regimental infirmary

1 wagon Cobblers equipment, company stores

Total transportation needed for a regiment:

Escort wagons	49
Spring wagons	2

C. G. Helmick, Lieutenant Colonel, 15th F. A. - D. P. McCarthy, Captain, 15th F. A. and P. S. Seim, 1st Lieutenant, 15th F. A.

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(1) Organization.

(a) Quartermaster. The allowance of Quartermaster Supplies and the quality was satisfactory when received. There was frequent shortage and difficulty in obtaining supplies at the right time and the right sizes.

(b) M. T. S. Total allowance never received. The greatest difficulty of this department seems to have been lack of spare parts. It is believed the motor repair for artillery could be combined with the M.O.R.S. and spare parts distributed thru the repair shop.

(c) Vehicle. The caisson for the 155 mm Howitzer is unsatisfactory. It is too heavy and is designed for conditions which seldom occur. The two wheel carts are not of good design. The water tank was in a number of cases placed on 4-wheel carts, greatly improving its traction and making it easier to haul.

The medical cart is the worst vehicle in the equipment. It is universally and justly condemned. The escort wagons which were furnished this regiment for the combat train proved to be very efficient for hauling examination. It was approved by all battery commanders and is preferred to the caisson, even with the firing battery.

(d) Ordnance: The small arm rifle was never used in the regiment. It is believed substitution of a pistol would be better. The artillery equipment on the whole was satisfactory. Some trouble with the trail spindle and trail spade. Improvements could be made. The wheels if corrugated would prevent tendency to slide off the road and would improve its traction.

(e) Medical: Transportation not satisfactory. (See 'c' above). Supplies satisfactory when allowance is received. Some articles included in Medical Equipment Table of Allowance not needed for mobile combat.

(2) Personnel.

(a) Quartermaster: Satisfactory.

(b) Ordnance: Handle of cup should have positive lock. The knife could be improved by better quality metal and blade after the French design of table cutlery.

(c) Mounted Equipment: The equipment furnished was the old style McClellan Saddle, etc. It is understood that this equipment had lost the support of mounted officers before the war. It was probably furnished owing to the emergency. It seems to stand a good deal of hard usage but could be replaced by better equipment.

(d) Medical: Satisfactory.

(e) Gas Service: The S.B.R. performed its functions but is a very trying apparatus to use. Further experiments should be continued until the Gas Mask, easier to wear and carry has been designed. - E. O. Sarratt, Colonel, 309th F. A.

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1. The powder supply for the 155 mm howitzer should be arranged so that the issue of SSP and BG5 be governed by the missions of the batteries instead of on a proportion issue. In the end the consumption would be practically the same. Batteries often fail to reach their important objectives due to lack of proper charge occasioned by a proportion issue. G. F. Verbeck, Lieutenant Colonel, 106th F. A.

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1. All of the French four-wheeled wagons used in our army have proved impracticable. The front wheels are too small and the center of gravity too high, making them hard to pull and very easy to upset, so that, together with the artillery hitch, the number of men and animals necessary is out of all proportion to the tonnage carried.

2. The French caissons issued to the 155 mm. regiments and the American Battery and Store Wagons have proved to be absolutely useless, and it is my opinion that at least half of the caissons in the 75 mm. regiments and the caissons in the Ammunition Trains should be replaced by American Escort wagons. (Four mules with one driver with an American Escort Wagon can carry the same load as six to eight horses with five to six men on a caisson and with double the chance of getting through.)

3. The American water cart is too heavy and cumbersome. A light cart with removable casks would be far more practicable.

4. The American rolling kitchen with certain modifications in the coupling and the firebox would be superior to any now in use.

5. The two-wheeled carts used in the French Army, due to their weight and handiness, have proved to be, in many cases, the only transportation which could get through to the advanced positions, as they could leave the road and be easily lifted out of mud and shell holes.

6. The American Escort Wagon, with American harness, mule drawn and driven from the seat, has proven to be the most economical and practical four-wheeled wagon in use in our Army. It draws easily and if not loaded too heavily can leave the roads and go almost anywhere that the animals can get through. The brakes should be made stronger, the tires wider and the tops more durable.

7. The German wagons, while easily drawn are not practicable for more than two horses and not as durable as the American Escort Wagon.

8. Supplies should be transported from the railhead to a Regimental Dump at Rear Echelon in trucks, from Regimental Dump to an "Advanced Distributing Point" in Regimental Supply Train of Escort Wagons and from the "Advanced Distributing Point" to the battery position in French two-wheeled carts.

9. The many divverent types of vehicles in use in our Army in France have made the rapid replacement of broken parts both cumbersome and uncertain. The number of different types of vehicles should be as few as possible, the parts stabilized and interchangeable. All kinds of supplies, forage and ammunition were much more easily handled in American Escort

Wagons and French two-wheeled carts than in any of the other types of transportation. Therefore, with the exception of the American rolling kitchen and the American caisson, I would recommend that all other types of horse and mule drawn transportation be eliminated. - Livingston Whitney, 1st Lieutenant, Cavalry (103rd Field Artillery)

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The 75 mm. French gun is a better light gun than the U. S. three inch. The 75 mm. guns of my Brigade fired 147,875 rounds and no guns burst. One gun fired 4,047 rounds. The addition of the panoramic sight would make it an entirely satisfactory gun. The panoramic sight on the German 77 mm. gun is an excellent one. The pole of the French limber is too frail.

The Ordnance Department pack ammunition carrier was very successful, and enabled ammunition to be delivered to the guns where limbers couldn't go. Although designed for ten rounds, it was adjusted to carry twelve rounds per animal, giving the caisson team almost the capacity of the caisson without fatigue of hauling the vehicle, and enabling the train to work around congested traffic on the roads and pass shell holes without difficulty.

The 155 mm. Schneider short is a splendid gun. This Brigade fired 33,056 rounds and no guns burst. One gun fired 2,100 rounds. The 155 mm. caissons are altogether too heavy for the amount of ammunition carried. My Brigade found it more efficient to use chariots du pare. I believe it would be better to use motor trucks or a trailer hauled by a tractor, where the regiment is motorized.

The Nash Quad ammunition truck broke steering knuckles so repeatedly it was quite undependable. It would be better if ammunition trucks had wider bodies, so they could also be used as cargo carriers.

Corps should have truck transportation to enable them to establish Corps ammunition dumps farther forward. The movement of Brigade ammunition trains far to the rear creates undue road congestion.

A Ford light delivery truck should be provided for use by the Brigade Communications Officer in laying wire and repairing damaged line of communication. - G. S. Wingate, Brigadier General, 52nd F. A. Brigade

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ANNEX 6.

Recommendations of Artillery Officers

American E. F.

COMMUNICATION OFFICERS AND DETACHMENTS

E.

COMMUNICATION OFFICERS AND DETACHMENTS AND THE RELATION TO THE SIGNAL CORPS

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I am convinced that communications officers and detachments in artillery brigades and regiments should be furnished from the artillery personnel, and should have no relation to the signal corps. The maintenance of communication is a function of the line troops, under the operations staff, and the signal corps, is, or should be, a supply department. I do not believe that there is any excuse for the existence of the field signal battalions within the infantry divisions. The greatest difficulty with the mixed communication arrangement was that all of the good material was generally reserved, by the supply officers, for the signal corps, troops and the artillery only got what wwas not wanted by the others. For example, the switchboard furnished for the artillery brigades was absolutely inadequate. Practically every artillery brigade with which I came into contact secured some other board. The fifty drop box switchboards furnished by the signal corps to field signal battalions was issued in a few cases, and in other cases (as in my own brigade) German switchboards were secured and used. - R. S. Abernathy, Colonel, 165th F. A. Brigade

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In a Brigade Staff organization, it is believed that the communication officer may easily combine the functioning of telephone or radio service with the necessary detachments for each purpose.

The Communication Officer may advantageously be an officer of the Signal Corps. I have had experience with such an officer and have found that the liaison with the Signal Officer of the Division or Army Corps, both as respects the communication service and the service of signal supply, is thus more satisfactorily handled. - D. E. Aultman, Brigadier General, Army Artillery, 2nd Army

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A trained signal officer at brigade headquarters instead of an artillery officer with slight training should be a good change. I am not in favor of having all lines laid by the Signal Corps. The demands on the Signal Corps by the Division and by the Infantry Brigades are such that the artillery will almost invariably suffer. - B. B. Babbitt, Brigadier General, 4th Army

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The communication personnel of the Field Artillery should be absolutely and entirely field artillery. There should be no intermingling and so far as the Signal Corps is concerned with a Field Artillery Brigade, its functions should embrace supply only.

The constant attempts of Division Signal Officers to extend the duties of the Field Artillery Brigade communication details beyone the capabilities of its personnel and materiel should be prevented by rigid orders and instructions not capable of being changed by Division Commanders. - H. G. Bishop, Brigadier General, 3rd F. A. Brigade

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The entire communication of the field artillery should be separate and distinct, and should be entirely supplied by artillery personnel. This refers to corps artillery as well as all divisional artillery communications. The Signal Corps is bound to be filled with

untrained men in time of war. In any case the signal corps will fail to appreciate the necessity for the accurate and quick communication of the field artillery. My experience in this war justifies me in this statement. - A. J. Bowley, Brigadier General, 6th Corps Artillery

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Communication Officers and Detachments should be Artillery personnel and should maintain all lines of communication within the Brigade and to its Liaison Officers with the Infantry. The Brigade Communications Officer should be in close touch with the Divisional and Corps Signal Officers and should at all times be acquainted with supplies available. The question of salvage for reissue should be attended to by the Signal Corps who should at all times be acquainted with the needs of the Brigade. - H. W. Butner, Brigadier General, 1st Brigade.

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That all communication officers, details, etc., remain as at present members of the Field Artillery. - Tilman Campbell, Colonel, 329th Field Artillery

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The Signal Corps to handle communications down to the Brigades. Within the brigade all communications should be installed, maintained and operated by artillery personnel. - Army Center of Artillery Studies

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The assignment of a signal corps officer to each regiment will greatly facilitate the procuring of signal property and supplies, and would probably make possible the utilization of signal corps wire by the artillery. Our experience being that signal corps wires are not permitted to be used by the artillery. - Albert L. Cox, Colonel, 113th Field Artillery

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Each brigade should be absolutely selfsustaining in this respect, without any relation whatever to the Signal Corps. The Signal Corps should furnish the supplies, but artillerymen, as part and parcel of the organization, should do the installing and operating. This I consider fundamental. The importance of the Communications Officers and detachments is second to nothing in the proper functioning of the artillery. - R. P. Davis, Brigadier General, 151st Brigade.

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The present system of communication within the regiment has proved satisfactory. Communication between regiment and brigade is at present cumbersome, due to length of lines. This can be overcome:

(1) By the issue of proper reel carts, or

(2) The establishment by brigade of an advance central.

(3) By the running of the line by the Signal Corps.

Recommend adoption of:

(1) A light reel cart, the present cart, as issued, being entirely unsuitable for field service. The cart should be drawn by 2 horses, should carry two 1 km. drums of twisted

pair wire, normal gauge, and have a space for one extra 1 km. drum. There should be some means of reeling in wire. It has been found that a spring wagon (surrey) has been very satisfactory as a makeshift cart, due to its extreme lightness.

(2) The so-called Outpost twisted pair wire, as issued in quantities recently, is of no use whatever, as it absorbs moisture and consequently becomes short-circuited.

(3) The Western Electric, Achilles type telephone has a very serious defect in the generator handle which is poorly made and easily broken, and very difficult to repair in the Field.

(4) Recommend also that the Signal Corps run lines from each Artillery Battalion P.C. to the front line Infantry Regimental P.C. that the Artillery Battalion supports. - F. C. Doyle, Colonel, 305th Field Artillery

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I am in favor of having the communication officer and detail, part of the Artillery or organization as at present, but when a unit is a long while at the front without opportunity of carrying on regular training. I believe some arrangement should be made with the Signal Corps for trained men to be transferred to the Artillery on demand. - R. H. Dunlap, Colonel, M. C., 17th Field Artillery

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There has been evident on occasions a tendancy on the part of Divisional Signal Officers to try to command the Artillery Telephone Officers and to exercise undue jurisdiction over artillery lines. Happily these questions have usually been amicably arranged. The Division Signal Officers of the Divisions in which this Brigade has served have, as a rule, not felt it incumbent upon them to connect Brigade Headquarters with Division Headquarters or to afford any assistance in running these lines.

Provisions should be made clearly defining these points. - A. S. Fleming, Brigadier General, 158th Brigade

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The Communication in our operations has never been entirely satisfactory. The Artillery lines in general have been considered far more efficient, better maintained and operated than those of the Infantry and in several instances it was necessary for the Divisional Commanders to use the Artillery lines for the transmission of Divisional orders. It is therefore suggested that the two nets be so emplaced, maintained and operated as to permit their use in conjunction or in parallel for emergency. It is therefore recommended that the regiment of light artillery maintain communications and liaison with the Infantry Brigade which it is supporting and with Division headquarters whenever and wherever possible, both direct; that time and wire permitting, it connect itself laterally with the artillery on its right. Battalions to connect with regiment, and batteries with battalions. Where two regiments are operating separately behind their own Division each maintain one-half the connecting lines. The heavy Artillery to connect with Division and if possible with the light regiments which it is supporting; at all events with the nearest of these two. The telephone lines may be augmented by liaison officers, couriers and runners. The Regimental and Battalion radios which likewise will be available for their infantry in case of emergency, still further tie in and expand this system of communication. The Signal Corps then working parallel with the artillery will be able to better develop the system, to discover flaws and to improve in general the communication. The Artillery lines and personnel working parallel to the Signal Corps would develop a rivalry and a broader point of view in maintaining communication which could not but be beneficial. Again the information service might be pooled and have more

accurate information delivered with greater speed and certainty of its ultimate arrival at Division headquarters. The Division Commander will then be able to have at his disposal two arteries of communication in case one breaks down. It is firmly believed that this system in general will be materially beneficial.

Further than the supply of Signal Equipment and the salvaging of wire, it is not recommended that the Signal Corps be associated with the Artillery for Communication. - E. St. J., Greble, Jr., Colonel, 76th Field Artillery

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Communications Officers should be Field Artillery Officers, and controlled by Field Artillery commanders, should pursue courses of instruction wherever best instruction may be obtained. - Ira A. Haynes, Brigadier General, 64th F. A. Brigade

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Communication details seem to be satisfactory.

An officer of the Signal Corps should be attached to Brigade Headquarters, as inspector-instructor on communications. - T. N. Horn, Brigadier General, 7th F. A. Brigade

The work of the Signal Corps was not satisfactory. You could never depend on their work for communication. They usually put up their lines two or three days after the battle. The Signal Corps could, with proper training and discipline, function down to the Artillery Brigade. Within the Brigade the communication officers, with their details, should function entirely. Their organizations are interested and they will get the communication if good officers are put on the job and it is possible to get it.

The Signal Corps should not function within the Brigade. - J. T. Kennedy, Lieutenant Colonel, 5th Field Artillery

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The communication officers and their detachments should form a complete system of communication within the brigade. Any connection which they may have with the Signal Corps should be at Division Headquarters and not further to the front. As communication must be maintained with the infantry, this would require a similar procedure with respect to the communication system for infantry brigades, or otherwise there will, of necessity, by a connection at different places, between the artillery details and those of the Signal Corps. I have seen such a system in operation, where infantry had details similar to those of the artillery, where the Signal Corps operated no further forward then Division Headquarters, and in exceptional cases, to Brigade Headquarters, but never beyond this point. The artillery and the Infantry details worked together admirably. This was, however, in what may be called open warfare, where the lines were not of so permanent a nature as those used in the position warfare of the Western front. - A. McIntyre, Brigadier General, 154th Brigade

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Officers and detachments considered ample. Further than supply of signal material the Signal Corps should exercise no control or authority over this personnel or its work. The question of inter-communication within the artillery regiment should be left absolutely in the hands of the artillery regimental commander on the ground. A divisional staff officer cannot with safety control, or in any way interfere in this matter. If control of expenditures of material must be had it is considered imperative that it be invested in the regimental commander - and this to remedy a vital defect in the present procedure needs to be made positive. - J. A. Mack, Colonel, 102nd Field Artillery

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The personnel and materiel necessary for the establishment of the artillery not be organized in the artillery. - E. A. Millar, Brigadier General, 6th Brigade.

(a) It is suggested that the personnel of each Battalion Telephone Detail be increased by one Sergeant. The reason for this suggestion is as follows: -

At the present time a Battalion Station would be in the charge of a Corporal. In numerous cases this Corporal will have to give instructions to battery Sergeants. These battery Sergeants ranking the Corporal, often do not feel that they should receive orders from a subordinate.

(b) The work is sufficient at a Battalion station to demand the attention of a Sergeant as assistant to the Battalion Telephone Officer. A man capable of doing this should be a Sergeant. By the present Tables of Organization he is limited to being Corporal. If he is only fit to be a Corporal, he is not fit to command a Battalion Station. It is suggested that telephone operators be first class privates in all cases. At the present time only one first class private is called for at each unit station with four privates as operators. A man with a technical training should be a good operator and deserves promotion to first class private. It is suggested that signaller listed for the Regimental section of the telephone detail be increased to two and that each Battalion Signaller be made two. - Allison Owen, Colonel, 141st Field Artillery

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Having been with the 156th F. A. Brigade on detached service from the Signal Corps for five months including two months service at the front, during which time I acted in the capacity of Brigade Signal Officer, I have arrived at the conclusion that in order to more closely coordinate the Artillery signal work with that of the Infantry as well as the other branches of the Service whose communication work is handled by the Signal Corps personnel, a Signal Corps Officer with the rank of Captain, should be detailed from the Signal Corps to each Artillery Brigade as Brigade Signal Officer.

My reason for advocating such an assignment is due to the fact that in all instances where it becomes necessary to approach the Infantry relative to cooperation in communications or in obtaining signal supplies and equipment from Division or Corps, the Artillery Signal Officer deals entirely with the officers of the Signal Corps.

A Captain should be in charge of Brigade signals purely as a matter of prestige, for his relations with adjoining brigades are carried on through officers of an equal or superior rank. Within the brigade the signal work is planned by him and carried out by the various regimental and battalion telephone and radio officers who bear the rank of Lieutenant.

Artillery signal detachments as recognized under the present Table of Organization for Brigade and Regimental Headquarters have not sufficient personnel to efficiently handle telephone communication. This condition is entirely due to the fact that in open warfare as experienced during the closing months of the war, it was often necessary to maintain long lines and several stations at a time so as to facilitate matters for advanced call or additional personnel for signal work, and to say the least, this method has not been satisfactory due to the lack of experience of new men. - Charles L. Ring, Second Lieutenant, S. G. 18th Field Artillery

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The present scheme of furnishing trained officers and specialists to handle all communication is an excellent one. The officers turned out by the schools were almost invariably

efficient, and it is deemed advisable that these officers and details be field Artillery men rather than Signal Corps personnel detailed for that purpose.

The personnel obtained from the different schools was very useful and the continuance of schools for the training of specialists is earnestly recommended. Enough trained officers and specialists should be automatically provided to furnish the needs of all regiments. - W. H. Rucker, Lieutenant Colonel, 16th Field Artillery

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I would rather have my own communication officers and detachments and not have them a part of the Signal Corps. - W. R. Smith, Major General, 36th Division

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The communications officers and detachments in the Artillery Brigade and all units thereof must be entirely independent of the Signal Corps, and they must in no way be restricted or interfered with by the Signal Corps. - C. P. Summerall, Major General, 5th Corps

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1. Communication detachments are 100% too small.

2. Signal Corps should lay the lines between the Infantry and Artillery. The lines should be maintained by the Artillery and Signal Corps. - G. L. Wertenbaker, Colonel, 345th Field Artillery

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The Communication Officer and his detachment should be a part of the Headquarters Detachment, but I do not believe that they should have any connection with the Signal Corps. - Winn, C. D., Colonel, 306th Field Artillery

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The Divisional Artillery should not be dependent upon the Signal Corps for any communication between its elements. - R. H. McMaster, Colonel 21st F. A.

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ANNEX 7.

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Recommendations of Artillery Officers

American E.E.

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MOTOR TRANSPORT AND TRACTOR DRAWN GUNS.

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MOTOR TRANSPORT, TRACTOR-DRAWN GUNS, CATERPILLAR MOUNTS, ETC.

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I have just completed a march of about 200 kilometers, and I am convinced that the tractor-drawn artillery has a great many advantages over the horse-drawn. It may be noted that a regiment of 155's can move 30 miles on a three Quad truck loads of gasoline, while a horse-drawn regiment of 75's requires fifteen Quad truck loads of forage to move 19 miles. When at rest the forage supply does not increase while little gasoline is used.

The weakness of the 155 motor-drawn regiment was in the trucks. While the tractor-drawn guns, and even cassions could go places impossible to horse-drawn artillery of the same caliber, the ammunition trucks were unable to leave the roads. In my opinion the answer to this is the supply of five ten tractors to haul ammunition not suited for use with tractors over all kinds of ground. The tractor-drawn trailor is not economical of gaseline on good roads, but hauls of this kind might be cared for by trucks of the ammunition and supply trains. A greater degree of economy may be obtained when draft conditions are favorable by increasing the number of trailers drawn by one tractor.

My experience has shown no single advantage for horse-drawn artillery, save in case of shortage of fuel oil. -R.S. Abernathy, Colonel, 165th Field Arty., Brigade.

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It is believed that every piece of artillery that can be successfully adapted to motor traction should be motorized.

The tractor is an essential for transportation of material off the roads, but is not entirely satisfactory for the transport of artillery over good roads for two reasons:

(1). Motorized artillery comprises both tractors and motor trucks. These two means of transportation have entirely different speeds, and it is extremely desirable to have, for any organization, a uniform rate of march.

(2.) The tractor vibrates a great deal on the roads and is believed that this vibration will materially shorton the life of the machine.

It is, therefore, proposed that, with the exception of very heavy artillery, which requires the use of the caterpiller tractor at all times, motorized artillery be drawn on the rounds by tractors similar to the 'Renault', and that two or more caterpillar tractors per battery be transported on auitable motor trucks for the purpose of placing guns in position when they must be moved across country.

The caterpillar mount, while giring a unit carriage for the gun, is undesirable, due to the disadvantage of vibration on the road, and its slow rate of travel, and due also to the fact that the gun and carriage would thus be increased in size, made more visible and would be more difficult to conceal. -D.E. Aultman, Brigadier General, Army Artillery., 2nd Army.

I have had no experience with tractor drawn guns or caterpillar mounts. Each motorized regiment and ammunition train should be provided with a powerful tractor to assist in getting by difficult points. In the recent operations serious delays occurred which might have been obviated had a tractor been located at a point where for a short distance the going was especially difficult. - E.B. Babbitt, Brigadier General, 4th Brigade.

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A motor transport service properly affieared should be of great value to the service. That a man has sold automobiles on a commission should not be a guarantee that he will make a number one motor transport officer. Technical men should be obtained for this service. Governors should never be allowed to be removed. Strict road discipline should be taught all men connected with motor transport. In furnishing tractors for field artillery spare tractors should be provided. It is not sufficient to have an excess of power but the actual spare tractors should be in the column to take the places promptly of tractors that break down. -A.J. Bowley, Brigadier General, 6th Corps Art'y.

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75's can be transported long distances in trucks in a minimun of time, but it requires longer to displace them a short distance forward than it does with horses.

Motorized heavy regiments should be equipped so that ammunition can be hauled to emplacements with tractors. -H.W. Butner, Brigadier General, 1st Brigade.

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Transport is not developed that will in all cases replace the horse. We believe from experiences of this war that motor transportation should be developed if practicable to entirely replace the horse. -Army Center of Artillery Studies.

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In addition to the present equipment allowed by the Tables of Organization, there should be supplies;

Four(4) water tank trucks;
One (1) gasoline trailer, per battalion;
One (1) gasoline truck for regiment.
-A.S. Conklin, Colonel, Board F.A.

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It is earnestly recommended that light regiments be provided with motor transports for everything except the first four sections, which should be left horsed. All such motor transportation to be equipped with lunettes so as to haul the guns and cassions wherever it was expedient or necessary. This would reduce greatly the perservice of supplies. I cannot recommend this too strongly, and it is the one recommendation I will put before everything else. -Albert I. Cox, Colonel, 113th Field Artillery

A truck for carrying ammunition without cargo capacity is fundamentally wrong. The absence of cargo capicity in ammunition trucks was a serious defect.

Tractors and caterpillars need further development in certain details. They are very satisfactory for the work in hand. Some four years ago recommendation was made that their development was the most important item affecting our artillery service. This statement is as true today as it was then.

The Rash Quad and F.W.D. trucks were unsatisfactory. -R.F. Davis, Brigadier General, 151st Brigade.

I personally believe from my experience at St. Mihiel and later in the Argemne that 75's should be drawn by light caterpillar tractors of the Belt type. I have yet to meet with a condition from the beginning of the offensive by the First American Army up to the date of the Armiatice was signed and since then in the march to Germany that tractors of the type above cited could not have better done the work at hand even taking into account the usual engine and motor trouble than horse drawn organization. As a matter of fact horse drawn organizations were often times stalled for hours in mud and difficult ground that would have been simple matters for tractors. The question of road space is all in favor of the motorized unit. The tractor is but little effected by shell fragments and the supply of gasoline is a much simpler matter than the supply of forage and for equal bulk will carry the tractor much futher than the horse. The saving in personnel and money is a factor to be considered. In my mind there is no argument in favor of the horse drawn battery that cannot be met by the tractor battery, and many in favor of the tractor battery that can not be met by the horse drawn organization. The ammunition supply should be handled partly by caissons drawn by tractors and partly by motor trucks of the F.W.D. type- not four wheel steer. This would handle the longer hauls by road and take into consideration the more difficult situation. - W.H. Dodds, Colonel, 6th F.A.

Motor Transport

This is a question of policy and a rather delicate question it would seem.

Tractor Drawn Guns.

A very good idea, I presume this implies the guns only are tractor drawn and the balance of the battery is horse drawn. This would provide both means of traction and enable most any situation to be overcome.

(Note)-

The organization as regards personnel and equipment would of course be changed to meet the above proposals.

Caterpillar Mounts.

My experience is very limited but from general knowledge I think that caterpillar tractors used as described above for

"Tractor Drawn Guns" would be a better arrangement. -F.C. Doyle, Colonel, 305th Field Artillery.

I am the greatest advocate of motor drawn guns, particularly the 155's. From much previous experience and from experience with this regiment, I am confident that it would add greatly to the efficiency of the regiment. -R.H. Dunlap, Colonel, M.C. 17th Field Artillery.

I believe in motor transportation and tractor drawn guns and other vehicles for Artillery whenever and wherever possible. The difficulty in securing animals and sorage, and losses of animals by casualties, and the lack of care, which in spite of every endeavor cannot be secured from green officers, constitute strong arguments aganist horse drawn Artillery. On the other hand, there will be occasions when horse drawn light Artillery is necessary. In this connection see my remarks under (a) "Organization of the battery, the battalion, the regiment, the brigade". I should like to see a comprehensive experiment made of horse drawn light battaries of six sections each with tractor drawn ammunition companies as a integral part of the regiment. -A.S. Fleming, Brigadier General, 158th Brigade.

It is recommended that the use of motor trucks of the socalled "Four wheel drive and steer" type be discontinued, or only used for transport where road conditions are of the best. -G.G. Gatley, Brigadier General, 67th Brigade.

It is believed that there should be some regiments of tank light artillery.

Tractor drawn guns certainly simplify forage supply with under any and all circustances is a bete noir.

It is believed that motor transported (not motor drawn) light Artillery is of great value in a quick shift of reinforcements from one part of the line to another. It is believed that motor transported light Artillery is more generally useful than motor drawn Artillery.

The four wheel steer is a failure.

Tractors with trailors are of more general value to motorized regiments than trucks.

Light trucks should be generously provided for instruments, radio equipment, etc., as they can carry small parties also.

The Harley-Davidson Motorcycles is much superior to the Indian. All machines should be provided with a special military gearing for slow speeds. -T.N. Horn, Brigadier General, 7th Field Artillery

All Divisional Artillery, including 155mm, howitzers, should be horse drawn. All other should be tractor drawn, that is with a caterpillar tractor and not trucks. The Ammunition for motor drawn artillery should be tractor drawn also. Trucks are unreliable and can seldom get ammunition to guns. A trailer, drawn by a caterpillar tractor could best be used for ammunition. Four caissons are needed for motor drawn artillery.

For horse drawn heavy artillery, short, there should be an ammunition wagon designed very similar to a wagon now used by the Engineers for carring rock, cut under front wheels for turning in small space, strongly built, low center of gravity and broad tires with reasonably high hind wheels. There are two types of these wagons used by the Engineers. The longer bodied wagon is nearly exactly what is needed. A wagon of this type will carry 48 rounds complete, charges, fuses, shells and also a box of tools and a working table. They should be designed for three horses in the wheel and two in the lead. The same type of wagon could be used as trailer behind a caterpillar tractor. -J.T. Kennedy, Lieut. Colonel, 5th Field Artillery.

One Ford truck should be issued to every battery and one to each battalion and regimental detail.

In general the more open the warfare the greater the necessity for increasing the mobility of the reconnaissance and communications details. Horse flesh must be saved.

The ammunition and supply must be carried as far forward as possible by trucks or caterpillar. Full use of the latter as an ammunition carrier has not been made. -D. McKell, Col. 12th F.A.

In campaign the Tables of Organization should provide a few 3-ton trucks for each light regiment, these provided with ramps and fastenings for transporting guns would be a tremendous saver of horse flesh. -J.A. Mack, Colonel, 102nd Field Artillery.

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1. I unqualifiedly favor tractor drawn Field Artillery of all calibers from the 75's up. Of the two 75mm. regiments of a division, one at least, should be entirely equipped as tractor drawn artillery, using a tractor similar to the 15 H.F. Holt. The other regiment might have one battalion horse drawn and the other motor truck carried with one light caterpiller tractor to each battery while all artillery of greater calibre then the 75mm. should in my opinion, be tractor drawn.

2. Ample motor transport for commissioned and specialist personnel should be provided and some stops should be taken to prevent the retention by every one from Sergeant of the Q.M. Corps up, in the S.O.S. of good mo or vehicles and the sending into the lines of broken down machines, patched up from spare parts.

3. In my experience I have become firmly convinced that the day of the horse is a means of draft for Field Artillery has passed; futhermore, the motorcycle and side car are useless, always getting out of repair, easily damaged or destroyed and entirely unsatisfact-

ory. A small light car coats little more and is infinitely more satisfactory. The immense saving, both in orginal cutlay and upkeep an ample number of small cars in addition to the regular reconnaissance car with which a battery commander should be supplied to accommodate commissioned and specialist personnel and make possible rapid and effective reconnaissance, excellent liaison etc. G.B. Merhard, Lieut. Colonel, 321st Field Artillery.

The question of transportation of the artillery depends so much on the character of the country in which it is to be used that no particular recommendation is made. In France there are many good roads and many things have interfered with the procurement and maintainance of good horse transportation. These conditions might not exist in other campaigns. Futher experimentation with the light tank tractor would proably develop important data on this subject. -E.A. Miller, Brigadier General, 6th Brigade.

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1. Tables of organization for motorized regiment 4.7" and 8" call for ten (10) 5-ton tractors per battery. If 10-ton tractors are to be furnished there should be five (5) for each battery.

2. The 2 1/2-ton tractors for reel carts have never been furnished. It is believed these tractors of a comparatively higher speed should be provided.

3. Tractors should have mufflers.

4. Some form of a motorcycle which can go along the road at the same speed as the battery without over-heating might be developed. and takes up too much room on the road. Mounting the two riders tandem would obviate these difficulties.

6. A generous supply of spare parts, while taking up room, is believed to be economical.

7. Trailers should be provided for all organizations. They are believed to be more economical than a number of trucks which give the same carring capacity. -W.P. Platt, Colonel, 303rd F.A.

In case light batteries (3" or 75mm.) are to be motorized, it is believed the method of handling guns on low trucks should be followed. To haul these guns behind light fast moving tractors will work serious injury to the carriages. But trucks are apt to get stuck, hence each battery should be provided with light tractors also. These tractors could be used to pull trailers, and for other purposes, and would be avaliable when needed to pull trucks out, also to haul guns short distances into position. Tractors rather than horses should be provided for this purpose - in facc a motorized organization should have no horses, otherwise many advantages are partially lost. -H.S. Pratt, Colonel, 18th Field Artillery.

More motor transportation should be provided for light Artillery regiments, at least two additional motor-cycles, solo, are needed, one for each battalion.

The supply officer should have at his disposal about six cargo trucks, to be used for the supply of rations, equipment, etc., and about two light Ford trucks for making quick trips when needed. W.H. Rucker, Lieut. Colonel, 16th Field Artillery.

I have always thought that motor transport should be used as much as possible, but I have had very little practical experience with it. W.R. Smith. Major General, 36th Division.

No guns or caissons of the divisional Artillery should be drawn by tractors. They are unreliable and noisy, and they cannot go into many positions where guns must be placed. The horse only is sutiable for the purpose of divisional Artillery. Corps and army Artillery may well be tractor drawn. It is doubtful if a caterpiller mount can be successful employed under field conditions. A gun must have a stability that requires special support and the shock of discharge should in no way endanger the operation of the motor power for mobility.

Motor transport is limited to the ammunition supply and it should not be extended to the supply company or other trains. -C.P. Summerall, Major General, 5th Corps.

Reducing the number of animals and adding motor transportation to Brigade Headquarters was a great step in advance. Experience showed that for some parts of the advnace a few riding and a few draft animals are necessary but in general passenger cars and motor trucks are the most useful. In fact they are required.

Tractors were found most efficient in drawing guns and were able to take the 155 mm howitzers every place that the horse drawn 75mm guns were able to go. Almost the only limitations to the use of the tractor is the strength of brigades. The 5 ton tractor is able to do all the work required of it and does not bring excessive weight on brigades.

This Brigade had no experience with caterpillar mounts. -Todd, H.D. Jr., Brigadier General, 58th Brigade.

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1. An excessive rather than a short supply of motor equipment to a mobile unit is economy. From 20 to 50 percent more trucks should be allowed than will be required daily in extensive operations.

2. Caterpiller tractors moured like small French tanks as motive power, and limited number of caterpillar trailers with supply of suitable trucks to deliver ammunition within a few kilometers of the batteries will fully and adequqtely furnish a

light or heavy regiment with all necessary mobility and supply it for extensive operations anywhere. A Brigade so supplied with motive power would be far superior to any horse drawn outfit and could perform any feat and in less time than the horsed outfit. -G.L. Wertenbaker, Colonel, 345th Field Artillery.

I consider tractors as absolutely necessary for 155 mm. howitzers. Theoretically, you are issued large, heavy horses of the so-called "Artillery Type" to pull these guns, but actually you get anything that can stand up and be called a horse. The training necessary for horse drawn outfits is too extensive to be given in war-time, while men who can handle motors and tractors are in abundance. This, of course applies more especially to organizations such as this, which was procured largely from New for 155 m/m howitzers, because in a push such as we had, there comes a time when the supply breaks down, your horses have to go without food and it only takes two or three days of this to render you absolutely immobile. Due to this cause, my regiment was scattered over something like 60 to 70 kilometers and was a source of great trouble to regimental and battalion officers, and it also resulted in great mortality of horses. -(C.D. Colonel,) 306th F.A. Colonel C.D. Winn.

Horse drawn Artillery very nearly failed during the Meuse-Argonne offensive because of the death of horses.

Possibily for the following reasons:-

1. The Artillery teams from the beginning were overloaded with personnel.
2. The animals were of poor quality.
3. Forage in sufficient quanity was lacking.
4. Battery Commanders, their Lieutenants and Non-Commissioned officers did not know how to care for animals and neglected the simplist things, like grooming, saving animals, unsaddling or loosening harness on halts etc.

Yet taking all this into account, I believe the horse for F.A. use is passing and we must work for the development of tractor and portse F.A. Consideration must be paid in America to brigade and culvert construction, but if the weight can be made right, the tractor appears better than the horse.

In Conn. Manouvers in 1912, the S-ton trucks continually broke country brigades and culverts.

Motor transport has been very faulty for several reasons, among which are:

1. Diversity of makes within a unit.
2. Failure to have in Franco, Motor repair units, even when same had been organized from the division in the U.S., necessitating organizing groen personnel in field.
3. Almost absolute shortage of spare parts.

I have been repeatedly told by the M.T.G. that the panacea for all evils of the peresent is that all cars be operated, manned, repaired and inspected by M.T.G.

A certain number of cars are just as necessary to a Division or to a heavy F.A. Regiment as the horses are to the F.A. or the horse drawn vehicles of the combat train to the Infantry Regiment or M.G. Bn. Every effort must be used to combat this pernicious doctrine of the M.T.G.

For a Division, all transportation of the train should be one type of car or truck, and the Am. body should be discarded. The cargo body is more universal, and will carry Am. O.K. The Div. pool is excellent. Heavy Arty. Regiments must have some Regimental truck transportation. It may be possible to take from Div. and Heavy Units about 1/2 truck transportation and pool in corps - but it must be in Corps avaliable for use in the Div. or Heavy Unit when needed for open warfare conditions. All units must have their own repair facilities, personel, etc. The drivers must be under the command of the unit with which they work. It is inconceivable of having M.T.G. men running the battery Am. up to Battery positions. As above stated, a division, temporairily stabilized, does not need so much transportation and hence pooling part in the Corps would allow better use of the large amount now assigned the division on paper, but which none of Am. divisions in these campaigns have had. In some way personel trucks of heavy batteries are not needed in rest, and are merely Am. trucks in action after the battery has moved into position.

Remember French pool of trucks was for necessary economy in transportation - English for efficiency in operation - but neither scheme fitted warfare of movement. Futhermore the British do assign trucks to units for movement warfare.

Truck transportation went to pieces with us because it was frightfully overworked, no time for systematic inspection and spare parts were woefully lacking. I pushed as hard as possible with all the authority of Chief of Artillery, 1st Army for 4 weeks to get spare parts for one train, and never succedded in getting 10% of spare parts actually necessary on any weekly requisition. -P.H. Worcester , Colonel, 146th Field Artillery.

The memorandum of December 13, 1918, from Headquarters American E.F., regarding motor equipment of 155 m/m Howitzer Regiments authorize the issue of thirty-four tractors but does not specify the size and there has been issued to this Regiment twenty-four, 5 ton and ten, 10 ton tractors. They are used as follows: one battery is equipped with five 10 ton tractors the other batteries have four, 5 ton and one 10 ton tractors each. Regimental Battalion Headquarters Sections have one 5 ton tractor for operating and reel-carts.

At the present time the tractors in the batteries are used as follows; one tractor for each gun and one tractor for the four caissons, as it is impracticable to limber a gun and caisson in the rear of each tractor due to the very small and weak pintle on the caisson body. The result is and will be in the future that a battery will go into action with four guns but with no ammunition, due to the breading down or loss of the tractor transporting the caissons. This has happened once during the manouvers this week, futher, the 5 ton tractor has not sufficient weight and power to drag a 155 m/m Howitzer up ordinary grades or to pull it out of the mud. This has been demonstrated this week.

I recommend that there be issued to each regiment twenty-four 10-ton tractors and twelve 5-ton tractors and that a suitable pintle be placed on the caissons so that a gun and caisson can be transported by each 10-ton tractor and that the twelve 5-ton tractors be used for transporting the four reel-carts and eight rolling kitchens with trail mobiles.

If it is expected that the Heavy Arty. do its part and arrive on time, the above changes are necessary. - J.B. W. Corey, Col. 6th F.A.

Ammunition trucks should be arranged to permit the use of caterpillar treads on wheels. There should be attached to each motorized unit, at least two, light, six mile per hour tractors, capable of hauling from two to four trailers at that rate, for work which would ordinarily fall to horsed transport, and to meet emergencies. -A.Cronkhite, Major General, 6th Corps Artillery.

ADDENDUM

TO

ANNEX 7

Recommendations of Officers of Artillery.

American E.F.

Received after the Dissolution of the

Board.

MOTOR TRANSPORT AND TRACTOR DRAWN GUNS.

Motor transport and motor traction for Field Artillery have come to stay, with increasing application to all calibers. It is only a question of details of development and application. Experience has shown that tractor drawn artillery of medium calibers can go wherever horse drawn guns of same caliber can go and some places where the latter cannont. No apparent reason exists why this should not be the case with light artillery, given a suitable tractor. The difficulties of providing sufficient horses and of supplying sufficient forage to them is alone sufficient to decide the matter. The American experience, this last summer and fall, with much artillery immobilized on account of lack of horses or of sufficient horses, and on account of heavy losses of animals from hard work and insufficient forage, is enough to decide the question. My own brigade was immobilized for this reason only a few miles in rear of the Argonne front, where need existed for all the artillery we possessed.

My opinion is that a combination of the systems of "artillerie portee" and tractor drawn artillery will best meet future conditions for light artillery 3-inch or 75 m/m. "Artillerie portee" meets best all conditions where good roads permit of its use and addition of a few small tractors per battery (to be truck carried when moving) will remove present limitations of its use to gun positions close to good roads. If sufficient small tractors are held in reserve, such artillery can be used as tractor artillery in campaign, where good roads do not exist. The combination will provide flexibility and mobility of guns and ammunition supply absolutely unattainable with animals.

The future development of tractors may be expected to furnish sutiable tractors for military use, especially as to reliability, which is essential. Noiselessness is also essential. The present tractors make entirely too much noise for use in the vicinity of the enemy, especially at night, when sounds carry best. Edward Burr, Brigadier General, 62nd Field Artillery Brigade.

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2. It is not believed that all motorized artillery should be mounted on caterpillar mounts. Mounted or carried on motor trucks the mobility of light artillery is so much greater than the mobility of caterpillar artillery that it is believed that a portion of the light guns of motorized artillery should be carried or mounted on standard type trucks.

3. My experience leads me to believe that the motorizing of all artillery assigned to a field army is precticable, except for that portion of light artillery which would, under ordinary conditions, be assigned to close support of the infantry. For the sections, platoons or batteries which are assigned to close support of the advancing infantry it is believed that pack mules should be employed. J.R. Davis, Colonel, 15th Field Artillery.

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1. Motor transportation has never been supplied in sufficient quantity. Enough of it has, however, been avaliable to make possible certain conclusions. This brigade has never had any guns drawn by tractors. Its heavy regiment is at present being organized as a motor drawn outfit. From observation of other units whose guns were tractor drawn, it is recommended that all guns heavier than the 3" or 75mm. be tractor drawn. Motorization of lighter calibers is considered feasible but a decision between the horse and motor traction in the lighter calibers would proably be influenced by the supply of horses and motors. Without futher experience, it is not recommended that horses be

eliminated from the Field Artillery. Caterpillar mounts have never been used and are not deamed necessary in the calibers used in this Brigade.

2. The type of ammunition truck known as the Quad was a failure in this organization. It seems that all bad faults have been concentrated in this truck. The four-wheel steer turned the trucks into the ditches and the mechanism of this steering device was a continual source of breakage and trouble. The four-wheel drive was never necessary except of in hauling other trucks from the ditch. No reason whatever can be thought of for having a truck body narrower than the treat of the wheels. Conservation of round space allows a body at least as wide as the distance between the outer edges of the wheels. This truck could not carry as large a load as a cargo truck of the same tonhago. -C.C. Hearn, Brigadier General, 153rd Field Artillery Brigade.

I would retain horses in 2 light regiments with tractors for the 155 howitzers only, unless it might be considered expedient to use tractors for the 4.7 howitzers. However, these howitzers can be handled as easily with horses as can the 75 mm. gun. -W.G. Price, Jr., Brigadier General, 53rd Field Artillery Brigade.

ANNEX 8.

Recommendations of Artillery Officers

American E.F.

AERIAL OBSERVATION; F.R.S. and S.R.S.

H.

AERIAL OBSERVATIONS, F.R.S. and S.R.S.

Aerial observation was very unsatisfactory throughout our operations. The Air Service, in my judgement, has two functions, the primary of which is reconnaissance, and the secondary that of preventing hostile reconnaissance.

Battles are won on the ground, and the Air Service performs its functions best when it provides the troops, and more especially the artillery, with the information that will enable the troops to successfully operate aganist the enemy.

It is believed that our Air Service had the tendency to indulge in combat rather than to perform the functions of reconnaissance and the adjustment of artillery fire.

Reconnaissance planes were thus relegated to a secondary place and were frequently obliged to perform their functions without the necessary protection of battle planes.

Under these circumstances, though the spirit of the aviator and observer were excellent, they were necessarily timid and did not fulfill thier role satisfactorily.

It is believed that the control of the Air Service should be so vested in the commander of the unit with which it is serving as to assure that mission of the service shall be fulfilled, and that undue attention to combat and the making of 'Aces' is avoided. For this reason it is believed that notoriety for aerial combat should be frowned upon and men should be specially rewarded for successful reconnaissance.

Flash Ranging Service latterly gave reasonable satisfaction, though it never reached the high proficiency of the French S.R.O.T.

It is believed that, since this service has absolutely no other mission than the furnishing of information to the artillery, it should be an artillery organization, and its members should be absolutely under the control and direction of the corresponding artillery commander.

The same is true of the Sound Ranging Sections. These services can only reach their maximum efficiency when they are under the direct control and command, in every respect, of the Chiefs of Artillery of Corps and Army, under whose direction they must always operate in war. -D.E. Autman, Brigadier General, Army Artillery, 2nd Army.

Aerial observation, so far as this Brigade was concerned, was almost a farce, due largely to the very unfavorable weather on the Argonne. No attempt was made to use it at St. Mihiel, and on the Vesle it was non-existent.

With reference to the F.R.S. and S.R.S., data from their observation was received through the Corps and was always too late to be of any assistance to Divisional Artillery. -E.B. Babbitt, Brigadier General, 4th Brigade.

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1. The light field artillery is not ordinarily used for counter battery work and has no use for flash or sound ranging sections.

These organizations are products of stabilized warfare and should pertain to Corps or Army Artillery to be brought into use when required.

2. The details of liason between aerial organizations and the Field Artillery Brigade should be amplified and more opportunity afforded for practice. The aerial observers should remain with their brigades, only leaving when they go on observation. This applies to both airplanes and ballons. When occasion for their use arises, they can then be fully oriented for which they are to work, proceed to the plane or balloon which has been assigned by the aerial unit and go aloft with a full understanding of what they are to do, reconnaissance, spotting, etc. -H.G. Bishop, Brigadier General, 3rd Brigade.

Aerial observation in my experience has been comspicuous by its absence. Had the American Air Service built observation and chasse planes instead of the bombing planes the American army might have been a much stronger organiztion than it was. Aerial observation is very essential and should be developed. Observers should be serious-minded efficient field artillerymen and not fly-up-the-creek air-man. The F.R.S. and S.R.S. should be part of the field artillery service. They work for the field artillery and therefore they should be under field artillery control. Both organizations should be prepared for quick changes in the war of movement. -A.J. Bowley, Brigadier General, 6th Corps Artillery.

Regulations tightening up the relations of the air service and artillery should be issued. My experience has been that when an observer went up, either balloon or plane, good results were obtained if the observers was given a definite mission over a definite terrain and if he had one fire unit at his call. If he went up looking for what he could see, with a battalion of 75's one of 155's and a part of the Corps Artillery at his call, for instance, the results were not satisfactory, and usually ended up by not firing at all, or if fire was delivered, it was on a target visible from the ground. -H.W. Butner, Brigadier General, 1st Brigade.

The cooperation of our airplanes with our artillery was unsatisfactory in this war. The help given the artillery by the airplanes should be enormous. In open warfare, airplane observation should be an important means of locating fleeting and battery targets. This will require (a) an airplane patrol of the artillery alone, constantly in the air; (b) A certain number of the Corps and Div. Arty. Commanders. Balloons are very useful to the artillery, and gave good service as at present organized. All observers should be artillerymen.

F.R.S. should be a part of the permanent Corps Artillery organization. It can be made invaluable. The personnel should be Field Artillery and the training should be under the Field Artillery.

S.R.S. could well remain with the Army Artillery. It is very useful under special conditions, but cannot be quickly installed. Personnel and training should be Artillery. It should certainly be continued and developed as an aid to the Artillery. -Army Center of Artillery Studies.

Aerial Observation so far as our experience goes, has been a failure. On every front the regiment has been engaged, the radio sets have at all times been employed and panels displayed for days at a time, with but slight if any attention paid by the air service. On the one of two occasions on which an aeroplane registered in, but one observation would be made when the aeroplane would send message that conditions were not favorable and it was going home. It is recommended that observers be attached to regiment and be responsible to the artillery commanders for failure to function properly. In such way, were results not obtained, cause for failure could be quickly determined. -Albert L. Cox, Colonel, 113th F.A.

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It is thought that there should be aerial observers who are members of the organizations with which observation planes are to operate. There was a great deal of backing and filling on aerial observers during this war, members of an organization and are sent to the Aerial Squadron which is to serve that organization, for the period of such service. This apparently was the orginal idea in the Tables of Organization, and I am sure it is correct. These officers would serve the purpose not only of making observation, but also of establishing a desirable liaison from the artillery point of view between the artillery organization and its aerial squadron.

All artilleryofficers should take a course in Aerial Observation.

It is thought that each brigade should establish its Flash Ranging Sections.

I am not prepared to make a recommendation as to Sound Ranging. This latter service, however, gave some very satisfactory results which came under my observation. I am not prepared to say what should be its organization. R.P. Davis, Brigadier General, 151st Brigade.

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There is no question that a big improvement can be made toward the Artillery and the Artillery and the Air Service "getting together".

This regiment has always been ready to do its part and has tried to, but practically nothing has resulted from our efforts. I presume the Air Service had constant more valuable use of their planes, but I believe that many occaisions exit when plans should be turned over to the Artillery Brigade Commander for co-ordinated use of adjustment of fire, photography of new positions to test camouflage, etc. -F.C. Doyle, Colonel, 305th F.A.

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We have been able to secure so little aerial observation that I am familiar with few of its good points from practical experience at the front. On a few isolated occasions it has worked and worked well. The trouble is that the artillery has no control over the aerial observers. The only solution I see is to assign certain aeroplanes and balloons to the artillery for the purpose of observing and permit them to do no other work. My practical experience at the front was limited to about two months, but embraced service in three Corps (one of them French) and at different times five divisions (one of them French) and we always experienced the greatest difficulty in securing aerial craft to observe for us, since we could only request and not issue orders. -A.S. Fleming, Brigadier General, 158th Brigade.

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It is recommended that aerial observers be under the direct command of battery, battalion, or regimental commanders. -G.G. Gatley, 67th F.A. Brigade.

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The work of our aerial observers as far as this regiment was concerned, was practically nil. The Regiment received no assistance from the aviators, nor any information that was of any value. The aviators remained so far to the rear that they were never on hand when wanted or needed. It is considered that if these machines came to rest in rear of the battery positions in the open fields in the early morning where they would be in touch with the batteries returning that hight after their work was done, and that if the aerial observers understood that those assigned to organizations were required to be with the, for closer work, better liaison and more efficiency would be obtained. It would take but little work to prepare suitable landing fields and the danger of the machines while waiting would be slight. Quick telephonic communication would be maintained and installed. It is thought that if these machines are closer to the front they will likewise afford a greater sense of security to the balloon observers, who, in turn will be able to render more valuable service to the artillery regiments than they have in the past, and futher that the practice of leaving balloons in the air without observers in them, would be minimized, and the regiments not required to wait as long for adjustments as they have in some cases been required to do. It is thought that the balloon should be kept in direct communication with the battery. Much closer liaison between the aerial service and the artillery can be procured, and should be procured by the aeroplane observers of the regiments, which should be left with them except when actually conduction reglages. Night work by bombing machines with heavy artillery has not been heard of in our army, while it was constant occurrency by the enemy. Under this arrangement the pilots bring up machines and wait. A reglage is wanted - reconnaissance desired. The artillery commander orders his observers to perform the work, they having been with the regiment and fully coguizant of what is desired. They then proceed by motor transportation but a few kilometers to the waiting machines and shortly are performing the exact work desired. If there is any failure the Commanding Officers can immediately determine the cause and is in a position to obtain instant and satisfactory results, without resorting to long and exaperating correspondence. E. St. J. Greble, Jr., Colonel, 76th F.A.

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Present orders with reference to Aerial Observers are believed to be satisfactory. -I. A. Haynes, Brigadier General, 64th Brigade.

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In the matter of aerial observation amplifiers seen necessary for artillery radio sets to insure an accurate receipt of observations made by aeiral observers.

So far as has been observed a field artilleryman can become an aerial observer but an aerial observer can do very little for the field artillery unless he be a field artilleryman.

So far as known the F.R.S. and S.R.S. are excellently applicable only to a warfare of position. -T.N. Horn, Brigadier General, 7th Brigade.

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Experience has shown that it is more satisfactory to have the Bn. C.O., pick several points which he considers suitable for adjustment and submit them to the Air Service rather than to have a plane come up for adjustment on some point chosen by the Air Service and which may be entirely unsuitable in range or direction. Many times adjustments were made on unsensitive points when they might as well have been made on batteries or tronches. -R.D. Johnson, Lt. Col., 18th F.A.

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Aerial observation is very important and should be developed. The observers should belong to the Air Service but should be required to take courses at Artillery Training Camps.

Aerial observation at the front druing attacks was never dependable or satisfactory, nor even approximately so. The aviators all wanted to "Chasse work", so called, and none of them seemed to be keen for the hard and dangerous work of the observing plane. This was no doubt due to the lack of discipline and a lack of appreciation of their responsibilities an officers of the Army on the part of the officers of the Aviation Section of the Signal Corps. Aerial Observation is very important and should be developed. -J.T. Kennedy. Lt. Col., 5th F.A.

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Flash Ranging and Sound Ranging sections are of little advantge to light field artillery which is seldom used in counter battery work, but could be used most advantageously with the 155 Howitzers as a counter battery weapon.

Little is known of the advantage of Aerial observation in this Regiment as it was never given the assistance of observation Planes. It would doubtlessly increase the accuracy of fire if adjustments were made by planes or balloons on such points as could not be adjusted on by direct observation. Two planes attached at all times to a Brigade of Artillery could effectively make all necessary adjustments. -C.R. Lloyd, Colonel, 10th F.A.

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F.R.S. to be made as mobiles as possible and should be able to operate as soon as the 155 regiments are ready to fire.

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Results obtained from aerial observation considered unsatisfactory. This work, to be of value to the artillery, must be done by trained and experienced artillery officers whose chief object in their work should be to so perfect themselves in correctly observing fire and reporting it as to be reliable assistants to the artilleryman. This Signal Corps Officer can never do, nor be reasonably expected to do, since his chief business and interest in life is centered in the machine he flies. The placing of this matter in the hands of the Signal Corps is believed faulty in principle. -J.A. Mack, Colonel, 102nd F.A.

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All aerial observers and the entire F.R.S. and S.R.S. systems must be composed of artillery personnel and must be absolutely under the control of the artillery. We shall never get successful results by the methods that have been pursued in this war. It has been demonstrated that the artillery personnel can grasp the details of these duties and can perform them successfully. This personnel should be a part of the corps artillery and should operate and function with it at all times. It may be utilized by the Army and it may be supplemented by the Army, but it should not be displaced by the Army or by any other organization of the military establishment.

Not only should observers be taken from the Artillery, but all air units for artillery observation and reconnaissance must be absolutely under the Divisions and Corps as a part of the organic stregnth. No independent Corps or arm will give good results. -C.P. Summerall, Major General, 5th Corps.

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This Brigade had little or no assistance from friendly air service, but suffered serious losses from hostile air service. -H.D. Todd, Jr., Brigadier General, 58th Brigade.

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A flight of at least four airplanes should be a constituent part of each field artillery brigade. Such flight should be under the direct orders of the brigade commander and should be trained with the brigade. In no other way can prompt and satisfactory serial observation be assured. -J.F. Walker, Colonel, 314th F.A.

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ADDENDUM

TO

ANNEX 8

Recommendations of Artillery Officers,
American E.F.

Received after the Dissolution of the
Board

AERIAL OBSERVATION; F.R.S. and S.R.S.

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1. EMPLOYMENT AND LIAISON:

The employment and organization of aerial units for artillery adjustments depends largely upon the following question: "Is it more important for an observing unit to remain in a particular sector and throughly familiarize itself with the terrain and local conditions pertaining to that sector, or is it more important that this unit become a close and co-ordinated part of a division and move with that division from one sector to another?" It is believed that the former is of the greater importance, but that sufficient cohesion can be obtained by having a certain number of observers attached permamently with a division, move with the division and attach themselves to the observing unit in each sector where the division is employed. This matter of cohesion is of prime importance and it is not exercised as far as the experience of this regiment is concerned.

2. PRESENT SYSTEM OF LIAISON:

It has been the experience of this regiment that upon arrival in a new sector, or upon the assignment of a new aerial unit a sector, a visit is received from three to six observers who, in every case have shown an enthusiastic desire to work with the artillery. Schemes are planned and preparations made for adjustments, but nothing after this visit is heard form these air units and they are usually too far in rear for telephonic liaison.

3. SUGGESTED LIAISON:

If not less than two aeiral observers were permanently attached to a regiment or artillery upon arrival in a new sector, one of these observers would immediately look up and attach himself to the air unit to be used for artillery adjustments. On the other hand, not less than one observer belonging to the air unit would immediately attach himself to the regiment. Motor transportation, in addition to the present regimental allowance, should be provided for the two observers at the regimental station. In liaison with the air unit, the regimental radio offers, and the battalion assigned for aerial adjustments, the observers on duty with regiment would make all arrangements for the employment of the air unit.

4. SLECTION OF "ARTILLERY" OBSERVERS:

Section should be made from officers on duty with regiments of artillery who are especially interested and especially qualified for this work; however, the larger proportion should be selected from students at the Saumur Artillery School. Those selected at this school, in addition to having the usual courses of instruction for aerial observers, should have, before entering upon their duties, not less than one month of service with a battery of artillery. It is found that as a rule, aerial observers (working with artillery) are not sufficiently grounded in matters pertaining to the employment and capabilities of the guns with which they work. When Commandant of the Saumur Artillery School nearly a hundred balloon and airplane observers were sent to the school for a special three weeks' course. I have since run across many of these young officers and they have expressed great enthusiasm at the benefits which they obtained at the school. -P.D. Glassford, Brigadier General 51st Field Artillery Brigade.

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Aeroplane and balloon units should be placed under the command of the Artillery Commander. -A.G. Fisher, Colonel, 307th Field Artillery.

1. Aerial observation proved of great value in the matter of reconnaissance in the brigade. Aerial photographs were a source of abundant and accurate information. The use of the airplane in the adjustment of five was, however, almost a failure. Very few adjustments were made by airplane. It is believed, however, that adjustment of fire by airplane is of the utmost importance and may be accomplished. Proably the greatest reason for the failure of airplane adjustment in this brigade was the fact that the squadrons assigned to us were so frequently changed. Adjustment of fire by an observer in an airplane requires the finest sort of liaison between the observer and the battery commanders. In fact they should know each other personally and have a thorough understanding before the adjustment is attempted. Generally by the time an observer had visited a Battery Commander and arranged an adjustment, he would return to find his squadron moving elsewhere. It is believed that a squadron should be assigned to each Division to remain permanetly with that Division and that a certain number of planes, pilots, and observers in that squadron would be assigned permanetly to the Artillery of that Division. Such a plan would proably make possible successful adjustment of fire by aerial observation. More Chasse planes should be provided to prevent enemy reconnaissance.

2. F.R.S. and S.R.S. were of great value in some factors and of little or no value in others. It is believed that their value is directly dependent upon that initiative and ability of their personnel. It is also believed that their organizations should never be moved from one sector to another but should be left to make the greatest possible use of the knowledge of a sector which they have gained through constant observation in it.

3. F.R.S. was used on several occasions on the West bank of the Moselle River in adjustment of fire. S.R.S. was ready to render assistance in this matter also, but were never called upon to do so. In the Argonne, both the F.R.S. and the S.R.S. were complete failures due entirely to the lack either of ability or desire on the part of the personnel to push forward their observation stations and install their communications and apparatus. -C.C. Hearn, Brigadier General, 153rd Field Artillery Brigade.

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Aerial observation should undoubtedly be made by trained artillery officers. My observation has been that the type of men who as a rule put in for Air Service, both as Aviators and Observers, are not the type of men who make satisfactory artillery officers, and in the cases which have come under my observation, they have failed to come up to the standard as observers, which has been reached as artillerymen by the young men who have gone in for the artillery. If it is not expedinet to transfer artillery officers as observers then all Aeiral Observers should be given careful training in artillery regiments both in discipline and the technique of Artillery. -W.G. Price, Jr., Brigadier General, 53rd Field Artillery Brigade.

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Aeroplane observation is necessary for best results with the 155mm. Howitzer. Observers and aeroplanes should be part of the regiment. A repair shop for aeroplanes could be operated similar to the M.O.R.S. There will always be enough work with the Howitzer regiment to warrant assigning a number of planes to each regiment as part of the regiment. Liaison is thus assured

and it will not add to the number of planes required but merely make for greater efficiency.

F.R.S. and S.R.S. - Neither of these agencies were of any particular value to this regiment. The impression remains that the data they furnished is not of sufficient accuracy to warrant expediture of ammunition. -E.O. Sarratt, Colonel, 309th Field Artillery.

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Aerial observation was good with balloons and unsatisfactory with planes. The weather while this Brigade was in the line prevented observation much of the time. There were few planes avaliable, and those we had could not adjust. Their reconnaissance information was so often incorrect as to make them unreliable. -G.A. Wingate, Brigadier General, 52nd Field Artillery Brigade.

ANNEX 9.

Recommendations of Artillery Officers

American E.F.

LIAISON AND LIAISON OFFICERS

I.

LIAISON AND LIAISON OFFICERS

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The subject of liaison with Infantry was tried in several ways during the operations.

This liaison was found most satisfactory when accomplished through an entire system of Artillery Liaison Officers with the Infantry commander. The system finally found most satisfactory was as follows:

Each light regiment was normally assigned to the support of one of the brigade of Infantry of the division, the supposition being that these brigades would both have elements upon the line both during the attack and defense.

A Liaison Officer from the regiment was attached to the staff of the Infantry Brigade Commander and, wherever practicable, the Artillery Regimental Commander was himself stationed in close proximity to the Brigade Commander so that personal liaison between the two was practicable.

A liaison officer was also attached to each Infantry Regiment, and in operations involving at attach or advance, a Liaison Officer was attached to the battalion in the front line.

These Liaison Officers were connected up with the Artillery Regimental Commander and through him to the Brigade by telephonic liaison, and by the necessary enlisted personnel to insure visual signalling, and connection by runners.

The officer with the leading battalion was provided with wire and telephone detail to extend the telephone line with the advance of the Infantry Commander.

Through this system of liaison, communication was maintained with the advanced units of the infantry in such a way as to enable the Division Artillery Commander to provide for the necessary rolling barrages, protective barrages, and bombardment of enemy organizations. To provide for the needs of a proper liaison with the Infantry, it is believed that there should be maintained in all light artillery regiments an extra presonnel, consisting of four officers and about 30 men.

The heavy Artillery Regiments do not maintain direct liaison with the Infantry - one battalion thereof was assigned normally to the support of each brigade, and for this purpose maintained liaison with the commander of the light field artillery regiments in direct support of the brigade.

The whole artillery system was co-ordinated and controlled through artillery communication system by the division Artillery Commander, so that all or any part theof could be brought to the support of any other portion of the line. At the same time each regiment of light artillery normally supported its corresponding brigade of infantry.

The system was marked by aimplicity and worked very well throughout the Marne-Vesle offensive. Better results might have been obtained by training that it was impossible to give during operations. -D.E. Aultman, Brigadier General, Army Artillery, 2nd Army.

Liaison Officers need more training than it was possible to give them in the short period before actual hositilities.

Apart form the addition of two Liaison Officers to Brigade Headquarters recommended above, no change in the duties as at present prescribed suggests itself. The training in Liaison between Infantry and Artillery should commence by having the Liaison Officers attached while in camp to the Infantry, in order that a mutual acquaintance may be established. This presupposes that a proper selection of an Artillery Liaison Officer has been made, who not only knows the capabilities of his own arm, but is able to secure the confidence of the Infantry with which he is associated. In active operations this Liaison work is exceedingly fatiguing and hazardous, and no less than three officers should be assigned to it in order that there may be a relief after a reasonable period. -E.B. Babbitt, Brigadier General, 4th Brigade.

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Much is to be learned in our army regarding Liaison and Liaison Officers. Good or even fair results were the exception. Subordinate Infantry Commanders (Colonels down) either ignor or ask too much of the Artillery. The only solution I know of is to educate the Infantry to a better appreciation of the powers and limitations of Field Artillery and for the Artillery to send as Liaison Officers, officers of sufficient rank capacity and personality to properly represent the Field Artillery. -H.G. Bishop, Brigadier General, 3rd Brigade.

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Liaison detachments should be provided with telephones, and buzzer wire so reeled as to make it possible to unreel it from some device fastened to the person. My observation is that Artillery Liaison Officers generally are not able to communicate their information the the Artillery quickly enough over the Infantry lines of communication.

These Liaison Officers should tie in to a forward Artillery Brigade Center of information which in turn is connected by wire to Brigade Headquarters. -J.H. Bryson, Brigadier General, 155th Brigade.

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Officers doing Liaison duty should be so carefully instructed in their duties that they will not act as a message center, and should have the confidence in their judgement, of the officer sending them out. Some officers sent out with the Infantry were quick and brave and had 12 guns at the other end of a telephone line, would persist in sending back requests for fire from the Infantry. This faught was also found in forward observers, and lost many favorable opportunities. -H.W. Butner, Brigadier General, 1st Brigade.

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Extra officers should be provided, preferably Captains or Lieutenants, with considerably more experience than most Lieutenants have had. -T.Campbell, Colonel, 32th F.A.

One Liaison Officer Captain from the regiment, to the infantry unit to which the regiment is assigned for support.

One Liaison Officer Lieutenant to the Artillery Brigade. Four Liaison Officers for liaison between battalions and Infantry units they support.

Enlisted personnel should be increased to furnish four enlisted assistants for Liaison Officer. -Army Center of Artillery Studies.

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Liaison Officers should be trained for their duty and likewise the Infantry should be taught to understand the value of the Artillery Officers furnished by the Artillery. In most cases Infantry Commanders have disregarded the Liaison details sent forward by the Artillery and they have had to obtain information under great disadvantages. By selection of alert, intelligent officers and instructing them thoroughly, in what they might expect when reaching Infantry Headquarters, we have obtained in most instances, good results. There should be likewise a Liaison Officer sent by the Infantry to the Artillery. -A.I. Cox, Colonel, 113th F.A.

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The Artillery net should include both the laying and the operating of the lines which are necessary for the proper functioning of the Artillery units: such lines would thus include lines for the operation of the brigade, lines connecting the brigade commander with the division commander (if they are not at the same P.C.), as well as lines to the units which the Artillery is supporting. Of course, additional lines would not be run when the Signal Corps truck could supply them, but the line form the Artillery organization to that truck should be laid and cared for by the Artillery organization. Getting somebody else to do part of the work of a net always produces poor results. The number of men to lay lines which are to be used purely for Liaison purposes will be the same, whether the men are members of the Signal Corps or members of the Artillery, and much better results will be obtained by having the Artillery operate all its lines.

Liaison Officers should go from the divisional brigade commanders to Corps and Army (Heavy) Artillery, and from each Artillery unit to the Infantry unit which it is supporting. Also, from the Corps and Heavy Artillery to the divisional Chiefs of Artillery. No rule may be laid down as to whether a supporting battalion should send a Liaison Officer to the Infantry Regimental or to a Battalion Commander. Circumstances alter cases. There should, however, be provided in the Artillery organization, over and above those necessary for the normal operation of the Artillery units, officers classed as Liaison Officers. The rank of these officers should be that of Captain and First Lieutenant. -R.P. Davis, Brigadier General, 151st Brigade.

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Liaison between Infantry and Artillery has not been satisfactorily worked out and should be the subject of special study and consideration. The following points are considered essential. There should be a Liaison Officer with each Infantry Regimental Headquarters and one with the assaulting battalion. Each should have a complete enlisted detail of signalmen, linesmen, operators and runners with the necessary equipment. Projectors are in the general case preferable to flags and it is believed that too little use has been made of them. The wire furnished this detail should be light, wound on reels carried on a light two wheeled hand cart. The purpose of the officer at the Infantry Regimental Headquarters is to see that all information

and messages are transmitted promptly from the forward Liaison Officer to the Artillery battalion and regiment, and that the detail of the Battalion Liaison Officer is kept up to strength using his detail as replacements. He must be prepared to take over the duties of the forward Liaison Officer at any time turning his over to his non-commissioned officer in charge of the detail, until he can be replaced from regimental or battalion headquarters. Liaison is always more or less imperfect unless good telephonic communication is maintained. The Infantry has its own line to the forward battalion and the Artillery should have one also thus giving a two way path. With linemen at intervals of about one kilometer along a wire communication is very good with a well laid line even in a heavily shelled area. It is often possible for forward Liaison Officers to adjust the fire of a battery or certain guns on particular targets which retard the advance of the Infantry and to obtain excellent results. This emphasizes the fact that these officers must be above the average in ability and not men who are below the average as is so often the case. -W.H. Dodds, Colonel, 6th F.A.

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Battalion.

Require tow (a) Liaison Officers instead of one (2) as now allowed.

Regiment.

Requires two (2) Liaison Officers, none at present allowed. - F.C. Doyle, Colonel
305th F.A.

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The Infantry with which we have come in contact has almost as an invariable rule no proper understanding of the duties of Artillery Liaison Officers. This applies not only to Regimental Officers but in some cases this misconception has gone as high as Division Commanders. I attach hereto an excerpt from notes made at the time on actual experiences which fully explain the dangers resulting from this ignorance. - A.S. Fleming, Brigadier General, 158th Brigade.

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It is recommended that Liaison Officers receive a special course which will fit them for their duty as such. That they be familiar with all arms of the service. -G.G. Gatley, Brigadier General, 67th F.A. Brigade.

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The Tables of Organization do not allow for the proper number of Liaison Officers with the Infantry. For the purpose of advising and assuring the proper use of Artillery there should be at each Infantry Brigade Headquarters which the regiment is supporting, one Captain, who will be in charge of Liaison and have under his command the following officers: From each Artillery Battalion, one 1st or one 2nd Lieutenant with the Infantry Regiment which the Battalion is supporting; one 1st and one 2nd Lieutenant from each Battalion as substitutes and reliefs for these Liaison Officers. These reliefs to be kept at the battalion, brigade P.C.'s., or Infantry Regiments, depedning upon where their services are mostly needed. Futher, this Liaison Officer should have under his direct control one seregant, 3 corporals, as runners who are proficient in signalling and able to send and receive projector and somaphore.

It is considered that this question of liaison is of the utmost importance, and has been sadly lacking in our army. This number of officers and enlisted men should be allowed in full, and should be the best trained and qualified of those avaliable in the regiment. They may be substituted from time to time by other officers, but always should they be high caliber Artillerymen.

It is firmly believed that by eliminating the Artillery Brigade, the supporting regiments receiving orders by way of Infantry Brigades and direct will assist not only in Liaison between the Artillery and Infantry but between that Infantry and its division. -E. St. J. Greble, Jr., Colonel, 76th F.A.

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The word "Liaison" has come into very general use to mean contact, connection, communication, command and good fellowship. It is believed that it has but one intelligent meaning to the Artillery and that is "understanding". The other expressions referred to are well known and still used in English in the Drill and Service Regulations.

It is believed that a Liaison Officer should act as a staff officer of the commander at whose headquarters he is stationed. If this commander does not care to keep him as such he should be changed. The function of connection, communication and contact are simply a part of his duties and he should have sufficient personnel with him for the proper accomplishment of that part of his duties.

In the opinion of the Commanding General of the 7th Field Artillery Brigade, Liaison officers can properly be obtained throughout the U.S. Army by requiring each officer to pass a part of his service in the various branches of the army and that in this way, and in this way only, will exact Liaison ever be obtained.

It is believed the Infantry should furnish Liaison Officers to the Artillery just as the Artillery furnishes them to the Infantry, under present conditions. -T.N. Horn, Brigadier General, 7th Brigade.

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Liaison with the Infantry as well as with adjoining Artillery units is very important. A good, conscientious, hardworking officer of good judgment and common sense makes the best Liaison Officer. They do not need any special training but need to be good Artillery Officers with ability to recognize a situation when they see one. There was never a lack of plenty of good Liaison Officers; the difficulty was in keeping communication with him. -J.T. Kennedy, Lt., Col., 5th F. A.

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Liaison with the Infantry in many cases affords indifferent results; information from the Infantry is often very unreliable; targets are reported with inaccurate locations; in a rapid advance Infantry Commanders have repeatedly ordered the Artillery forward into position in advance of the main Infantry line when the firing batteries were protected from a sudden raid by only a few scattered patrols; Infantry Commanders sometines fail to make proper use of the Artillery Liaison Officers; Infantry Officers are seldom familiar with the use of Artillery; the Artillery Liaison Officer is placed at their disposal for the purpose of advising as to the use of the avaliable

artillery as well as for the transmission of information; failure to ask for and use this advice has no occasions led to unfortunate results. -C.R. Lloyd, Colonel, 10th F.A.

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Infantry and artillery officers should be systematically exchanged for short periods to enable the artillery officers to understand needs of the infantry and great importance of cooperation, and to impress on the infantry officers the need to accurate designation of an artillery target, and in order that the infantry may understand the possibilities and impossibilities of artillery fire. -D. McKell, Colonel, 12th F.A.

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An artillery liaison officer is one attached to a commander, generally of other units, for specific purposes. Experience shows these purposes are not understood or appreciated by other arms. Special provision should be made for training younger officers for this mission. Great need was found to exist for special training of officers for all ranks of other arms, especially infantry, in the possibilities, powers and limitations of artillery, the principal assistant and most powerful help in their tasks. All infantry officers should be required to demonstrate an elementary knowledge of light artillery prior to being entrusted with the command of troops in the front line. The infantryman must be able to tell the artillery his needs with sufficient accuracy for the artilleryman to act intelligently. An artilleryman of experience and field rank should be placed upon the staff of the division for the purpose of co-ordinating the plans of the artillery action with that of the infantry. The use heretofore made of Brigade Staff for this purpose is considered badly deficient. -J.A. Mack, Colonel, 102nd F.A.

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This subject I have partly covered in my remarks relative to a signal equipment.

From my own experience as a battalion commander, I got most excellent results from my Liaison Officer and the personnel assisting him, but, he and they were selected for their knowledge of field artillery; their intelligence courage and endurance, and were among the best men I had in the battalion. I had occasion frequently to observe that this was not the case, and officers and men were frequently assigned to liaison duty who were utterly incompetent.

I recommend that Tables of Organization be revised so as to permit the liaison personnel, both commissioned and enlisted, to be doubled, not only in order to cover more territory more satisfactorily but in order to permit relief.

My own battalion was for 31 days within 2000 meters or less of the infantry and was constantly engaged with the enemy. During that period we supported three different divisions and eight different regiments of infantry. These were constantly relieved whereas my Liaison Officer, his runners and so on remained constantly with the infantry front elements, and frequently went beyond them into "No man's Land" for the purpose of definitely locating targets and observing and even conducting fire. I was unable to relieve them owing to the fact that I had no other trained personnel and indeed had only about 50% or less of my commissioned strength present.

I consider effective liaison of equal importance with the rapid and accurate delivery of fire in the field artillery service and in my observations, it was the part of the work in which our troops in the recent engagements most often and most completely failed. I strongly recommend that liaison personnel be doubled in strength, that it be specially trained and that it be fully equipped at all times with ample signal equipment and such riding horses or preferably bicycles and good solo motor-cycles as the theatre of operations may make avisable. -C.B. Mehard, Lt. Col., 321st F.A.

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The world LIAISON has been used so much in so many different senses that is has almost ceased to mean anything definite to many officers. The word TEAMPLAY better describes what is meant. Its use would be helpful.

If artillery and infantry commanders received more instructions in TEAMPLAY in the employment of their representive arms, the technical means of keeping up communications and the co-operation of the two Arms would be better carried out, because the real purpose for the communications and the necissity of co-operation would be understood. As it is at present, the technical means of communication are often satisfactorily established as a matter of form without any intelligent use being made of this communication.

Suggest that the baisis of instruction in LIAISON be instruction in TEAMPLAY in the employment of Infantry and Artillery together.

In order to get good TEAMPLAY between the Infantry and the supporting Artillery it is necessary that Battalion Commanders be given more authority and discretion, so that they may not only take greater interest in keeping in close touch with their Infantry, but be able to open fire more quickly. -P.L. Mitchell, Colonel, 136th F.A.

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More attention should be paid in peace time training to Liaison in all its details. Trained Liaison Officers should be provided, along with the necessary detail, and these should be kept up to strength, and in a state of efficiency at all times. It is important that these details, along with all other specialists, be not allowed to deteriorate in team work or efficiency through lack of practice in their work. -W.H. Rucker, L. Col., 16th F.A.

My knowledge is theretical, though I think the lack of co-operation for instruction in this important subject is very largely universal in our army. -Wm. R.Smith, Major General, 36th Division.

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The system of liaison officers between the infantry and artillery is entirely satisfactory. Its operation can be improved by having artillery officers and infantry officers serve with each others arms and establish not only cordial relations, but working knowledge of each others functions, needs, and limitations. -C.P. Summerall, Major General 5th Corps.

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This Brigade made every effort at all times to obtain and maintain close liaison with the Infantry, but with the exception of when serving with Divisions command by Artillery Officers, it was not always successful. The Infantry appeared to think that all efforts in this line should be exercised by the Artillery. The continual changing of positions of the Infantry Brigade Commanders and Infantry Regimental Commanders without any notice, or without

leaving anyone to locate their new position, did not in their minds excuse Artillery Officers from being unable to find them. In some Divisions, Colonels of Artillery regiments were supposed to leave their regiments and follow the meanderings of Infantry Commanders from their regiments to keep alongside of Infantry Regimental Commanders than for taking Infantry Regimental Commanders from their Regiments and making them remain with Artillery Regimental Commanders. I am of the opinion that the following plan is the best:

Designate a 75 mm. regiment as support to each Infantry Brigade. Whenever conditions become stable estabilsh Artillery Regimental and Infantry Brigade P.C.'s hear each other. Assign intelligent Artillery Officers to the Staffs of the Infantry Brigade Commander and to the Regimental and front line Battalion Commanders respectively with the necessary runners and telephone men and materiael. Also assign an Infantry officer to the supporting Artillery Regimental Commander's Staff.

Impress upon Infantry Brigade Commanders the necessity of notifying the Commander of their supporting artillery during an advance where they expect to establish their P.C.

Then, if Infantry Officers will give Artillery Officers credit for as much zeal and ability as they claim for themselves, liaison should be complete. -H.D. Todd, Jr., Brigadier General, 58th Brigade.

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There should be provided in each battalion and regiment a liaison detachment of three officers and twelve enlisted men. These men should receive special training in means of communication and liaison particularly in map reading. There is no more important duty developing upon the artillery and it was found that without special training neither officers or men grasped what was required or were able to successfully accomplish their mission. -J.F. Walker, Colonel, 314th F.A.

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The great importance of the closest liaison with the infantry has been well demonstrated during the recent campaign in the sector north and northeast of Verdun, as the country was heavily wooded in places and the enemy frequently occupied the commanding hights so that it was difficult and often times impossible to secure the necessary information from the infantry. During the entire period from 29th October to 11th November this regiment was in support of an infantry brigade commanded by a general who shared my opinion regarding close liaison. It was next to impossible to secure from the infantry the trpical reciprocal liaison laid down in the text-books, and we had to depend entirely on the liaison furnished by the artillery itself. I detailed to infantry brigade headquarters one officer and four runners, and established telephone, radio, and in some cases visual signalling. With each regiment of infantry I also had an officer and two runners in dddition to the same signal equipment, and similarly I had one officer and four runners with each of the infantry battalions in line, the usual formation being two battalions in line and one in support. It can thus be seen that the requirements for this duty alone involved the use of seven officers and twenty-four men, and it was also necessary to have an officer and two men at Artillery Brigade Headquarters for the many emergencies which required close and positive co-operation. The results were remarkably good and never were we without some means of communication, and the information gathered by the officers and men in the forward lines was of

extreme importance to the General commanding the infantry brigade and frequently the first and most accurate report of the progress of the action. The officers whom I sent forward used remarkably good judgment in gathering this information, and were frequently able to observe and report positively on fire as well as to keep everyone posted on the general line of the Infantry advance. The runners made extremely good time to and from the front lines and generally safely passed through machine gun and shell fire. I am firmly convienced that a similar method of liaison is vitally important to all successful artillery work and renders the co-operation between the two arms more effective, but to have this, the strain upon the personnel as now limited is too great, and I strongly recommend that additional officers and enlisted men be attached to artillery regiments and trained especially for these duties. These officers should be of the grade of Captain to inspire the proper confidence, or if this is impracticable for all, at least those detailed to brigade and regiments should be of this grade. -D.C. Weld, Jr., Colonel, 105th F.A.

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1. This undoubtedly a most important subject. The liaison between artillery units is satisfactory as far as the regiment is concerned. An additional officer (Lieutenant) should be assigned to Brigade Headquarters to furnish liaison with similar units on the flank. This Regiment was called upon to furnish such liaison during the Argonne Campaign when it could ill spare the officers.

2. Liaison with the Infantry.

During the Argonne Campaign this regiment detailed three Officers, seven non-commissioned officers and thirty six privates for liaison with the Infantry Brigade it supported, and furnished telephones, wire and visual signal apparatus. This appeared to be sufficient. The third officer was attached to Brigade Headquarters. It is recommended that a liaison detachment of at least this strength to be included in the war strength of each Light Field Artillery Reigment. -H.C. Williams, Colonel, 320th F.A.

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There should be an additional Staff Officer in Tables of Organization for each Battalion Commander for liaison. This officer should have no other duty but Liaison. -R.H. McMaster, Colonel, 21st F.A.

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A D D E N D U M

To

ANNEX 9

Recommendations of Artillery Officers,

American E.F.

Received after the Dissolution of the

Board

LIAISON AND LIAISON OFFICERS.

Where possible artillery regimental P.C. with infantry Brigade P.C. : Artillery battalion P/C. with infantry regiment P.C. : Battalion liaison officers with advanced battalions of Infantry. -C.M. Bunker, Colonel, 308th Field Artillery.

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1. In those cases where infantry commander could be induced to use them to the limit the results were satisfactory. Their principal value was in getting accurate information back with speed. In three instances the information as to the progress of the infantry reached Division Headquarters through the liaison officer of this regiment before it come direct from the infantry brigade. In one instance the only wire communication that the infantry brigade had to the rear was over the line gotten out of the F.A. Liaison Officer. In another case the Infantry B.G. used a battery central for all his communications to the rear. In the third case the message travelled faster over the artillery net than it did over the special line laid by the signal Corps.

I strongly advocate greater attention to training in this work, both for officers and enlisted men; but all the training in the world will do no good if there is no reciprocation. Do not believe that a special school will do any great amount of good; an the schools tend to run too much to a set theory and become academic rather than practical. Affability and a "nose for news" will produce a better man for liaison work than any amount of special training. -M.M. Bush, Colonel, 134th Field Artillery

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Liaison officers on duty with infantry regiments and battalions should not be changed as long as artillery supports that regiment. There officers should be specially selected. --A.G. Fisher, Colonel, 307th Field Artillery.

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Liaison between the Artillery and the Infantry should be of the closest sort and should not stop with the ceasing of hostilities. Artillery and Infantry Officers must be constantly associated with each other and must make every effort to understand one another's missions. In combat the light artillery should send liaison officers with details of enlisted men to the infantry of which it is in support. Liaison between the light regimental commanders and the infantry brigade commanders can best be established and maintained by the closest association of the two commanders; namely, by the location of their respective P.C.'s at the same place. This may be impracticable on account of the disposition of their troops and the necessity that they be near their own subordinate commanders. In such a case, the artillery regiment must send a competent artillery officer with the necessary detail of enlisted men to live with the infantry brigade commander and establish and maintain perfect communication between the two commanders. Each light artillery battalion should have three artillery officers permanently assigned to the duty of liaison agents with the infantry. Each officer should have his own detail of enlisted men. Each officer should be assigned to a definite infantry battalion. Usually one infantry battalion is in line, one in support, and one in reserve. The officer assigned to the battalion in line should be with that battalion. The officer assigned to the battalion in support should be with the infantry regimental commander, the officer assigned to the battalion in reserve should be with his own artillery battalion commander. A change in the location of the infantry battalion should cause a corresponding change in the location of the artillery liaison officers. This plan allows the relief of the artillery liaison officers when the infantry is relieved and also provides for the periodical return of the artillery officer

to his own unit in order that he may keep abreast of all progress in artillery support. The Heavy Regiment should be in liaison with the Artillery Brigade Commander, generally by the location of its P.C. in the same place. In Addition the Artillery Officers which are with the Infantry as outlined above should be in communication with the lower units of the Heavey Regiment. The detail of an officer for duty in liaison with the infantry should be permanent and should receive the undivided attention of the officer so detailed. -C.C. Hearn, Brigadier General, 153rd Field Artillery Brigade.

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System is in general satisfactory, but it is proably better to run the lines from the artillery battalion to the infantry regiment. No artillery line should be run from the artillery battalion to the infantry battalion. To maintain this properly, requires an excessive personnel. This personnel could be more effectively used in maintaining a second line of a different route to the infantry regiment. The infantry should maintain the line from the infantry battalion to the infantry regiment. An Artillery liaison officer should be with the infantry battalion commander.

System of relay stations is only possible way of maintaining advanced lines a reasonable proportion of the time. It requires picked personnel, but has proved efficient in practice. A permanent battalion liaison detail should be trained, organized as part of battalion headquarters. The number of telephones allowed must also be greatly increased.

General tendency is to judge a system by the number of lines laid. The fewest lines which will give sufficient communication should be laid; but they should be maintained all the time. Maintenance requires a very large personnel, and consequently number of lines must be limited as much as possible. A.I. Henderson, Captain, 7th Field Artillery.

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I think the necessity of proper liaison is now better understood than ever before, and it must be realized by all the necessity for insistence upon the careful training of thes officers. Liaison officers should be furnished from the artillery with the infantry and should be consulted freely upon the use of the artillery, unless it should so happen that the Commanding Officer, to whom the artilelry liaison officer is assigned, is an officer experienced in artillery. -W.G. Price, Jr., Brigadier General, 53rd Field Artillery Brigade.

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Staffs of regiments should have at least seven liaison officers, lieutenants. Experience demonstrated that where a regiment was supporting an Infantry Brigade, it was necessary to have one liaison officer at the Infantry Brigade Headquarters and one at each Infantry regimental headquarters, and at four Infantry battalion headquarters. Liaison officers, to be of service to the Infantry and of value to the artillery, need special training and the detail of an officer who has not had such training is of little use. -G.A. Wingate, Brigadier General, 52nd Field Artillery Brigade.

HEADQUARTERS 180TH INFANTRY BRIGADE
AMERICAN E.F.,

December 9, 1918.

From: Brigadier General U.G. McAlexander, U.S.A.

To: Chief of Staff, American E.F.

Subject: Criticism of, and suggestions concerning, Liaison between Artillery and Infantry in War.

1. In the campaigns in which I have participated there has been a marked lack of effective liaison between Infantry and Artillery. There have been attempts made such as sending liaison officers from artillery regiments to the Infantry regiments and an occasional N.C.O.

2. The Artillery has established its own observation posts quite independent of the infantry O.P.'s and usually much futher to the rear. The information obtained by each was thus denied to the other except through circuitous channels and usually too late to be of any prictical value. Especially was this true in the late campaigns when many excellent fleeting targets were offered.

3. The remedy for these defects of liaison may readily be found by establishing combined infantry and artillery O.P.'s. Two of these in sight of each other and of the enemy front should be sufficient, under ordinary circumstances, for the brigade front for flash ranging and direct observation purposes. These two O.P.'s should be connected by telephone and one or both connected directly by telephone and lamp to light and heavy batteries in rear.

4. It is impossible to make the liaison too close between these two arms of the service and the artillery officer in the O.P. should be given more authority than he has ever had before to call for and get, practically instantaneous fire upon any enemy target. By the time a thing is reported under existing conditions of liaison, through the various channels until someone in a far-off rear office authorizes action, just so long will splendid targets appear and then vanish forever, untouched by our fire.

U.G. McAlexander,
Brigadier General, U. S. A.

HEADQUARTERS NINETIETH DIVISION
AMERICAN EXPEDITIONARY FORCES,

11 December 1918.

Memorandum for Chief of Staff.

1. The attached communication from General McAlexander is very much to the pointas regards his criticism of liaison or rather the lack of liaison between the Infantry and Artillery during the recent campaigns. On this liaison depend the lives of the ifnantry and the ability of a division to carry on the battle over a considerable period. His note, however, is so brief that it no more than touches on the difficulty and possible remedy.

2. It is necessary to distinguish between liaison and means of communication. When we were in the PONT-A-MOUSSON a sector an infantry observer spotted an enemy convoy one morning moving on the road towards NOVIANT. He reported by telephone to his brigade headquarters where the information was given to the artillery commander of the light regiment supporting the Brigade. The target was out of range of his guns so he reported it to the Divisional Artillery Commander. The target was also out of range of his heaviest guns so the word was passed on the Corps Artillery.

in our sector. The C.O. could not fire without authority from the Corps Artillery Commander to whom he telephoned for permission. By the time this permission got back to the guns the target had long ago disappeared.

This is an exaggerated case but illustrates the point: telephone communications were perfect but there was absolutely nonliaison between the observer and the guns.

There is another instance in which our artillery on a number of occasions has given the infantry valuable support, but chiefly because of good communications not good liaison. Regimental Commanders with the Brigade Commander and an artillery officer is with the leading battalion. There are good telephone lines from front to rear. The infantry is held up by machine gun fire from a string point. Brigade Commander tells his artillery officer to put fire on the strong point. This is done, the fire to continue until a definite hour when it will stop and the infantry advance. There is no great difficulty involved in this maneuver, and if telephone lines are good and the Artillery fairly competent, nine times out of ten, the Infantry will be able to continue their advance.

But, in the meantime, the advance has been halted for a period depending upon the state of the communications, the skill of the Artillery and the amount of fire required. This is not the "close Liaison" that we are seeking. What we want is immediate reaction of Artillery to Infantry needs so that enemy resistance will be forestalled and the advance continued practically without interuption. It is principally for this purpose that our G.H.Q. have been so insistent on forward guns and accompanying batteries. The idea, of course is to have the guns on the spot, to eliminate intermediate channels of communication and control and to attempt to anticipate infantry difficulties. In addition, there is the moral value of guns in action close to the infantry.

3. To secure what we commonly call "close liaison" between artillery and infantry and to have this liaison result in effective fire, three things must exist:

(a) Good observation by competent artillery personnel to give the target to the guns and to direct fire.

(b) Good communications between the observer and the batteries.

(c) Immediate authority at the front to give the fire requested by the observer. Intermediate channels must be eliminated.

4. Theoretically, there is no advantage in having mixed infantry and artillery O.P.'s so far as observation alone is concerned. Granted that the Artillery is competent, its observers are as anxious and as skillful as infantry observers in picking up targets which will help the Infantry. The practical advantage of mixed O.P.'s is that artillery brigades are not allowed by their tables sufficient personnel to establish the number of O.P.'s required, and , therefore, if there are infantry observers that can be made use of the situation will be very greatly improved. The fact that the artillery observation personnel is not sufficient is very just point for criticism and one which should be emphasized.

5. With regard to means of communications between the observers and the batteries and between the batteries and artillery and infantry commanders, there is not much to be said. It is, of course, essential and difficult in active operations, but is purely a technical question involving personnel and equipment.

6. The real solution of the difficulty involves, I believe, the idea of mixed O.P. 's in this respect: the Infantry part of the mixed O.P. should be given the authority for giving the fire - to the Artillery part of the O.P. the technical direction of the fire. The mixed O.P. 's which function in this manner will be of the greatest value, but the mixed

O.P. 's which are simply for observation will be of no particular value except insofar as the infantry personnel will supplement an inadequate artillery personnel.

7. The question of fire of opportunity differs somewhat on defensive fronts and during offensive operations when considerable movement is involved. On defensive fronts the matter is comparatively simple. It is simply a case of establishing sufficient O.P. 's and giving the observers authority to give immediate fire without going through channels.

During offensive operations in which there is considerable movement and the exact location of the infantry is uncertain at higher headquarters the situation is much more difficult. We have met with two principal difficulties.

(a) The High Command, for instance, the Division Commander, sees that his advance is progressing slowly or is held up; he receives scattering and more or less uncertain reports as to just where his infantry is and to just what their difficulties are. With his map before him he decides that certain points must be covered at once by all artillery immediately under his control and he gives such orders to his staff. The staff officer concerned does not dare take a chance on this fire. He calls up the Brigade (if the telephones are working), the brigade goes to the regiment and the regiment to the battalion, and eventually information as to the safety or value of this fire finds its way back to the Division, nine times out of ten, too late to be of any value. Checking up as to the situation of/infnatry at Division Headquarters is, of necessity, so slow as to absolutely prevent results in a moving battle. That this checking up is absolutely necessary is beyond question. In the course of one afternoon it was found that if the fire had been given as directed by the higher command we would have annihilated battalions of our own infantry on four seperate occasions. The same will be true, although perhaps to a less extent, of guns directed solely by the Brigade Commander.

It must, therefore, be recognized that guns which are held out for fire only on direction of a command as high as the Division or Brigade cannot be counted on for effective use except when the situation is stabilized for a period varying from one hour to several hours, depending upon the state of communications. An important question, therefore, is how much of the artillery avialiable should be held out. In my opinion very little - much less than the one regiment of howitzers of one-third of the divisional artillery, which is the customary amount.

I do not mean that the artillery avaliable should ireevocably be dispersed by assignment to the brigades and lower units or committed to missions from which it cannot be withdrawn if special need for a concentration arises. For this reason the number of forward guns and accompanying batteries must be limited. Also, guns too far forward lose excessively in horses and in case of counter attack become targets which must be defended and which, therefore, tend to limit maneuvering of the infantry. I do believe, however, that all the guns of a division, including the howitzers, should be put in direct support of the attacking infantry and the liaison be made as close as possible. This does not necessarily mean that the Division Commander gives away his reserve of fire power. The <u>forward move</u> of all guns (except forward guns and accompanying batteries) must be ordered <u>only</u> by the Division Artillery Commander. If this is done, communications will be uniterupted, touch will be kept with the mission ordered by the Division Commander.

(b) The infantry battalions meet resistance which they cannot overcome with their own arms except perhaps with annihilating losses. They have no artillery immediately on the spot, and because of the difficulty of keeping guns up with the infantry, they never will have sufficient with them to meet all situations. Undoubtedly guns and accompanying

batteries will save many situations and should be insisted upon. Where they are not sufficient, the Infantry must at present get word back somehow to Regiment or Brigade or even Division. So long as this arrangement continues Infantry will not get the support they need if they are to succeed without great losses.

Our most effective means at present for meeting this situation is the rolling barrage. For the break through of the enemy positions it is doubtful whether a more effective means than a deep rolling barrage will be found, although we have much to learn about observation and control of the barrage. Barrages, however, tie guns to a mission from which they cannot be withdrawn and involve an enormous ammunition expenditure. With "close liaison" many barrages can be eliminated for more scientific and less wasteful methods.

8. It is apparent, therefore, that what is needed in a moving battle is a combination of observation and direction of fire by a trained artillery personnel, and at the same time the authority to give fire at the front instead of at the rear. The control of fire must be moved from the echelon of division and brigades to the echelon of battalions.

In this respect I believe that General McAlexander's suggestion of mixed O.P.'s is very sound. The artillery personnel will observe and direct the fire; the infantry personnel will be qualified and authorized to call for fire from any and all guns at the disposition of the particular unit without going through higher authority. It is only in this way that we can secure immediate assistance for the Infantry and thereby have what we call "close liaison".

SCHOFIELD ANDREWS,
G-3

1st Ind.

Hq. 90th Division, American E.F., 13 December 1918 - to The Commanding Officer 165th Field Artillery Brigade.

1. For remark and recommendation.

By command of Brigadier General O'Neil:

E.V.D. Murphy,
A.C. of S., G-1.

Received 18 hours
14 December 1918
Hq. 165th F.A. Brigade.

2nd Ind.

Hq. 165th F. A. Brigade, A. E. F., A.P.O. 770, 21 December 1918 - To Commanding General, 90th Division, A.E.F., A.P.O. 770

1. My experience in command of artillery troops, in active service, has been extremely limited, but I am entirely in sympathy with the general ideas expressed in the enclosure. It must be remembered that the desires and decisions of the Infantry Commander are to be obtained not at his forward O.P.'s but at his P.C., consequently combined observation posts as proposed herein should not be confused with liaison between commanders.

2. It seems better to retiterate that were every observation post on the front line a combined post for artillery and infantry observers, tactical liaison would not be assured, since the transmission of information

between observers in snot so important as the communication of conclusions, plans and decisions from commander to commander.

3. It has been the experience of artillery observers in our own army, and to a greater extent in the French and British armies, that due to the difficulties of communication and the necissity for the transmission of very precise information, artillery observation posts must be situated so that (the essential requirement of good ovservation being met) there shall be the least possible amount of unnecessary noise and confusion in the vicinity. It is thought unwise to have important observation posts (from which fire is to be adjusted) in the infantry front lines, or even at infantry observation posts. It is the duty of the artillery observers to locate themselves so as to render the most effective service at the very time when the infantry is suffering the heaviest fire. This does not mean that artillery O.P.'should be pushed well up to the outpost's line of observation, but that artillery observers, even more than infantry observers, should avoid posts that draw fire.

4. Combining observation posts necessairly increase the vulnerability of the observation system and divides the responsibility for proper performance of duty. French artillery officers say that when they get into infantry O.P.'s they are usually told to get out of the way - (Decanpez l'artilleur). In view of the difficult conditions at the O.P.'s I cannot blame the infantry observers.

5. In my opinion, both the artillery and the infantry observers have been remiss in transmitting information to each other. This must be largely the result of lack of training since the French, from whom we copy our liaison and observation system, have much less difficulty.

6. The present liaison arrangements of the artillery provide a liaison detachment at each infantry regimental P.C. from the artillery battalion, or battalions that support the regiment, and it is considered good practice (I believe it should be compulsory) to send a complete liaison detachment to each infantry battalion P.C. from the battery or batteries that support it. To my mind this is a sufficient detail from the artillery personnel for liaison alone. It has been found extremely difficult to provide this many well trained officers and men.

7. The impression is conveyed in paragraph 2 (and justifiably I believe) that in some cases the artillery O.P.'s are not sufficiently advanced. This condition was improved as our artillery experience broadened, and in the November actions in advance of Montfaucon I found the artillery O. P.'s well to the front.

8. The information from important infantry O.P.'s might well be transmitted by direct line to artillery O.P.'s nearby, but I believe that this kind of liaison can be prescribed to fit special conditions only. Its development must be the result of much experience and constant training. The infantry observer would proably not be qualified to direct the fire of a battery of artillery on a fleeting target, but with proper liaison he might bring the target to the attention of a nerby artillery observer stationed so as to see the target. It is my understanding that such an infantry observer would not, as a rule, be empowered to direct the fire of an infantry company either.

9. I have been especially impressed with the fact, as our war experience has grown, both the artillery observation system and the guns have been pushed forward and there have come to be arrangements of one or more forward guns with observers only a few meters away who can order instantaneous fire on fleeting targets.

10. I feel that the Artillery has, in many cases, been lax in the performance of this important duty and that artillery observers have failed to comprehend and to meet the needs of the infantry. Our observers have also failed to transmit their information by the most direct channels to the neighboring infantry units. It is perhaps not unfair to say that the lack of close cooperation in this respect is no less the fault of one arm of the service than of the other, and that the best remedy would be to train the officers of each branch of the service to a fuller comprehension of the conditions, needs and methods of the other. It is hardly necessary to add that this training is possible only in actual war or combined maneuvers of large units. The difficulty cannot be met by the simple expedient proposed.

R.S. Abernethy,
Colonel, U. S. A.,
Commanding.

RSA/s

HEADQUARTERS NINETIETH DIVISION,
AMERICAN EXPEDITIONARY FORCES,

27 December 1918.

Memorandum for Chief of Staff.

1. It is believed that the suggestions and criticisms brought out in this letter are the reuslts of specific instances of failure on the part of Infantry Commanders, though the channels of their O.P.'s, to be in a position to bring a prompt and accurate fire upon more or less fleeting artillery targets, and do not arise from any defects in the present system of liaison between artillery and infantry command posts. It is apparent also that the letter is based upon conditions of static or stabilized warfare.

2. The problem then resolves itself into that of combining, with the greatest efficiency possible, - observation and fire.

3. The suggestion contained in Paragraphs 3 and 4 of this letter would, if adopted, add materially to the fire power of the division. Desiginated batteries of the supporting artillery should be considered as "batteries of opportunity". They should be directly connected by wire to the infantry O.P. The infantry O.P. should have as a part of its personnel an artillery officer who should have the authority to call directly on the battery or battaries assigned for fire on designated targets, adjustment of that fire by direct terrestial observation and fire for effect. In other words, he should have full authority to "shoot out the problem". The opportunities provided would ordinairly not be numerous, and during the time that the guns were not being used for the purpose above noted, they could continue on their normal missions.

E.H. Teal,
Lieut. Colonel, Acting G-3

3d Ind.

Hq. 90th Div., American E. F., 28 December 1918 - To the Adjutant General, G.H.Q., A.E.F.

1. In my opinion the best results are obtained when the battery commanders command their units from forward observing stations. The trouble with observing stations has been that the observers merely see without having authority to direct fire on what they see. The infantry commander on the spot should have authority to direct that artillery fire be placed on fleeting targets or targets that are obstructing the infantry advance.

J.P. O'Neil,
Brigadier General, Commanding.

GENERAL HEADQUARTERS
AMERICAN EXPEDITIONARY FORCES

15 August 1918.

MEMORANDUM ON THE EMPLOYMENT OF ARTILLERY LIAISON OFFICERS.

1. The function fo the artillery Liaison Officer, especially those attached to forward infantry units, is to act as the connecting link between the infantry commander with whom they are serving and the artillery commander whose guns support that infantry.

2. The primary duty of the artillery liaison officer is to keep his infantry commander informed of all measures taken by the artillery to support that infantry, and vice-versa, to keep the artillery commander informed of the location and action of the infantry and the character of assistance which they require or will require from the artillery.

3. The Artillery Liaison Officer should be prepared to give the infantry officer with whom he is associated the benefit of this special knowledge of his arm, and it would seem in the interest of all, that the infantry commander should, within reasonable limits, be guided by the counsel which he receives from his artillery liaison officer. Moreover, if the artillery liaison officer occupies himself fully with the work of interchange of information between infantry and artillery and in providing any necessary technical suggestions to the infantry commander his time will be fully occupied. He should not be regarded as an aide of the infantry commander and subject to any duty as such as may be imposed upon him. To send him off on various missions pertaining purely to infantry operations, as has been done in some instances, deprives him of opportunity of exercising his proper functions of maintaining close relationship between the two arms, and the endeavor should be made to leave him free to do this. He should, as far as possible, endeavor to maintain the most rapid system of communication between himself and the aritllery commander with whom he is linked. This may take various forms, either the laying of a zone telephone line or the establishing of a form of visual signalling, as well as a runner service.

Colonel, Field Artillery.

hph.

G. H. Q., AMERICAN E.F., (O.C.A.)

3d October 1918.

Memo. for the C. of A., A.E.F.

Colonel Cortlandt Parker, 6th F.A., was in this morning and talked very interestingly on his experience near Soissons during the recent operations.

(a) He was of the opinion that there was considerable needless sacrifice among the infantry troops. He stated that our men were absolutely fearless, even to a point of being incautious; that their method of attack on machine gun nests caused them tremendous losses; he stated that the 28th Infantry has had practically 100% casualties, and that the infantry of the 1st Division has had more than 70% casualties among field officers, and very close to 50% enlisted casualties.

(b) He talked considerably about the so-called "open warfare", stating that in his opinion there would be open warfare but it would be warfare between well defended and well organized positions which in time would have to be taken by all of the means at our disposal He stated that his view was the generally accepted view at the front; that the infantryman believed implicity in the artill ry, and though at times he got away from it yet it was pretty clearly understood that when a hard nut had to be cracked the artillery of all calibers would do the work.

(c) Colonel Parker states that the congestion on the roads was simply indescribable; the roads were jammed with vehicles of all kinds, with men going in both directions; he noted the ammunition trains, evacuation of the wounded, the bringing in of supplies, etc., etc. He noted particularly that there were very few vehicles off the roads, and stated that the tank was about the only thing except men and animals that made any progress to speak of across country.

(d) He stated that the field artillery must have horses; that the losses of horses are termendous, and that this form of transportation is the only satisfactory one, in his present knowledge, for premitting artillery to keep anywhere near the infantry. He was interested in the subject of caterpillar vehicles, and urged that this question be taken up immediately; he doubted whether the Ordnance Department could produce a satisfactory substitute for the horse, but he wanted experiments conducted without loss of time. He appeared to be interested in the caterpillar-carried project, but didn't know very much about it. I told him that some one had said that war was a question of transportation, and this seemed to strike his fancy as he agreeded with it and enlarged on the difficulties he had recently experienced.

(e) Colonel Parker spoke of the difficulty of liaison in attack; the attached pencil sketch was made by him to illustrate the plan he had adopted. He states that in attack it is largely a matter of runners, and that even the most careful plan of telephone, flag and projector liaison will surely break down.

(f) He informed me that very little gas was used by the Germans in their opposition to the progress of the First Division; considerable shrapnel and high explosive shell were used. Bombing by airplane was serious; Col. Parker lost his regimental surgeon who was with the echelon about six miles behind the front line.

W.I. Westervelt,
Brigadier General, N.A.

H/

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W.I. Westervelt,
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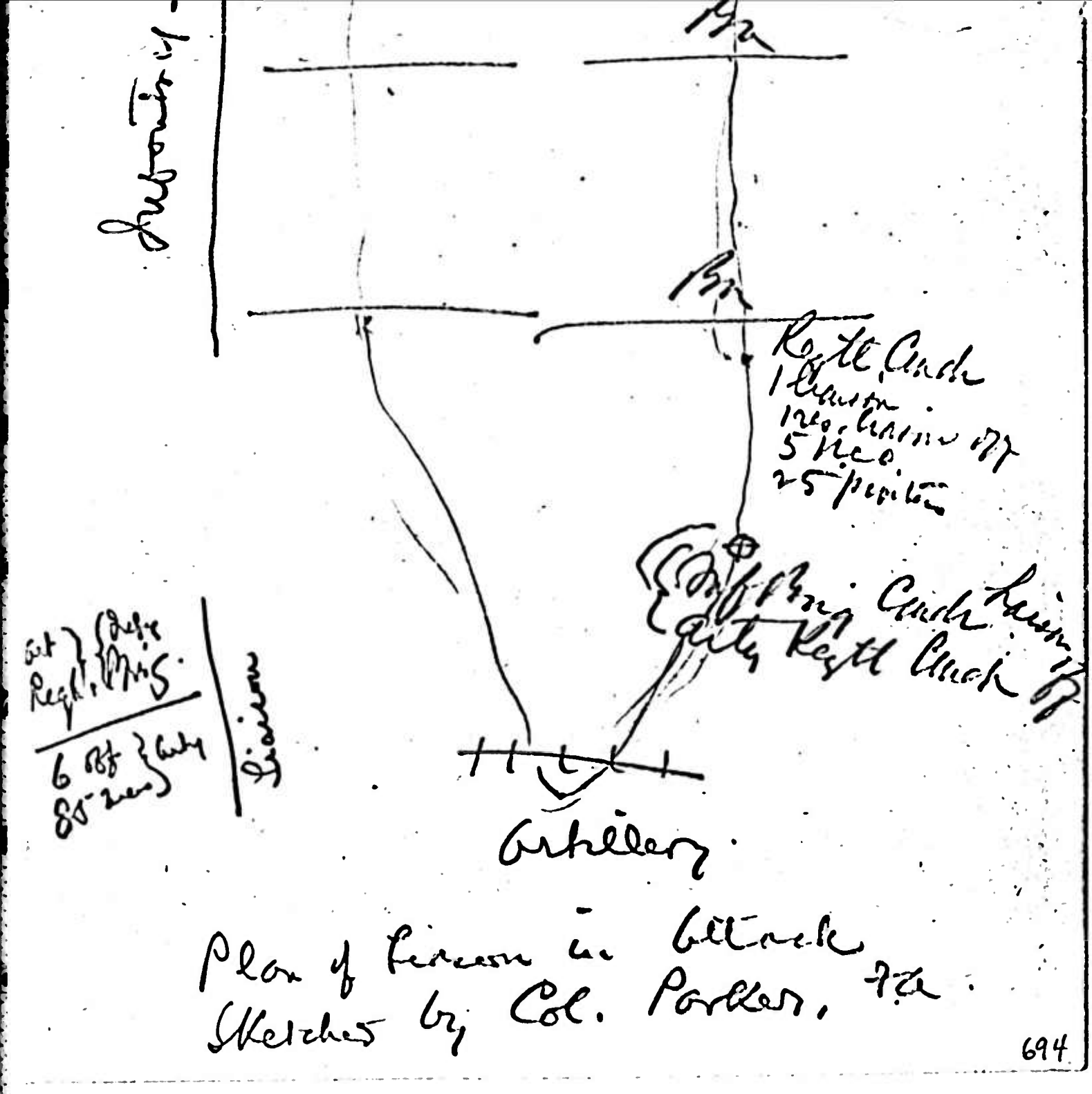
Regt. Cav.
1 Gun
12 Gun Carr
5 Rec
25 pieces
Regt. Cav.
Regt. Cav.
Regt. Cav.

ANNEX 10.

Recommendations of Artillery Officers

American E.F.

ACCOMPANYING GUNS AND BATTERIES.

J.

ACCOMPANYING GUNS AND BATTERIES.

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I am absolutely oppesed to the principle of the accompanying gun or battery, though I have on several occasions given the idea a fair trial, with the honest intent of determining if any advantage could be gained thereby.

In practically every case the guns thus detached have been taken forward with great labor and generally with some loss, to report to an infantry commander who was then unable, due to the fact that he was entirely absorbed in the fighting of his unit or through lack of knowledge of the employment of artillery, to indicate to the guns the targets upon which they might effectively fire. They were consequently totally neglected by the infantry commander.

The object of these guns being close support of the infantry, the lack of knowledge of their use coupled with the lack of knowledge of the local situation on the part of the officer in charge of the guns, prevented them from rendering any service, while their removal from the mass of guns under the command of the Division Artillery Commander thinned the barrage and diminished his ability to produce effective concentration upon enemy organizations.

On on occasion the fact that only five batteries out of six in one regiment were firing in a barrage, and that this barrage was consequently too thin to afford the necessary artillery protection for the infantry advance, was noted and commented upon adversely by an inspector. He did not state, however, that the missing battery was detailed as an accompanying battery and had consequently not been able to get into effective action.

As a principle, the Division is a team endowed with certain infantry and artillery to operate together. The quota of artillery in a division is even now too small (4 light guns per 1,000 infantry, as compared with the French 5 guns per 1,000 infantry) to afford effective support in an advance.

The best and most effective method of employment to obtain the necessary team work is the collective use of all the artillery under the Division Artillery Commander.

He is moreover, provided with an information system which enables him to employ this mass most effectively, whereas, the use of the accompanying guns under the direction of a local infantry commander or of a junior officer artillery, without an information system, cannot possibly permit of the attainment of the highest efficiency from the guns.

The principle of the accompanying gun has been discarded in all armies but our own. Substitutes therefor have been sought in the forme of the Stokes mortar, 37 m/m guns, and the tank. The latter seems to be, at the present time, the best response to the demand for the accompanying gun and it, even more than

the infantry, demands the collective support of the artillery behind it for the neutralization of hostile artillery and anti-tank guns.

The foregoing, however, is not to be interpreted to forbid, in a prepared offensive, the stationing of batteries or of single pieces for special surprise fire upon known enemy organizations, such as machine guns, anti-tank guns and the like. Such targets, when their location is known, may often be surprised and totally silenced.

The objection is the detaching pieces to accompany infantry in the vain hope of finding suitable targets and being able to fire upon them. -D.H. Aultman, Brigadier General, Army Art'y., 2nd Army.

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At different periods this Brigade had from one to four batteries with the Infantry Brigades as accompanying guns, almost invariably with no results. Infantry Brigade Commanders have neither the training, nor, what is more to the point, the time to give to handling artillery in action, and unless the terrain is excedingly favorable, the accompanying guns cannot get sufficiently far forward to do the work contemplated without being annihilated by an active artillery defense. The undersigned is of the opinion that the use of the accompanying gun is very much overrated, and that it is a needless sacrifice of artillery. The maximum that should be indulged in is not to exceed one paltoon with a regiment, of which only one gun should be with the advance. If this gun properly performs its duty, it will almost surely in a short time be out of action, and the second gun could then be sent forward. -E.B. Babbitt, Brig. Gen. 4th Brigade.

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With a very few exceptions the results coming under my observation were nil. Lack of results was always due to one or both of:

Lack of aggressiveness and judgment on the part of the Field Artillery officer in command and failure on the part of the infantry to afford proper facilities for their use. The only remedy I know of, is training for both artillery and Infantry officers in this respect. -H.C. Bishop, Brigadier General, 3rd Brigade.

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No general rule should be laid down for this subject. Accompanying guns, batteries, battalions or regiments should be furnished by the divisional artillery commander when the tactical situation demands it. A division usually has its own mode of fighting learned principally by experience in battle. Whereas general rules regarding accompanying guns and batteries may be furnished for the beginner. Yet these rules should not be obligatory but each artillery brigade commander should be held responsible for the fighting of his own guns.

Much has been said about accompanying guns. When an artillery commander is not sure of himself or of his organizations he passes the buck by dividing his command. A light regiment and sometimes a part of a heavy will be assigned to an infantry brigade commander. The infantry brigade commander in turn will split up the artillery and divide it among his regiments. The reigments often again split the outfit and assign the guns to battalions. The unity of command power of the arm are lost. The idea of accompanying guns is

really to build up the confidence of the infantry by the actual presence of the guns themselves. What is really needed is accompanying fire and not accompanying guns. When artillery is wanted it is usually wanted with a punch. Such a punch can not be obtained from a few guns. A staff officer of G.H.Q. was heard to remark on November 1st, "I saw many cases where accompanying guns would have been extremely useful." I might supplement this remakd by stating that I have seen many cases where I would have been pleased to have drawn a 42 centimeter out of one hip pocket and a G.F.F. out of the other. The problem that confronts any artillery commander is, there are a fixed number of guns to be employed, how is it best to employ them. Experience in this country has shown that guns on wheels drawn by horses as a rule can not follow the infantry, except by movements on the roads. Cross country work as a rule, has not been possible due to mud, trenches, wire entanglements, steep slopes and streams. In many cases when the accompanying guns were seen by the enemy, horses and personnel and the carriages themselves were destroyed by enemy artillery fire. In a general attack where the infantry follows the barrage the possible accompanying guns will be found in tanks, Stokesmortars, 37 millimeter guns, and possibly in mountain guns packed on mules. In some cases the tanks can not go forward on account of the terrain. In all cases the infantry can make use of the Stokesmortars and 37 millimeter guns. If the enemy is in sufficient strength and is determined to hold and the infantry by means of its own rifle, and machine gun fire, accompanied by the use of its Stokesmoters and 37 millimeter guns can not make the advance then there is but one thing to be done and that is reorganization of a seperate attack with a preliminary bombardment followed by a thick barrage and the taking of the local place. Experience with the 2nd Division has shown me that the infantry can be make to depend on the strength of its own arms. They can be made to use the Stokesmortars and 37 millimeter guns. Machine guns should not be held in reserve but should be shoved forward and concentrated on machine gun nets of the enemy that have not been overcome by artillery fire. -A.J. Bowley, Brigadier General, 6th Corps Art'y

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Recommend that the divisional artillery of each division be equipped with a certain number of guns specially adapted for service as accompanying guns. The 75 m/m gun of the divisional artillery is not adapted for the work of an accompanying gun. In the first place, it is not sufficiently mobil. To draw the gun by horses for this purpose is out of the question. Even if moved by men it is almost always necessary to move on roads. It is believed that the failure of the accompanying gun as an institution in the operations of this place, thepresent 75 m/m gun is very vulnerable target. If placed behind a crest, it cannot deliver direct fire and therefore fails in its mission. If placed in the front line trench, its approach cannot be concealed nor its position camouflaged. Being easy to locate by the enemy's artillery, one pounders and machine guns, it is soon rendered hors de combat.

Accompanying guns must be capable of being dismounted into pieces capable of being carried by men on foot. This requires that the gun as a whole be light. Inasmuch as the range of an accompanying gun is never more than three thousand meters the tube may be quite short. If it is impossible to design a tube light enough to be carried by one man, it can be transported by two men on a carrier in the nature of a stretched. The same may be done with the trail.

It should be mounted on small wheels so as to enable its being set up in minimum time.

It is believed that only such a gun as has been described can really accompany infantry in its advance over shelled terrain. Due to its small size, it can easily be concealed in a clump of bushes or a shell hole until the moment it is used. Once having fired a mission it can be quickly taken down and removed, before hostile artillery fire finds it. It is believed that a division should be equipped with at least one such gun for each infantry battalion. -Leo Brewer, Captain, th Corps Art'y.

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1. Complete report of accompanying guns and batteries was made from this Brigade to the Chief of Artillery, First Army, under date of 26th November 1918. -J.H. Bryson, Brigadier General, 155th Brigade.

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The value of accompanying guns and batteries will depend upon the nature of the resistance encountered. If the defense is weak, being conducted by troops a low morale and poorly equipped, and just waiting for an opportunity to break, then the accompanying gun will often afford that excuse; also when time is avaliable for the single gun or even battery to come into action aganist a building or a machine gun nest which has been located then the gun will be of value. But when the defense is desperate with numbers of machine guns which can be quickly put into action and fought to the last, with skill and determination, I believe that a single gun ceases to be a benefit, and becomes a menace to the Infantry, especially if the Infantry has confidence enough in it to halt while the gun is being emplaced and wait till the gun does its work. To my mind, it is very much better to let the gun stay in position and do its work and to use every avaliable means to keep rapid and positive communication between a battalion of 75's and one of 155's which are in place and which can be instantly put on the target and an officer up with the Infantry, who can conduct the fire and quickly smash machine gun nests than it is to waste several minutes if not hours trying to get a single gun into position which when it gets there is of little more value aganist a target at 3000 meters than the Infantry 37 m/m. -H.W. Butner, Brigadier General, 1st Brigade.

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No definite rule or principle should be enunciated with respect to this subject. Each situation should be considered upon its own merits and the mission involved should always be accomplished with the best means avaliable. -Army Center of Studies.

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In rare cases it is useful to use accompanying guns or batteries, and such cases should be left under the control of the artillery brigade or regimental commanders and never sent forward until opportunity has been given for a thorough reconnaissance. Albert L. Cox, Colonel, 113th Field Artillery.

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It is thought that the artillery weapons to accompany the advanced infantry units should consist of individual guns with the necessary extra equipment, and that the organization and equipment tables should provide for each regiment the necessary excess to equip four guns to be used when desirable as accompanying guns. -R.P. Davis, Brigadier General, 151st Brigade.

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My views and recommendations relating to accompanying guns are briefly as follows: In place of the trench mortar battery I would organize a special accompanying gun battery so selected personnel, twice the number of highly qualified non-commissioned officers with such extra telephones and other equipment as would permit each gun to be fully operated as an independent command, with amply personnel replacements. They would be trained for accompanying gun duty, and four such guns would permit one gun each to be assigned to the advance battalion of each regiment of infantry, when the two infnatry brigades are in line, regiment being side by side. Where one brigade only is deployed, two accompanying guns could be assigned each reigment on the line. Their special training would be such as to expect a breaking up of the unit. It could be organized for cooking and forage facilities to specially meet the difficulties of these supplies, and it would futher prevent the disorganization of other artillery units to meet the very special duties which the accompanying gun must perform. The 75 mm is not suited very well for use as an accompanying gun. It is too heavy to get quickly over soft, wet, ploughed fields, and its principal use will take it largely over such terrain. Futher, the horses not only offer a large target, but introduce tremendous forags difficulties where the gun is separated from its battery. I favor the 75 mm mountain gun for such use, transported to the vicinity where it is to be used by motor truck which will carry the personnel and ammunition, the gun to be manhandled by drag ropes when taken from its truck. Ammunition could be put upon small limbers to be dragged also. We must expect no help in man power from the infantry. Past experience on the lines showed that they simply would give up none of their personnel to help. This actual condition will demand a large detachment to manhandle the gun and proably an extra truck to carry them and extra ammunition. As a matter of fact if the accompanying gun were a 75 mm mountain Maxim Vickers, such as we had issued in 1901 with

shafts, if could have been taken anywhere by a single mule, the ammunition problem then being the great one; this could proably be settled in such a case by the use of a light limber with a single animal. As a rule, experience indicated that a single battery, maintained in place in the battalion where it could function with the other batteries when needed with them, was a better arrangement for an "accompanying battery", than detaching one entirely from the artillery command. When detached, its value is largely wasted. Accompanying fire could practically always be delivered from the battalion position. -C.J. Deems, Colonel, 57th Brigade.

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Accompanying guns in the sense of actually accompanying the infantry are a total failure. This regiment has lost the services of as many as four guns during an entire attack due to being sent on such missions and being demobolized and rendered incapable of action at the beginning of an operation and before firing a shot. The horses and men have invariably become casualties. A section or platoon is too vulnerable a target for such duty. They are either caught in the enemy's counter preparation or knocked out by machine gun fire. Horses are always scarce in a campaign, difficult to replace and should not be wasted in this manner. No artilleryman objects to the loss of men, animals or material if there is a commensurate return for this loss but when such are thrown away as is always the case with accompanying guns such loss is in my opinion absolutely unjsutifable. This duty can be more efficiently performed by either large or small tanks or by the infantry's own special weapons the 37 m/m gun or Stokes mortars. The accompanying gun has no function aganist an active enemy well equipped with machine guns and artillery. Artillery should accompany by fire, not otherwise. No statements made here are to be interpreted in any way to mean that artillery should not push forward agressively in support of its infantry. -W.H. Dodds, Colonel, 6th Field Artillery

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Accompanying Guns

I think we are all agreed that used with judgement such guns are valuable.

Accompanying batteries.

I am convinced that in rapid forward movements that such batteries should be used. An entire battalion takes up too much road space.

The accompanying battery can be split into platoons and can "fit in" to raod space and suitable positions, and shorten up liaison, and in other respects is much more flexible than a battalion. Its liaison should be first of all with the front line infantry battalion and its O.P., next with the front line Infantry regiment and last of all and not at all if operations are "slowed down" with its rear communications save that of munitions, rations are forage. -P.C. Doyle, Colonel, 305th Field Artillery.

I am firmly of the opinion that the troops can be better protected by accompanying fire under competent artillery command rather than placing the guns under command of an Infantry commander. -R.H. Dunlap Colonel, 17th Field Artillery.

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I do not believe the use of accompanying guns and Infantry battereis to be good tactics. -Q.A. Gillmore, Colongl, 112th F. A.

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The subject of accompany guns and batteries has called for a number of varied ideas and principles. It has been found in this regiment that accompanying guns, platoons and batteries, can, in the attack perform invaluable service if properly employed; on the other hand if put under the control of infantrymen ignorant of the uses of artillery, and unwilling to utilize the technical knowledge of the artillery officer should be at all times in direct command of these guns, platoons, or batteries, then the asssignment of these to this duty is considered worse than wasteful. Depending upon the tactical situation, which should be designated by the artillery Regimental Commander, a reving piece and accompanying platoon or even battery under the control of an energetic, resourceful and efficient artillery officer, might well be assigned for forward work with the most advanced elements of the infantry. The officers in command of these units should be given the greatest possible latitude and freedom in the use of their artillery. They should have at all times that closest of liaison - the personal contact with the infantry commanders of the units to which they are assigned, and these commanders should be fully acquainted with the proper functioning of the guns assigned to them by no less than the Regimental Commander of the artillery from which the guns are detached. The infantry commander should not be permitted to have the guns assigned to him unless he fully understands their powers and their limitations, or is always willing to accept the judgement, complete, of the officer detailed to command the guns; and futher, that he were willing to make some sacrifices himself to assist these guns in accomplishing their missions, for it has been found that in many cases such guns were not permitted to fire beacuse of the fear of the infantry that they might in return draw fire, or give away the position. On this the P.C. of the infantry commander, while he was planning attacks, the reduction of strong points or the destruction of machine gun nests, would be able to point out certrain places where his guns would be invaluable assistance, and could futher be able to render service that, from the Regimental positions, it would be impossible to perform.

Under any other conditions than the above, it is considered that these guns and batteries should not be taken from the Regiment for the majority of cases other than rendering valuable moral support to the infantry, they have been found to have performed but little service that could not have been rendered by the Regiment, or by the infantry one-pounders had they been properly employed, and at the same time have deprived for long periods the Regimental Commander of the power of their concentrated fire.
-B.St. J. Greble, Jr. Colonel, 76th Field Artillery.

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It is recommended that the work of "accompanying guns" be accomplished by an intelligentuse of the 37 mm. gun. Companys should be formed in each infantry regiment and given a course of instruction which will best fit them for this mission. -G.G. Gatley, Brigadier General, 67th Field Artillery Brigade.

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This phase of preparation for open warfare is believed to be extremely important, and every opportunity should be taken to perfect both the Infantry and Artillery in this from of combat. -Ira A. Haynes, Brigadier General, 64th Field Artillery Brigade.

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"Accompanying guns" and "accompanying batteries" seem to be merely terms incidental to the war of position suddenly converted into a war of short movements, and it is believed they have been a part of F.A. instruction under the regulations for years.

The fact of losses to artillery accompanying infantry closely seems to have been an undue influence in the last campaign and not unhesitatingly accepted as a part of the game. The attention of the board is invited to an article published in the "Infantry Journal" in 1912 entitled "Artillery Support to the Infantry Attack". It will be seen by a list of references at the end of that article, that close physical accompaniment was simply at that time a part of sound Field Artillery doctrine. It will also be noted in that article that the mountain artillery gun was advocated for use as an accompanying gun.

The moral support to the infantry of the physical presence of a light artillery weapon is incommensurate, in value, to the losses sustained by the artillery. -T.N. Horn, Brigadier General, 7th F.A.

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Accompanying guns and batteries was always a failure and always will be. It has been tried for years by French, British and Germans and always with the same result - failure. This is nothing but what can be expected. Artillery cannot fire unless it is in position. It offers too good a target for any man with a rifle or machine gun to let by. The bravest and coolest officers and men tried without success. It takes artillery out of action that could be firing effectively if it were in position. Why not use the heavy tanks carrying 75's for the same purpose? They are armored and have a reasonable chance of getting where they can fire effectively. It is the proper function of the heavy tank. They can go any place that a horse can go.

If an attack goes, no accompanying guns are needed. If it does not go, you will be much better off with all your guns in position. If a part of the line is held up by a nest of machine guns, it is very likely that it wont be near the accompanying guns. Put all of your guns in position as close up as you can haul ammunition. Get observation as close up as you can. Have close liaison with the infantry you are supporting and have one battery ready to answer any call of the Infantry immediately. Be ready to move one battalion forward as the attackers approach the limit of range. This is the answer to the accompanying gun question. The artillery will support its infantry much better in this way than by trying to move along with the Infantry. It will not in-

Ex. Asst. Chf. Engr.

A very interesting report by our efficient
lent. man Lt-Col J. Kennedy

I have recently seen much upon
against found type & in favor of found
O. P. in type. All of this of course
based on the assumption that there is
no difficulty with communication
and hinderance of fire over long lines
O. P.'s must displaced. Such assumptions
are unsound. Conclusions cannot be
hastily drawn from generalities of the
Lt. Kennedy sets forth, - or again from
the hair-raising experiences of your
officers of a few months particular
experience. The tactical handling of ar-
tillery is not a simple question, nor
one to be decided by artillerymen
alone.

J. M. McNair

12/26

Accompanying 8 encls.

crease the moral of the infantry and for them to see a part of their artillery, whose sole duty is to support them, put out of action soon after they jump off. Use tanks to accompany infantry for moral support, if they need it, which they seldom do, and use artillery to support infantry with effective artillery fire, which they always need. -J.T. Kennedy, Lieut. Colonel, 5th Field Artillery

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1. The two occasions on which the Regiment was asked for Infantry Batteries as accompanying guns were at the Vesle River and in the St. Mihiel Salient. I was familiar with both incidences, being with the Battery for a part of the time at both places, and my opinion on the subject coincides with that of Captain Pautot who commanded the Battery.

2. At the Vesle the Infantry knew nothing of the wherabouts of their first line and when at night we went into position where they said they would be we found in the morning that we were in advance of their front line. They never gave a mission which did not first come thru my Regular Infantry D.O.L., although Captain Pautot was with the front line Commander and on account of better concealment and better liaison, I gave most of the mission to the other Batteries and delivered fire with much more prompt and efficient service. I had a better idea of the manner of attacking the various targets than did the Infantry Commander. Captain Pautot had great difficulty in getting the least cooperation, while my several D.O.L's, and O.P's, kept me constantly informed of the needs of the Infantry.

3. At the St. Mihiel Salient, the night before the drive this same Battery in two Groupes of one Platoon each occupied a position in the front line with the Infantry Commander. The Advance was so rapid that the Infantry did not call on their Battery but kept them in the same position so long that whtn they finally wanted artillery fire, I received the order myself in the front line and executed the demand with the other Batteries of the regiment, which had progressed from 1500 meters to two kilometers behind the front line, and the accompanying Battery did not get up until the next morning, although they had followed the instructions of the Infantry Commander.

4. My solution of the proper support of Infantry by light artillery is to have the artillery well echeloned in depth with the foremost unit as near the front as cover for indirect fire will permit, if this is possible, and not to exceed 1500 meters behind. Have an efficient D.O.L. with the Infantry and all Battery and Battalion commanders in the front line or in places where they can direct the fire by observation. Well observed indirect fire by a well trained officer even with the difficulties of telephone communication, (which in every case in this regiment we have been able to overcome) is better, more accurate and much more dependable than direct fire which must be largely left to the gunner especially as that gunner if he is in a position to fire direct, is usually under fire of machine gun and artillery.

5. At the Ourcq this regiment successfully maintained telephone liaison and each Battery was directed in its fire from the Advanced

Infantry Command Posts, some of them which gave the best results being within 300 meters of enemy machine guns, while the Batteries were under cover from 1500 to 4,000 meters in the rear.

6. I respectfully refer you to General McCoy and General McArthur as to whether the plan of D.O.L's. in vogue in this regiment has not solved all the problems that confronted them on those two occasions.

7. Until Infantry Commanders are required to take a course in Artillery Schools, I do not think there is any advantages gained by turning the personal direction of guns over to them. I believe, however, that the average Artillery Commander remains to far in the rear and depends too much on maps when he should be with the Infantry needing his help and directing his fire from there.

8. Telephone liaison is as dependable as the average gunner firing from a direct fire position or trusting to bring limbered guns into full view of the enemy. I believe that well trained Infantry D.O.L's authorized to call for and direct fire, taking advantage of the various means of communications and keeping the guns in well advanced positions with Battalion and Battery Commanders in positions of direct observation, liaison, etc., is the solution of a proper Infantry support. -George E. Leach, Colonel, 151st Field Artillery.

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In defensive positions a forward guns can be used with excellent result when directed aganist a specific point or when guarding a passage. It is also believed that advance guns can be effectively used as a defense aganist tanks, in every case a well concealed and well protected position should be selected and prepared beforehand. On the offensive and in advances this regiment has repeatedly sent forward advance guns under efficient erable and the net result was nil. -C.R. Lloyd, Colonel, 10th Field Artillery.

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The following brefly summarizes the reports of Battery and Platoon Commanders of various units of Field Artillery which acted in the capacity of Accompanying Guns. These reports were made in reply to a letter sent from these Headquarters with the purpose of securing the experiences of units which have been employed in the above capacity. This summary is intended as an index to make more accessible the information contained in the letters from which extracts are taken and which are on file at Headquarters Army Artillery, 1st Army.

There exists some confusion in regard to the terms "Infantry Batteries" and "Accompanying Gune." In these reports, some officers have considered them one and the same thing while others made a distinction. The Field Artillery Drill Regulations 1916 define Infantry Batteries as "those assigned to the direct support of the Infantry, assisting it by firing on hostile infantry, by opening breaches in the enemy's line, or by otherwise facilitating the advance." Thus, all Divisional Artillery falls under the Classification of Infantry Batteries.

"Accompanying Guns" are also contemplated in our Field Artillery Drill Regulations. The normal employment, however, contemplated only an ACCOMPANYING FIRE. Their actual forward movement was only contemplated when by such ACTUAL MOVEMENT FORWARD a DISTINCT ADVANTAGE could be obtained or the MORALE of our infantry MATERIALLY STRENGTHENED.

The present employment of "Accompanying Guns" grew from the use which the Germans made of them during the Spring and Summer Offensive of this year. Due to the flat trajectory of the Field Guns (Rifles) the Germans insist that the proper use of the Accompanying Gun contemplates a mission which has for its purpose the breaking down of hostile resistance by shelling at close ranges over OPEN SIGHTS (DIRECT LAYING), (Tanslation German Document "The Attack in Position Warfare," as. 749, see pp. 36-T, page 9.)

The German and Allied Armies have in General made the following dispositions with Accompanying guns:

1. Those guns which are placed in position under cover and which do not open fire until shortly before the attack or even after the Infantry has begun its advance.

2. Those "hitched in " Batteries which are attached to the Infantry in attacks of considerable depth and which do not even take part in the Creeping Barrage. They are intended to go into position when necessary to engage isolated defensive points, machine guns, and tanks, directly at close ranges, and to repel enemy counter-strokes.

ADVANTAGES.

1. MORAL SUPPORT GIVEN TO OUR INFANTRY.

(a) Exhibit 1, par. 2, p.1

The Infantry were most enthusiastic in their praise of the Battalion and added that with such artillery support they could "Go through Hell." ---Col. O.L. Brunzell, 313th F.A.

(b) Exhibit H, par. 9, p.8.

"The Infantry seemed very glad to have us so close and appeared reassured by our assistance." ---Capt. Theodore Marks, 129th F.A.

(c) Exhibit H, par. 2, p.2.

"In my opinion nothing was accomplished by the forward movement of the Artillery with the Infantry that could not have accomplished from positions futher back save for the moral effect upon the Infantry." . ---Major John Nash, 313th F.A.

(d) Exhibit E, par. 3, p.3.

"In my opinion the main advantage of this sort of work is the moral effect on the Infantry. Battery "E" in the action referred to occupied a position which was impossible to reconciter the previous day and which was such a sensitive point that operation of the battery was seriously hampered." ---2nd Lt. Donald Fullerton 313th F.A.

2. SUCCESS ATTAINED IN SOME CASES WHERE GUNS HAVE PUSHED FORWARD.

(a) Exhibit E, par. 10, p.1.

"When visibility became good, excellent results were obtained in fire on ADEVANNE in which town machine guns were holding up the advance."
---Major John Nash, 313, F.A.

(b) Exhibit F, Far, 2, p.2.

"The left of our Infantry having fallen back to and in rear of the position occupied by Lieut. Peppard's battery, this officer, in the face of direct fire from the enemy guns in VILOSNES, and while at the same time under heavy fire of German artillery to his left flank, moved two of his guns forward by hand to the crest of the ridge and with direct fire put out of action the enemy guns located in the town of VILOSNES. These guns having been silenced our Infantry soon advanced. "
---Major F.J. Dunigan, 313th F.A.

(c) Exhibit F, par. 4 p.3.

"Upon investigation it was found that three (3) direct hits had been made on the gun, one hit on the observation station immediately to the left where the German observer was found dead, and nine (9) holes within a radius of twelve (12) yards."
---Lt. Col. O.L. Brunzell, 313th F.A.

(d) Exhibit D, par. 3, p.1.

"Put one gun into position on the crest of the hill and opened fired with direct fire on German Guns located behind VILOSNES. On account of Infantry falling back on our right, put another gun into position for direct fire on SIVRY-s/NEUSE."
---Lst Lt. Joseph G. Preppard, 313th F.A.

(e) Exhibit A, par. 2, p. 5.

"The Infantry then pointed out about six machine gun nests in the hollow below (S. E. or DANNEVOUX). The guns cleaned out the nests and our infantry shot those machine gunners who ran and were escaping our shells." ---E.F.A. Morgan, 31st F.A.

(f) Exhibit H, par. 2, p. 4.

"From the condition of enemy wire and the condition of his positions there was evidently no previous artillery preparation and I have knowledge of having received artillery support only upon two occasions: at 4:00 P.M. November 9, and from 8:00 to 9:30 A.M November 10, the first time being on MORANVILLE, and the second time on GRIRAUCOURT. I do not know what batteries were used, but the fire on these two occasions was very effective. " ---T.C. Tilghman, Major, 332nd Inf.

(g) Exhibit H, par. 2, p. 7.

"I called for a barrage on the PETITE COGNON WOODS where my left Co. was held up by machine gun nests. The barrage lasted 15 minutes. Directly after its cessation my left Co. advanced rapidly through the woods with little opposition." ---Capt. M.B. Anzell, 321st Inf.

(h) Exhibit H, par. 2, p. 10.

"It reduced the machine gun nest at MORANVILLE and enabled the infantry to take that place, which was strongly defended with barbed wire entanglements, a small stream and bogs." ---Capt. Spencer Salisbury, 129th F.A.

(i) Exhibit H, par. 3, p. 14.

"At this point an Infantry Officer brought information that the houses under fire contained machine gun nests which were preventing our infantry from advancing at that place. Fire was instantly concentrated on the two houses, both shrapnel and high explosives being used. ---Lst Lt. Francis G. Walthew, 129th F.A.

DISADVANTAGES.

1. DIFFICULTY IN MOVING GUNS OVER VARIOUS TERRAIN AND IN KEEPING UP WITH INFANTRY

(a) Exhibit C, par. 1, p. 1.

"The Infantry went over at 5:30 A.M. and at that time I started from the outskirts of ESNES, I was not closer because the bridge at SETHINCOURT was out and there was no way to cross until one was put in." ---1st Lt. John A.D. Penniman, 313th F.A.

(b) Exhibit B, par. 2, p. 4.

"The ordinary troubles with the accompanying guns arise from the difficulty of keeping in touch with the Infantry front line, of maneuvering guns and caissons with six horse teams in the day time on roads on which the enemy guns are accurately adjusted and which could not be reconnoitered beforehand, and of putting guns into position, laying them, camouflaging them, and maintaining an ammunition supply, and of maintaining an .O.P. with the heavy wire issued. These disadvantages indicate that in nearly every instance much more effective work can be done from guns already in position, laid and registered, and with plenty of ammunition, advancing the observation post rather than the guns. It is seldom that guns of this size can be put in a position where direct fire can be used, and its advantages are not remarkable." ---Capt. R.W. Perkins, 313th F.A.

(c) Exhibit A, par. 1, p. 4.

"I halted the column just south of BETHINCOURT where we waited for an hour until the bridge was finished. Even after the bridge was through, there was great delay due to the almost impassable conditions in BETHINCOURT." ---1st Lt. E.F. A. Morgan, 313th F.A.

(d) Exhibit H, pars. 1 and 3, p.8.

"Although moving forward as rapidly as possible, it was impossible to keep up with the Infantry on account of the condition

of the roads."

"There was only one road on which we could move forward and it was in very bad condition. It was torn with shell holes and trenches and almost impassible." ---Capt. Theodore Marks, 129th F.A.

(e) Exhibit H, par. 1. p. 11
"It being impossible to move the guns any futher than that as the NOULAINVILLE road was full of barbed wire entanglements."
---Capt. Spencer Salibury, 129th F.A.

(f) Exhibit K, par. 1, p. 4
"In that attack it took so long to cross the German trench systems, to cut through his wire entanglements and to pull across the muddy, broker ground that anything like keeping close to the Infantry was impossible." ---1st Lt. H.C. Evans, 6th F.A.

(g) Exhibit K, par. 2, p. 8.
"On leaving this position, I was deplayed while trees out down across the road were cleared away." ---1st Lt. L.G. Hammersly, 6th F.A.

2. INABILITY TO USE DIRECT LAYING DUE TO INVISIBILITY EITHER FROM ATMOSPHERE CONDITIONS, OR FROM SHORE OF FRIENDLY BARRAGE.

(a) Exhibit E, par. 2, p. 4.
"This same smoke concealed the enemy and no fire with direct observation was possible. " ---Capt. Robert T. Barton, 313th F.A.

(b) Exhibit B. par. 2, p. 2.
"Smoke from artiliery fire prevented all observation after "H" hour, which was at dawn." ---Capt. N.W. Perkins 313th F.A.

3. CASUALTIES RESULTING FROM PASSING THROUGH HOSTILE O.C.P.

(a) Exhibit N, par. 2, p. 4.
"Casualities among men, horses and materiel were incurred and would have been much heavier but for the dense smoke from the intense friendly barrage that concealed the movement from the enemy." --Capt. Robert T. Barton, 313th F.A.

(b) Exhibit I, par. 1. p. 4
"About 5:45 a.m., one man killed and three wounded by shell fire. Five horses killed and nine wounded about same time. Four men wounded during night."
---2nd Lt. D.B. Fullerton, 313th F.A.

4. DRAWING FIRE ON OUR INFANTRY.

(a) Exhibit I, par, 1, p. 1.
"He told me not to fire for fear of drawing German fire on his troops."
---1st Lt. Truman Plantz, Jr., 124th F.A.

5. PRACTICAL NEUTRALIZATION OF GUNS BY HOSTILE FIRE.

(a) Exhibit E, par. 4, p. 2.
"The cannoneers were disconerted by the heavy barrage to which they were subjected." ---Major John Nash, 313th F.A.

(b) Exhibit, G, par. 1. p. 6.
"During the night and following day the battery was under heavy fire, principally from one-pounders making the delivery of ammunition and the mainetnance of communication very difficult." ---1st Lt. John L. Logan, 314th F.A.

6. INABILITY TO FIRE DUE TO DEAD SPACE.

(a) Exhibit H, par. 4, p. 3.
"In such a position the sector could have been covered more completely and there would have been less dead space, while the problem of ammunition supply would have been greatly simplified." ---2nd Lt. Donald B. Fullerton, 313th F.A.

7. DIFFICULTY OF AMMUNITION SUPPLY.

(a) Exhibit B, par. 3, p. 3.
"Ammunition could not be gotten up, however, in sufficient quantities, and the rate of fire had to be greatly reduced. " ---Capt. N.W. Perkins 313th F.A.

8. TENDENCY OF INFANTRY COMMANDERS TO ASSUME TACTICAL CONTROL OF GUNS.

(a) Exhibit L, par. 1. p. 1.
"At one time he thought it would be advisable for me to take position on the Ridge from which the Infantry were to attack yesterday afternoon, but this was changed and I did not go into that position." ---1st Lt. Truman Plantz, Jr. 124th F.A.

(b) Exhibit E, par. 5, p. 3.
"Some seemed to think the ideal situation is to have guns sitting on a crest firing into a valley below, regardless of whether these guns are in plain view of any enemy already concealed and protected. " ---2nd Lt. Donald B. Fullerton, 313th F.

Other reports which have not been extracted for this paper show many similar cases in which the Accompanying Guns failed in their missions due to no lack of energy or initiative on the part of the Artillery but rather due to insurmountable difficulties.

It is interesting to note that these reports were all written after the Armistice and hence show that the officers had plenty of time to think over their experiences. There is no attempt on the part of any to evade the main problem which caused the guns to be ordered to very advanced positions, namely the reduction oe enemy centers of resistance, but the methods of meeting this problem raised the contention.

One of the Lieutenants who had considerable success with his Accompanying Guns (and who has been recommended for the Distinguished Service Cross) has expressed the conclusion of most of the officers who actually commanded the advance guns:

"I do not believe there has been a mission given to me during this drive which I could not have accomplished better and more effictively had I been more bold and aggressive with my O.P's. and less bold and aggressive with my Battery."

---1st Lt. Joseph G. Peppard, Jr., 313th F.A.

-W.S. McNair, Major General, Army Art'y, 1st Army.

The accompanying gun is not sound in principle. If the infantry is able to accurately translate and transmit its requirments to the supporting artillery it can be supported from normal positions to better advantage, and more accurately. Long before that becomes impossible, at least part of the artillery will have been displaced forward. The detaching of guns and batteries for this purpose weakens the supporting artillery just so much and in no known case has it resulted in anything like a proportionate return. Our 75 mm mountain gun, pack mule transported, would be an ideal weapon for this work, lending itself admirably, by its mode of transport, its accuracy, its range and power, to the conditions of modern battlefield terrain. J.A. Mack, Colonel, 102nd F.A.

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1. In my opinion accompanying guns as well as accompanying batteries should be furnished by the mountain artillery. The 75 mm, gun, horse drawn or tractor drawn, with its personnel is to combersome, presents too large a target; is too difficult to move rapidly over rough or muddy ground; is too defenceless when limbered up and too easily located when unlimbered and firing close to the infantry in open war fare, while the ammunition supply presents a question always difficult and sometimes impossible of satisfactory solution.

2. I recommend that mountain artillery be used for accompanying guns and batteries, but kept always under the control of and assigned to an artillery officer. -G.B. Mehard, Lieut. Colonel, 321st Field Artillery.

The use of accompanying guns and infantry batteries has been contemplated by our Drill Regulations for years and their use authorized in general terms. Particular situations in which their use if of great advantage have been brought out by experience in the present war. -E.A. Miller, Brigadier General, 6th Brigade.

I am heartily in accord with memorandum sent from G.H.Q. on this subject. -W.R. Smith, Major General, 36th Division.

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Accompanying guns and batteries will always have varying opportunities on the battle front. (The difficulties in their employment have arisen not from the principle involved but from a lack of understanding on the part of the infantry and the artillery as to how to utilize these guns). This knowledge can be gained by proper instruction and the prejudice aganist them will be replaced by enthusasm for their use. -G.P. Summerall, Major General, 5th Corps.

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The Infantry rifle is not a suitable weapon for the reduction of machine gun nests and the Infantry should be accompanied by weapons firing a larger projectile with more curved trajectory. This larger weapon should be of such weight and such mobility as to enable it being hauled by hand and kept comparatively near Infantry front lines.

Horse drawn field guns are not suitable for this work and should not be so employed. When so used they make vulnerable targets and when horses and guns are destroyed they cannot be replaced for days, if for weeks.

The Germans developed a mobil weapon that was able to accompany the Infantry when drawn by hand and I believe our mountain gun could have been so used as to greatly assist the Infantry. The continual movement recuired by the Infantry Commanders of Accompanying guns and batteries greatly reduces the length of time the guns or batteries could be supporting the Infantry by their fire from well chosen positions and from which they should be moved by echelon only when the front line of the Infantry approaches the limit of their range. -H.D. Todd, Brigadier General, 58th Brigade.

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The 3 inch gun will never prove sufficiently mobile to accompany attacking infantry in open warfare. The nearest approach we have to a suitable weapon for this purpose is the 2.95 mountain gun. Even this gun, I believe to be too heavey. My idea is a 2.25 in. pounder mounted on a two small whells which can be drawn by a horse to the vicinity of the support battalion and then dragged forward by hand. Such a gun should replace the one pounder which does not appear to have sufficient power to dig out well emplaced machine gun nests, at the same time it would solve the problem of accompanying guns. These guns should be infantry weapons and one platoon (2 guns) should form part of each infantry battalion. -J.F. Walker, Colonel, 314th Field Artillery.

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Tracterized 75 m/m outfit properly equipped would perform wounders and stay with the Infantry in very rapid advance. -G.L. Wertenbaker, Colonel 345th Field Artillery.

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There is no doubt that these are of great tactical assistance to the infantry if properly employed. The difficulty is that the Infantry needs to be instructed in the tactical employment of Field Artillery. Infantry Commanders do not make the best use of their one pounders and officers of this Regiment have been ordered to place 75 mm guns where the infantry would not put these lighter guns. They have also been ordered to put guns in where the flatness of the trajectory prohibited the accomplishment of the Artillery mission. My experience is that the artillery-man is always anxious to get his gun in action, and if given a mission can be entrusted to get his guns into the best position to fulfill their authority to the assignment of target. The Position of the guns and the method of attack should always be left to the Artillery Officer. -H.C. Willimas, Colonel, 320th Field Artillery.

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I consider the three-inch field piece a poor type of accompanying gun. A gun more on the order of our Mountain Gun would be a much better weapon, in my mind; something with rather a high trajectory. -C.D. Winn, Colonel, 306th Field Artillery.

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It is my experience that the 37 m/m. gun is too small for any purpose. It is likewise my experience that the 75 is too large a target for use as an accompanying gun. Also that no accompanying gun ever has been fought or ever will be fought other than by an officer who is specially instructed in its fighting and who possesses the necessary qualities and the will to do such fighting.

I don't think that the Divisional Artillery should be disrupted in its organization for any purpose whatever, but that it should be retained for use in mass effect.

I, therefor, believe that the 37 m/m. guns in number as now authorized should be replaced by guns similar to our long gun. -A. Cronkhite, Major General, 6th Corps Artillery.

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There can be no fixed rule for this. The Division Commander must exercise his common sense. When the condition of the soil and the nature of the terrain permit they should be used. If condition are too difficult he should have nerve and sense enough to say that accompanying guns or batteries will not be used but arrangements be made for accompanying fire. -R.H. McMaster, Colonel, 21st Field Artillery.

A D D E N D U M

To

ANNEX 10

Recommendations of Artillery Officers,

American E.F.

Received after the Dissolution of the

Board.

ACCOMPANYING GUNS AND BATTERIES.

No definite rule or principle should be enunciated with respect to this subject. Each situation should be considered upon its own merits and the mission involved should always be accomplished wiht the best means avaliable, (Trench mortars (Stokes) -37 mm. guns - tanks). Seldom should single guns be ordered forward by any one higher than a battalion commander. Never should single batteries be ordered by anyone higher than a regimental commander, except in the case of a small body detached for a special mission. -C.M. Butner, Colonel, 308th Field Artillery.

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Such guns (and in some cases, perhaps batteries) are essential to the success of the artillery in performing its functions (I.E., to support the infantry). Artillery must be trained to the idea and to fighting their guns (some of them) with the infantry, and in the infantry lines where necessary to success in advancing the mission of the Infantry. Infantry commanders of all grades must be educated as to the capabilities and limitations of artillery and the principles of the use and command of artillery. Similarly, artillery officers must know something of infantry tactical methods. The two must work togheter and each must know the other if successful teamwork is to be expected. Some guns must be used at times in the infantry lines, and if the artillery does not provide them, the infantry is entitled to have them as an artillery infantry arm. It is better and more efficient for the artillery to provide such guns.
EDW. Burr, Brigadier General, 62nd Field Artillery Brigade.

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1. No actual experience in warfare has been had with an accompanying gun or battery, but from the experience gained in four recent Divisional maneuvers, I do not believe that the 75mm gun is the proper weapon for this work.

2. In three cases cited by an Infantry Brigade Commander there was one case where the gun could not be used; another where the battery commander refused to place it as directed and was court-martialed and acquitted for his action; and a third case where the use was satisfactory to the infantry concerned. In a maneuver problem, held on ground this Brigade had actually fought over, this Brigade Commander detailed one gun to each of his two regiments on the front line and assigned a company of infantry to prepare roads for the moving of this gun. The following is taken from a report of one of the battery commanders who was assigned to go with one of these guns:

"It is my opinion that the field gun with its horse complement is too unwieldy and not sufficiently rapid for satisfactory use as an accompanying gun, as used at present with the infantry, and that something in the nature of a cross between the American mountain "75" and the latest German howitzer with its semi-flat trajectory is called for. During the 79th Divisional problem the accompanying gun was called upon to produce results and make rapid movements under fire beyond the possibilities of the 75 field gun. This was in a very large measure due to the nature of the terrain. What seems to be the most desired is a gun with a flat trajectory at ranges of 1500 to 2000 meters, which is also capable of delivering howitzer fire. This would be the ideal gun for accompanying infantry as viewed from my own experience in problems. The light one-pounder infantry gun does not possess sufficient power to produce desired results according to infantry commanders who have been supported by that weapon."

In the other case the detail to accompany the infantry ranged from one battery to a regiment to an entire battalion.

3. It should be noted that the material called for by the Chief of Artillery, 1st Army, to accompany one gun would materially hamper, in some respects,

the operation of the rest of the battery.

4. Aside from the breaking up of the integrity of the battery or battalion organizations, and at the same time recognizing the use and value of the infantry of a direct fire weapon, it would seem like an unnecessary waste to place the weapon, capable of accurate fire at 6000 meters, in a position where its normal objective is very considerably less, and whose principal use, according to all infantry officers with whom this matter has been discussed, lies in the making of a noise in order to keep up the morale.

5. It is suggested, in view of the fact that the Trench Mortar has proven of little or no use in open warfare, that the Trench Mortar Battery take over the infantry one pounder or some other light gun and be trained and instructed to operate the accompanying gun or guns as a regular thing. This would proably call for a increase in the personnel of the Trench Mortar Battery but would not engage, in the long run, as many men or as much material as the present use of the single gun (75) demands. -

6. It would require no more special training to educate the Trench Mortar men to use a light and more mobile weapon and would fully provide a specialist organization avaliable at all times and under all conditions for the work in hand. -H.M. Bush, Colonel, 134th Field Artillery.

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My views on this subject are covered in the following extract from training order issued by me in this regiment:

1. The term accompanying guns must be understood to mean guns which are pushed forward following and in support of attacking infantry and kept at a closer distance from the attacking infantry then would be possible for such larger and therefore more conspicuous, artillery units as batteries and battalions.

2. The value of accompanying guns lies in the moral effect on our infantry of the fire of friendly artillery in close support and comparative proximity; in the close liaison and resultant propmt opening of fire when required; and in the greater ease in observation of fire and consequent prompt and rapid adjustment on objectives.

3. It is utterly out of the question for accompanying guns to attempt to accompany the first infantry wave. The conspicuous and vulnerable targets presented by pieces and caissons drawn by horses are at the mercy of the enemy's fire, especially his machine gun fire.

4. Accompanying guns should follow the infantry at much distance as will afford reasonable protection aganist their being immobilized through and the nature of the resistance offered by the enemy. In close country it may be only a few hundred meters. In very open and flat country it may be measured in kilometers.

5. Accompanying guns and platoons, and the caissons that accompany them, must advance with distances between carriages, which will vary with the terrain and the nature of the enemy's resistance, but which will usually exceed 200 meters.

6. Accompany guns must take advantage of every feature of the terrain to secure concealment while advancing. When it is necessary to cross exposed terrain the crossing must be effected at the greatest possible speed.

7. Indirect fire will be the usual rule, direct fire the rare exception. A 75 mm. gun cannon, with any chance of success, be maneuvered and fired

in view of hostile machine gun nests at short range. Where direct fire is decided upon the gun should, if possible, be unlimbered under cover and then run by hand into direct fire position.

8. The personnel of each accompanying gun and platoon detachment should include two well trained officers. One of these officers should accompany the commander of the advanced infantry. The other should remain with the gun or platoon. Where it is possible to see the objective from a point near the gun or guns the fire should be comducted by the officer who accompanied the gun or guns. Where this is not possible the fire should be conducted by the officer who accompanies the infantry commander. In order that the officer accomapnying the infantry commander may conduct fire from an advanced position and promptly transmit information and order to the officer accompanying the guns, telephone men equiped with breast reels and light field wire should accompany both officers and lay a single or double telephone line on signal or order.

9. The elements of accomapnying gun section or platoon must be kept in close liaison by means of connecting files. Likewise the officer accompanying the infantry commander must keep in close touch with the guns by means of connecting files.

The Divisional Artillery should be provided with two types of light field guns. The major portion of the guns should be of the general type of the 75 mm. guns, equipped with panoramie sights. In addition, each division should be equipped with a certain number of light guns carried on the backs of pack mules, of a type similar to our old 2.95 mountain gun. The object of light guns carried on pack mules is for use as accompanying guns, platoons and batteries. Guns carried on the backs of pack mules can be pushed forward in much closer support of the infantry than the 75 mm horse drawn gun, due to the fact that the pack mule can traverse almost any terrain, and to the fact that by dispersing the various animals making up the seciton or platoon, much section or platoon can be rendered very inconspicuous. -J.R. Davis, colonel, 15th Field Artillery.

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Approve of accompanying guns. Think there should be not to exceed one for each front line infantry battalion. -A.C. Fisher, Colonel, 307th Field Artillery.

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Accompanying guns and infantry batteries were not successful in this brigade. In the attack of November 1st four guns were sent forward, each with an infantry battalion. Of these four only one did any firing. Firing done by this one gun was of doubtful effect on the enemy, and was all indirect firing with direct observation. No direct fire was used. The only real accomplishment of this gun was the encouragement given the infantry by the mere fact that a peice of Artillery was with them, and in some cases, even ahead of them in the pursuit of the enemy towards SEDAN. All of the guns experienced great difficulty in advancing over the natural obstacles of the terrain and in crossing the barriers left by the enemy in the way of destroyed bridges and roads. These same difficulties of terrain had been remedied by the engineers by the time the main body of artillary moved up and were crossed without serious trouble. The main force of artillery was always within range of our own front line and was always avaliable for fire in defense against a counter attack or for offensive action if there had been any enemy. So swift was the withdrawal on the Boche that all the artillery in the world on the very front lines would have found no targets. In those isolated cases where an accompanying gun would be desirable, it is believed that a gun similar to the type with which our Mountain batteries are armed is very superior to the 75mm. field piece. The mountain gun carried on pack mules could cross the most difficult terrain and keep up with the most rapid advance and could go into action as quickly and as effectively as the field piece. -C.C. Hearn, Brigadier General, 153rd Field Artillery Brigade.

ARMY CENTER OF ARTILLERY STUDIES - A.E.F.
THIRD COURSE

LECTURE DELIVERED BY

BRIGADIER GENERAL FRANK PARKER

APRIL 2D, 1919

CERTAIN OBSERVATIONS ON

I N F A N T R Y

its organization, arms and tactics, considered particularly from viewpoint of the BATTALION.

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ACCOMPANYING GUNS:

It has been my experience that 75's in attempting to accompany an infantry battalion have invariably gotten into trouble and not produced the results expected of them.

It is my conviction that the 75 is too large a gun, too visible, too heavy, and above all to valuable to be wasted by attempting progress over ground which a man on foot has difficulty enough in getting across.

These two guns could much better be employed forming an additional half of a battery firing normally at a normal distance. Instead of accompanying artillery there should be accompanying O.P.'s for artillery.

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(SEE ALSO p.9 GEN. H.E. ELY'S LECTURE AT "CENTER OF ARTILLERY STUDIES", FNEWS, Mch 10, 1919. ON ARTY RIGHT PLACED AT DISPOSAL OF DUF. BRIG. COMMANDER).

General Headquarters,
AMERICAN EXPEDITIONARY FORCES.

France, February 13, 1919.

MEMORANDUM FOR THE CHIEF OF ARTILLERY:

Subject: Report of Hero Borad, Part II.

The Battery:

Paragraph 474, Volume 2, Provisional Drill and Service Regulations for field Artillery, 1916, which is still in force, provides that:- "On a peace footing the 6th, 7th and 8th Sections are not manned or horsed." This should govern for both peace and war, that is, the 6th, 7th and 8th Sections of a battery should cease to exist. The addition of these sections makes a battery cumbersome and difficult to control tactically. In peace, a battery organized with these sections and having four guns, is unable properly to train all its personnel in the duties of the cannoneer, etc. On a war footing it would be preferable to organize an ammunition battery for each battalion of Field Artillery, subdivided into sections pertaining to each of the batteries in the battalion. All the ammunition batteries of a regiment to form an ammunition battalion. Such units could be authorized in the tables organization, and there would be no difficulty in organizing them when the necessity for them arose. This would be in line with the organization of ammunition trains, corps artillery parks, etc., which, while authorized by the tables of organization, will proably never be organized in time of peace except for maneuver.

Assuming a fixed personnel for Field Artillery, much better results could be obtained by organizinig numerous small units instead of a lesser number of larger units. It is not a difficult matter to expand a battery already organized into any size that may be desired; the difficult thing is to organize new units. For instance, assuming a Field Artillery personnel of 1000,000 men, it would be much better on a peace footing to organize 100 regiments of a thousand men each, than 67 regiments of 1500 men. Whatever re-organization may be agreed upon, it is certain that it will include some sort of reserve system, and will contemplate an expansion for war purposes. Many officers called in from the reserve or commissioned from the ranks would be quite acceptable as commanders of ammunition batteries, battalions, etc., whereas they would not be qualified to command a firing battery or battalion.

The Battalion:

It is recommended that howitzer regiments consist of two battalions of three batteries each. It has never been clear why these battalions should consist of only two batteries when the light battalions consist of three batteries. Certainly the task of directing the efforts of three howitzer batteries, with their comparatively deliberate missions, slower fire, etc., is quite as comparatively deliberate missions, slower fire, etc., is quite as easy, if not easier, than the task of directing three batteries of 75's, barrage guns, which must be always ready to act without delay. The reduction in personnel and the simplification of liaison justify the change in organization.

The Regiment:

Regiments of howitzers to be organized as recommended above, two battalions of three batteries each. Recommendations for sub-division of the Headquarters Company and the formation of an ammunition battalion for each regiment, also the recommendation for the regimental staff, concurred in.

The Brigade:

Trench mortars should be removed from the divisional artillery. They properly form no part thereof. Experience has shown the vital necissity for some form of accompanying gun, but it is believed that a satisfactory one has not yet been developed, unless it be the Italian gun reported upon by the Westervelt Board. Some form of accompanying gun must be developed or adopted, and should pertain to the Infantry of the division, to be manned and fought by that arm. The divisional artillery commander can exercise no control over these guns in combat. To attempt to do so would use up all his liaison detachment. Better turn these guns over to the Infantry entirely. Recommendation for a battalion of mountain howitzers not concurred in. The 75 is not acceptable as an accompanying gun, but in the absence of any other its use has been justified. The recommendations for the brigade staff are concurred in. It is believed that no duties should be assigned to aids.

Heavy Field Artillery:

It is assumed that this refers to what we understand as Corps Artillery. The primary function of Corps Artillery is counter-battery work. For this work the most valuable weapon is a good howitzer. Therefore, the howitzers should predominate in any Corps Artillery organization. The adoption of a 4.7" gun is not recommended. A suggested organization for this brigade is one regiment of 155 mm. howitzers, one regiment 155 G.P.F.'s, one regiment 8" howitzers.

This would give the Corps Artillery commander effective means of destroying or neutralizing enemy batteries, and also of effectively assisting the advance of our own infantry, which must not be regarded as an exceptional mission for Corps Artillery to perform.

Motorized Heavy Artillery:

There is no apparent reason for the recommendation that this class of artillery be organized into brigades of two regiments each. A brigade of three regiments is recommended. It is futher believed that no so-called army artillery should be allowed to operate. All artillery above the corps should be organized into a general reserve, from which reservoir, regiments or brigades as may be necessary, will be turned over to the Chief of Corps Artillery for use. Nothing could be worse than a system of having both Corps and Army Artillery operating in the same sector at the same time. In our service it has always led to confusion and always will. The organization of heavy artillery into brigades is mainly for administrative purposes. Usually this artillery will fight in a corps sector by regiment.

D.C. CUBBISON,
Colonel, F.A.

hbb

(Col. Binnie states that he knows of the reason for the 2btry battalion of howitzers other than the size of command-

ACCOMPANYING GUN TEST NO. 1.

Before going into the details of this test, it may be will to state the purpose of it. The accompanying gun, as developed during the present war, it is familiar, in name at least, to all officers of the infantry and field artillery; actual handling of this weapon was, however, reserved for infantry battalion commanders and a certain limited number of artillery officers detailed to command accompanying guns assigned to the infantry. The results accomplished by these guns did not, perhaps, in many cases, justify the losses incurred in men, animals and materiel, nor the lessened efficiency in fire power and mobility of the battery from which the gun was taken. Infantry officers, as a rule, lacked the knowledge of artillery necessary for the proper use of an accompanying gun; while the artillery officers, in many cases, lacked initiative and failed to assist the infantry commander as they might have done with their technical knowledge and with fire on targets of their own selection. Consequently, the accompanying gun has often times lain idle when it might have been working, or it has been used unwisely, with the result that much emenating from artillery officers with accomapnying gun experience in active service, is that practically all the missions assigned to them could have been carried out as well or better by the divisional artillery. Many considerations are bound up in such a statement; for example; the skill of the officers concerned, the efficiency of the liaison, the positions avaliable for or occupied by an accompanying gun or battery, the natural features of the sector of operations, the location of targets with respect to the two units, the time required to clear the way for the infantry, which is perhaps the paramount consideration of all. These are some of the points which must be considered.

The question under discussion, then is: "Can the divisional artillery support its infantry to the fullest extent without detailing accompanying guns to the front-line battalions?" In order to obtain data upon which an unbiased and supported opinion might be based it has been deemed avisable to have a number of tests, involving competition between an accompanying gun and divisional artillery, in the attack of targets reported by the infantry front line as holding up its advance. A 75 m/m battery of the divisional artillery was selected as the unit most likely to operate aganist a target suitable for an accompanying gun.

DETAILS OF TEST NO. 1.

SITUATION.

Infantry: - The Infantry considered was one regiment, advancing with one battalion in the front line; with this battalion was an accompanying gun and it was futher supported by the divisional artillery.

Artillery: - The accompanying gun was advancing with the infantry; while the divisional artillery represented by one battery was in position and had carried out a registration on a point in its sector of fire previous to the designation of a target.

Liaison: - Infantry: By runners, forward of battalion headquarters, from the latter to the rear by telephone.

headquarters Artillery: By telephone, from regimental headquarters to battalion/quarters and from battalion headquarters, to battery.

by telephone.

Infantry to Divisional Artillery: By telephone between regimental headquarters of units concerned.

PROCEDURE.

At a certain point during the advance it was assumed that the infantry was held up by machine gun fire; a message to this effect was sent back by the infantry battalion commander from the front line; the accompanying gun was held in a position in readiness its commander made a reconnaissance, located a position and established liaison by telephone with the infantry battalion commander. Meanwhile, the infantry, having the machine guns that were holding them up, attempted to dislodge them with their 37 m/m guns (simulated). Being unable to accomplish this task, the battalion commander was informed by runner with written message, that artillery fire was necessary, whereupon he simultaneously called for fire from the accompanying gun and from the divisional artillery, designating for eahch seperate target, in order that the fire of each unit might be practically the same problem, as though they had been one and the same objective.

The liaison at this point worked out in such a way that the message calling for fire was transmitted by telephone direct from the infantry battalion commander's station to the station of the battery instead of through the artillery battalion commander's station or even by the more devious route including the infantry and artillery regimental P.C.'s, with consequent delays for action and transmission. Thus, the battery had practically the same liaison as the accompanying gun, which was an unnatural circumstance and resulted in giving the battery an unusual advantage. That, in conjunction with the fact that it was in position and registered as mentioned above, enabled it to start its fire much more quickly than the accompanying gun which had to be moved a short distance than the accompanying gun which had to be moved a short distance and unlimbered after the designation of the target.

The various times and results of the firing are shown below:

	Accompanying Gun indirect fire	Baty. Div. Arty indirect fire	Remarks
Time of receipt of request for fire	9.50 a.m.	9.51 a.m.	By telephone
Time of opening of fire elasped time.	9.56 a.m.	9.52 a.m.	
Time of completion of fire (targets destroyed) Elasped time of firing	10.00 a.m. 4 mins.	10.00 a.m. 8 mins.	
Salvos or volleys fired.	15	19	
Ammunition expended, rounds	15	65	Percussion/used in lieu of shell
Adjusted ranges, meters.	1550	2650	
Salvos with which first effect was obtained. (No. of rounds).	10 (10)	13 (49)	Effect here refers to a direct hit on the target.

resistance and requesting artillery fire at 9.47 A.M.

The targets were framework covered with O.D. cloth each was a meter high and 1 1/3 meters long, plainly vissible, and set up ----- three in a row, without interval, making a rectangular target ----- meter high and 4 meters long. Firing was continued until all there panels were totally destroyed.

RECAPITULATION.

From the above it will be seen that request for fire reached both units at very nearly the same hour; that the battery, due to its more favorable situation was enabled to open fire 4 minutes ahead of the accompanying gun but that this handicap was overcome during the firing, complete destruction of both targets having been accomplished and the way cleared for the infantry at the same time by both units. The accompanying gun expended fifteen rounds of percussion sharpnel, while the battery used sixty-five rounds. Considering the firing alone in the test, it appears that the accompanying gun accomplished its mission in one half the time and at one quarter the cost in ammunition as compared to the battery. In the matter of liaison, an accompanying gun being actually under the command of the infantry battalion commander, should with its shorter lines of communication, be in closer touch with the infantry that would be the case with the Divisional Artillery. Therefore, if, in the case of the accompanying guns, as opposed to the divisional artillery liaison can be more easily obtained, adjustment more promptly secured and some targets reached that could not be taken care of other wise; then it would seem that the accompanying gun still has its place in the artillery scheme.

In actual battle the problem will be largely one of liaison. The destruction frequently is the lot of telephone lines and for that reason, the conclusion must not be too rapidly seized that we can always get quick response from the battery. In fact, in action, such response was often slow.

Frequently, too, observed fire cannot be obtained from the battery commander's position; whereas, the officer in charge of the accompanying gun may often have close and better observation.

These problems should be allowed to develop naturally, but it is hoped that in some cases we may be able to compare direct fire from the accompanying gun with fire from the battery.

In these cases the length of time the accompanying gun is exposed to hostile fire is important.

Other test similar to the above but under varied conditions will be carried out, in the hope that some interesting and valuable data may be obtained.

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GENERAL SITUATION.

1. The Red Line extending from Valdahon to Etalons has been broken at Camp Valdahon and the Blues are advancing thru the gap.

SPECIAL SITUATION.

The 52nd Infantry occupies the art of the Blue line from BOIS DE PERLE to PLATEAU HARICOT. It has one battalion in line, has an accompanying 75 m/m gun and is supported by divisional artillery.

The outpost line on the morning of April 9th extends along BOIS RAZE, ARBRE MIRIDOR.

The advance will be taken up at _____ hr. Rate of advance 100 m in 4 minutes.

INSTRUCTIONS TO DIVISIONAL ARTILLERY.

Provisions will be made for the close support of the infantry. Liaison detail be sent to the infantry and every effort made to maintain telephone communication.

All fire must be observed.

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INSTRUCTIONS FOR UMPIEES.

A. With the infantryfront line C.O. (written remarks to cover).
1. Infantry advancing 100 m in 4 minutes. Does not know of targets.
2. Inform C.O. of Co. that there is an accompanying gun, and a battery in position which can be called upon to fire.
3. At_____, inform Co. C.O. that the line is held up by M.G. fire from_____, and _____, and only artillery fire can give the desired relief.
   (a) Note the time
   (b) Note time message is sent back, also how message is sent.
   (c) Note time when fire is delivered on each target.
   (d) Time when advance could be resumed.
4. Any remarks as to conduct of problem or employment of gun or battery.

B. With the infantry Bn. C.O. (written remarks to cover).
1. Infantry to advance normal rate 100 m in 4 minutes.
   Details of problem.
2. Inform Bn. C.O. that there is an accompanying gun and a battery in position which can be called upon.
3. Note following times:
   (a) Time message is received from line company concerning resistance encountered.
   (b) Time message is transmitted by en. C.O., also how transmitted.
   (c) Time fire is delivered on each target if they can be seen.
   (d) Time advance is resumed.
4. Any remarks as to conduct of problem or employment of gun or battery.

C. With the accompanying gun.
1. Time message is received reference target.
2. Time fire is opened, kind of fire, direct or indirect, number of rounds. (Notel. - if direct fire is used, note how long gun is exposed).
3. Time of cease firing.
4. Any remarks as to conduct of problem of employment of gun.
5. Any exposure of gun during advance or any other time to be noted.

D. With Battery C.O., (written remarks to cover).
1. Note time when target is designated.
2. Time when fire is opened.
3. Number of rounds fired, methods used.

4. Time of cease firing.
5. Note exposure of details at O.P. or battery.
6. Any remarks as to conduct of problem, or employment of battery.

E. With Infantry Regimental C.O. (written remarks to cover).

1. Rate of advance 100 m in 4 minutes, details of problem unknown.
2. Note time when message is received reference resistance.
3. Action taken.
4. Time any message is transmitted to artillery.
5. Any remarks as to conduct of problem or employment of artillery in support of Infantry.

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U.S. ARMY FIELD MESSAGE.

FROM : C.O. Co. "E"

AT : 22 - 24.

DATE : 9 April 1919. HOUR : 9.45 No. 4: Sent: By runner.

Line held up by M.G. strong point at south edge LA PERCHE ridge. (Battery target), and M.G. strong points at A 4 (Accompanying Gun Target). Cannot overcome resistance with our own weapons.

STULLKIN.

ARMY ARTILLERY SCHOOL
A.P.O 704, AMERICAN E.F.
April 24th, 1919.

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ACCOMPANYING GUN TESTS NOS. 2,3,4 and 5.

GENERAL REMARKS

1. It was indicated in the report on Test No. 1, that other problems involving competion between an accompanying gun and a suitable unit of divisional artillery (a battery for example) were to be carried out, for the purpose of obtaining data as to the desirability or necessity of detailing accompanying guns with front line infantry battalions in combat.

Many officers who have handled accompanying guns in battle have claimed that practically all missions assigned to them could have been accomplished by their divisional artillery; these statements are proably not based upon actual firing by the divisional artillery but rather upon the opinions of the officers mentioned, which were undoubtedly influenced by the failure of the accompanying guns in some cases to carry out their missions.

We may assume, in many cases, even in the general case let us say, in a given sector that the divisional artillery, due to the character of the terrain, to the advantageous positions occupied by batteries, and to other causes, is able to accomplish all missions satisfactorily. In such a situation, obviously, the assignment of accompanying guns to the infantry is uncalled for, unless to give active moral support, a very unusual situation.

Let us consider another case; a battery of the divisional artillery, it appears, will be able to carry out any of the missions that might reasonably be assigned to an accompanying gun; but the battery has been experiencing communication difficulties which may possible delay its work somewhat. We must consider in this case, whether the quicker work that may result from the use of an accompanying gun will outweigh the certain loss that results from the withdrawal of the gun, it is personnel and equipment from the organization to which it belongs; there is also the increased possibility of loss of the gun itself due to greater likelihood of exposures in advanced positions. Upon these points rests the decision.

In many cases, depending upon character of terrain, conditions of observation and liaison, and upon other circumstances, it will be apparent that an accompanying gun may get action on targets that are not feasible for the divisional artillery, but which nevertheless are holding up the advance of our infantry. In such a situation we, must certainly have an accompanying gun at the disposal of the infantry commander.

Our experience with accompanying gun has not been sufficient to warrant us in saying that the accompanying gun is wrong in principle; that the work for which it is intended can be performed by some other unit. In some cases this is true; in others, it is not; in any case, the other unit may gave its own work of quite a different nature to carry on. The disruption of a battery, caused by the detail from it of an accompanying gun certainly makes for inefficiency in that battery, as regards fire power and mobility; in fact, this feature constitutes one of the most serious criticisms of the accompanying gun.

2. In the tests, in order to make the conditions a little more realistic, a battalion represented the divisional artillery instead of only a battery, and missions were assigned by the artillery battalion commander.

3. In all tests, the following system of liaison was used:
Infantry: By runners forward of battalion P.C., by runner and telephone to accompanying gun O.P. when established.
Artillery: Telephone from battalion P.C. to batteries, to infantry regimental P.C., and to liaison officer with front line infantry battalion. Runners between same points.
Accompanying Gun: By runners and telephone to O.P. when position was occupied; runner to gun commander at other times.

4. In connection with any discussion on the accompanying gun, the following advantages that it possesses if properly handled, should be borne in mind: Close liaison with the infantry, insuring quick and accurate designation of targets; observer close to gun, rendering adjustment easy; short range, giving less proable error and quicker and more demoralizing effect on the enemy; moral support of our own infantry due to proximity and close liaison.

Unless full advantage is taken of the ease of liaison between the infantry, gun commander and gun, the value of an accompanying gun is greatly diminished. The ideal-gun, gun commander and infantry commander practically together, should be approached as closely as existing conditions permit; otherwise the gun will encounter the same difficulties of liaison as the divisional artillery and will fail in its mission.

5. The targets used in these tests, except in Test No. 4, were framework covered with O.D. cloth, each 1 meter high and 1 1/3 meters long, set up three in a row, without interval, marking a rectangular target, 1 meter high and 4 meters long; in Test No. 4 only two panels were used, making a rectangular target 1 meter high and 2 2/3 meters long.

6. INSTRUCTION FOR UMPIRES. (All tests).

A. With the Infantry front line C.O. (written remarks to cover).

1. Infantry advancing 100 m in 4 minutes. Does not know of the targets.
2. Inform Co. C.O. that there is an accompanying gun, and a battery in position which can be called upon to fire gun, and a battery in position which can be called upon to fire.
3. At _____, inform Co. C.O. that the line is held up by M.G. fire from _____ and _____ and only artillery fire can give the desired relief.
   (a) Note the time.
   (b) Note time message is sent back, also how message is sent.
   (c) Note time when fire is delivered on each target.
   (d) Time when advance could be resumed, (Target destroyed).

4. Any remarks as to conduct of problem or employment of gun or battery.

B. With the Infantry Battalion C.O. (written remarks to cover).

1. Infantry to advance normal rate 100 m in 4 minutes. Details of problem not known.

2. Inform Battalion C.O. that there is an accompanying gun and a battery in position which can be called on.

3. Note following times:

(a) Time message is received from front line Company concerning resistance encountered.

(b) Time message is transmitted by Bn. C.O. also now transmitted.

(c) Time fire is delivered on each target if they can be seen.

(d) Time advance is resumed.

4. Remarks as to conduct of problem of employment of gun or battery.

C. With accompanying gun. (written remarks to cover).

1. Time message is received reference target.

2. Time fire is opened, kind of fire, direct or indirect, number of rounds, (note 1, if direct fire is used, not how long gun is exposed).

3. Time of cease firing.

4. Any remarks as to conduct of problem or employment of gun.

5. Any exposure of gun during advance or any other time to be noted.

D. With Battery C.O. (Written remarks to cover).

1. Note time when target is designated.

2. Time when fire is opened.

3. Number of rounds fired, methods used.

4. Time of cease firing.

5. Note exposure of detail at O.P. or battery.

6. Any remarks as to conduct of problems, or employment of battery.

E. With Infantry Regimental C.O. and Battery Battalion C.O. (Written remarks to cover).

1. Rate of advance 100 m in 4 minutes, details of problem unknown.

2. Note time when message is received reference resistance.

3. Action taken.

4. Time any message is transmitted to artillery.

5. Any remarks as to conduct of problem or employment of artillery in support of Infantry.

All watches will be synchronized and time kept to the second.

If the Infantry advance is resumed there will be a second problem and umpires will take the necessary additional notes.

TEST NO.2.
General Situation.

The Reds, weakened by a long operation, are falling back rapidly to a line ETALANS-VALDAHON.

Special Situation.

The 52nd Infantry, with one battalion in the line, is attacking in the sector East limit-North-East-Southwest line through CARRON FME, West limit, line parallel to east limit through OBS. DES FILES.

The outpost line on the morning of April 24, is through CARRON FME. along road to the northwest. The 1st Battalion 40th F.A. is in support. A battery is to detail an accompanying gun to report to the Infantry Regimental Commander.

Infantry Reg. P.C. at beginning of problem
Bn. P.O., Artillery Tribune B, Tribune B.

Instructions to Artillery.

Artillery Bn. will occupy following positions near 13.14 D, 15.11 E. 19.11 F. Communication will be established with the batteries, and an Artillery Liaison Officer and detail work with the forward infantry elements.

All fire must be observed.

Watches will be synchronized with infantry and umpires.

Instructions to Infantry.

Advance will be resumed at _____hour.

Accompanying gun will be at the disposal of front line Infantry Battalion C.O.

When advance is held up it should be reported and efforts made to overcome resistance with infantry weapons. Artillery fire to be called for only when the resistance is great enough to warrant the delay.

Infantry must be at least 500 m. from any target to be fired at by artillery.

Watches will be synchronized with Artillery and umpires.

The accompanying reported to the infanry battalion commander.

9.17 - Infantry advanced.
9.52 - Infantry advnace company commander sent message to infantry battalion commander that strong resistance had been encountered, designating two centers of resistance.

9.56:40 - Message received at infantry battalion headquarters.
9.58:30 - Message designating target sent by runner to accompanying gun.
10:00:00 - Message sent by telephone to infantry regiment (artillery liaison line not working).

	Acc. Gun. Indirect Fire.	Battery Div. Artillery: Indirect Fire	Remarks
Time of receipt of request for fire.	10:01:50	Target net identified no firing done.	
Time of opening of Fire.	10:02:30		
Elasped time	40 sec.		
Time of completion of fire (targets destroyed).	10:07:40		
Elasped time of firing	5'10"		
Salvos or volleys fire fired.	19		
Ammunition expended.: Rounds.	19		
Adjusted ranges meters...	1275		Percussion shrapnel used in lieu of shell
Salvos with which 1st effect was obtained (No. of rounds)	4 (4)		Effect where refers to a direct on the target

Comments.

At the artillery battalion the target was designated to Battery C, which reported at 10.12 that it was unable to observe target. At 10.13 the target was sent to Battery B. Battery B opened fire at 10:13:30, but did not fire on the right target, and was ordered to cease firing at 10:15:30. The target was described accurately, and all batteries could see the target. The reason given by the battery commander for not firing on the target designated was that the infantry line given was within 500 meters of the target designated. Instead of holding the fire until the line could be verified by the liaison officer, the battery commander opened fire on a target in line with the one designated, but considerably beyond it.

The gun commander was seldom with the infantry battalion commander, as he was going forward reconnoitering routes of approach, possible positions and O.P.'s for the gun. He was connected by runner to the infantry. When resistance was encountered by the infantry, he was informed and put his gun in position, established an O.P. and got telephone communications with his gun and infantry battalion. Gun commander was about 250 meters from the infantry battalion commander and almost 600 meters from his gun. The latter necissitated a long telephone line. The gun was well defiladed, and was exposed and would have been untenable. Fire was accurate and well handled.

TEST No. X3.

Same General Situation, Special situation, and instructions as in Test No. 2.

1:57 - Infantry advanced
2:05 - Resistance encountered, but advance was continued.
2:22 - Strong resistance encountered.
2:36 - Message sent from infantry advance company commander to infantry battalion commander designating objects holding up the advance.
2:30:50 - Message received at battalion.
2:42:55 - Same sent to accompanying gun commander by runner.
2:45:20 - Same sent Inf. Regt X by telephone.

	Accn. Gun. Indirect Fire	Battery Div. Artillery. Indirect Fire.	Remarks
Time of receipt of Request for Fire.	2:48	2:57:30	
Time opening of Fire. Elasped Time.	3:01:15 13' 15"	2:58:30 1 '	
Time of Completion of Fire. (Targets destroyed)	3:08:20	3:08:30	
Elasped time of Firing.	7' 05"	10'	
Salvos or Volleys Fired.	34	24	
Ammunition expended rds.	34	96	
Adjusted ranges, meters.	1125	2700	Percussion Shrapnel used in lieu of shell
Salvos with which first effect was obtained (No. of Rounds)	5 (5)	20 (80)	Effect here refers to a direct hit on the target.

The divisional artillery were delayed 7:30" while battalion commander checked the safety of the range. The target was designated as "Machine Gun next on S.E. end of La Perche Hill", and the target which the infantry desired destroyed was not fired upon. A machine gun target on the N.E. end of La Perche Hill was fired upon, and the data on this target is given. Difficulty in communications prevented a speedy check of the target between the battalion commander and his liaison officer.

In this problem the gun commander did not keep close contact with the infantry commander. When resistance was first encountered the gun commander put his gun in position chose an O.P. and awaited orders from the Infantry. The O.P. was 500 to 800 meters from the infantry commander. The line advanced and after waiting about 20 minutes the gun commander reported to the infantry commander in person for instructions. The message designating a target passed the gun commander, and when it received at the gun O.P. the gun commander was at the Infantry P.C. Fire was not handled and effect soon obtained. The gun was close to the O.P., rendering observation easy. The gun was not exposed more than a few seconds, and passed that point at an increased gait.

experienced with regards to the infantry line, which caused delay and firing on wrong target; lack of proper use of liaison Officer.

In one problem the gun commander was too far from his gun; in the second he was too far from the infantry commander.

TEST NO. 4.

SITUATION.

The front line Bn. of the 52nd Infantry advancing toward Grange Bondeau, is, on the morning of May 2nd, on the line CARRON-FME-Hill 605.8 (Other elements assumed on the rgt & Lft).

East limit of Infantry Sector-CARRON FME, FME, JEAN DES VACHES-WEST Limit. N.E. - S.W. line thru LA SEMELLE SAL.

One Bn. 140th F.A. is in support. An accompanying gun will be placed at the disposal of the infantry battalion commanding officer.

Inf. Reg. P.C. at beginning of problem Trib. B. Bn. P.C. Artillery Trib. B.

Instructions to Artillery.

Artillery Bn. will occupy following positions: 13, 14, 15, 11,19, 11. Communication will be established with the Batteries, and an Artillery Liaison Officer and detail will work with the forward infantry elements. All fire must be observed. Watches will be sychronized with infantry and umpiers.

Instructions to Infantry.

Advance will be rsumed at _____ hour. Accompanying gun will be at the disposal of Front Line infantry battalion C.O. When advance is held up it should be reported and efforts made to overcome resistance with infantry weapons. Artillery fire to be called for only when the resistance is great enough to warrant the delay. Infantry must be at least 500 m from any target to be fired at by the Artillery. Watches will be synchronized with Artillery and Umpires.

9:07:05 - Strong resistance encountered by infantry.
9:13:15 - Message sent from infantry company commander to Battalion designating objects holding up the advance.
9:17:40 - Message received at Bn. P.C.
9:25 - Message transmitted to infantry regimental P.C. by telephone; to accompanying gun by runner.

	Acc. Gun Indirect Fire.	Battery Div. Artillery Indirect Fire.	Remarks
Time of receipt of Request for Fire.	9:27	9:29	Targets: Machine Guns.
Time of Opening of Fire	9:43:05	9:30:40	
Elasped time.		1'40"	
Time of completion of Fire (Target Destroyed)	Not destroyed:	9:40	
Elasped time of firing		9'20"	
Salvos of Volleys fired	14	17	
Ammunition expended rds	14	68	
Adjusted ranges, meters	1000-1200:	1725	Percussion shrapnel used in lieu of shell
Salvos with which first effect was obtained. No. of rounds			Effect here refers to a direct hit on the range.

Comments.

Vissibility poor, due to fog and rain.

The battery assigned the mission in this problem was in position and had previously registered. It opened fire promptly and destroyed the target before the accompanying gun got into action. The gun in this case had to go into action from a position in rediness; proper use was not made of avaliable cover and the gun might have been subjected to hostile fire. A bracket of 200 meters was obtained, but the firing was stopped on account of advance of the infantry. During this firing one round grazed the mask, emphasizing particularly with an accompanying gun, on account of the flat trajectories at the shorter ranges used. Direct fire may have to be resorted to, sometimes to overcome this difficulty.

TEST NO. 5.

This Test was carried out as another incident in the situation stated in Test No. 4.

10:03:15 - Infantry line held up by fire from machine gun nest, position located.

10:08 - Message sent from front line company commander to infantry battalion commander, by runner, giving location of machine gun next.

10:11: - Message received at Bn. P.C.

10:11:50 - Message transmitted to infantry regimental P.C. and to gun commander.

	Acc. Gun. Direct Fire.	Battery Div. Artillery Indirect Fire.	Remarks
Time of receipt of request for fire	10:11:50	10:12:20	Target-Man Guns.
Time of opening of Fire: Elasped time	10:20 8'10"	10:13:30 1'10"	
Time of completion of Fire (Targets destroyed) Elasped time of Firing.	10:21 1'	10:30 target not destroyed.	
Salvos or Volleys Fired:	5	31	
Ammunition expended rds:	5	122	
Adjusted ranges meters	900	2500-2600	Percussion shrapnel used in lieu of shell.
Salvos with which first effect was obtained (No of rounds)	3 (3)		Effect here refers to a direce hit on the target

COMMENTS.

A different battery than that used in Test No. 4 was selected to carry out this mission. It was in position and had registered its fire previous to assignement of mission. Fire was opened promptly; observation was difficult, however and the accompanying gun had cleared the way for the infantry, before the battery had succeeded in destroying its target. A doubtful bracket (2500-2600) was secured by the battery and zone fire was used, precision fire being impracticable on account of the poor visibility. Some effect was secured.

The accompanying gun occupied an advantegous position at short range and used direct fire. A hit was obtained with the third round. A short ranges direct fire is desirable method so far as the firing alone is concerned; at ranges over 1000, with non-telescopic sight such as is used with the French 75 m/m, unless the visibility were excellent and the target very distinct, this method would offer great advantages.

Recapitulation.

Considering all cases (Test 1, 2, 3, 4, 5) including those fired in bad weather but omitting the cases in which the targets were not destroyed, we find that the average times are as follows:

Times considered.	Accompanying Gun.	Supporting Baty.
1. To get message from front line to 1st shot From X	14'41	15'38"
2. To get message from front line to total destruction of target by X:	19'00"	24'52"
3. Elasped time of actual firing by X.	4'29"	9'24"

Other data		
1. Number of failures to destroy target by X	1	2
2. Numbers of rounds required to destroy target by X (Average)	18	76

A comparison of the above data gives us the following interesting points:

1. The supporting battery had twice as many failures as the accompanying gun.
2. The battery used more than four times as much ammunition as the accompanying gun to accomplish the same mission.
3. The time from the origin of the message in the front line to actual destruction of the target is less for the gun than for the battery.
4. The actual time consumed in firing is very much less for the accompanying gun than for the battery due to better observation, shorter time of flight, and smaller number of pieces firing.

It is difficult to represent normal conditions in tests of this nature, for instance such a variable element as the effect of the enemy's fire; it may be all powerful or it be nil. In these problems this particular element has been eliminated with the result that the supporting battery has not had to contend with frequent, or even occasional destruction of communications, as often occurs in battle; its liaison has therefore, been super-normal. The accompanying gun has had the same advantage in respect to lines of communication but, owing to its close liaison if well placed, the destruction of its lines by enemy fire would be a matter of less moment. In these tests, the absence of the neutralizing and destructive effect of the enemy's fire on personnel and materiel has been more advantageous to the accompanying gun than to the supporting battery as it may reasonably be assumed that in battle the former would generally suffer more in this respect than the latter, owing to the nature of its role and to the more exposed positions that it must occupy.

While the number of tests, five in all, is small, it is nevertheless believed that the average times and other data derives from them present a fair comparison of the relative values of an accompanying gun and a battery of the divisional artillery in the handling of missions that would normally fall to the lot of an accompanying gun in action.

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ANNEX 11.

Recommendations of Artillery Officers

American E.F.

PLACING OF ARTILLERY UNDER COMMAND OF SUBORDINATE INFANTRY COMMANDERS

PLACING OF ARTILLERY UNDER COMMAND OF SUBORDINATE INFANTRY COMMANDERS.

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I am not in favor of placing artillery under the command of subordinate infantry commanders. They, as a rule, have an extremely limited knowledge of the employment of artillery and, in addition to this fact they are so absorbed with the fighting of their own commands that they cannot possibly give attention to the intelligent fighting of the artillery.

As before stated, the best results are obtained by the collective fire of the entire divisional artillery, whether reinforced or not, under the coordinated supervision and direction of the Division Artillery Commander, and through an efficient liaison system with the infantry. -D.E. Aultman, Brigadier General, Army Artillery, 2nd Army.

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Excepting the one platoon referred to above, artillery should not be placed under the command of infantry commanders of lesser rank than the Infantry Brigade Commanders. This brings up the question of the position of the Brigade Commander. If he should be well forward with the Infantry Brigade making the attack, he is in close touch with the immediate action, but necessarily loses sight of the larger field, which after all may be more important, especially if the attack of the Division be only a part of a very much larger movement. On the whole the present plan of having the Artillery Brigade Commander near the Division Commander is believed to be sound.
The Artillery Regiment supporting the Infantry Brigade should, however, possible, and the latter should rely entirely upon the Artillery Commander for the artillery support he is to receive, and not endeavor to handle the artillery himself.

It is thought that great care should be exercised in drawing conclusions from the Argonne offensive. Although they did not know it, the American troops were fighting an already beaten, though still plucky enemy, who was illy supplied with artillery ammunition and who was forced, from a lack of proper transportation, to early withdraw many of his guns. Although this Brigade suffered heavy casualties, it is proable that its losses would have been insupport-table had the enemy been supported with artillery and ammunition for proper operation aganist our positions around Septsarges and Nantillois, where all three regiments of the Brigade were well forward. To shove artillery well forward under the circumstances existing there was sound, but had it been done in the face of artillery of reasonable strength, well supplied with ammunition, and determined to hold the position, it would have proably been disastrous. -E.B. Babbitt, Brigadier General, 4th Brigade.

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The assignment of artillery to the command of Infantry Officers of less rank than colonel is not advisable. With the present cadre of Infantry officers those below that rank are men of such limited experience and lack of training that only indifferent results follow. Exceptions may be make in particular cases. It is the duty of the Field Artillery Brigade Commander to know his infantry and act accordingly. -H.G. Bishop, Brigadier General, 3rd Brigade.

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Such a system is little short of criminal. It has been my experience that the efficient infantry officer does not desire the command of the field artillery but prefers to leave the handling of that arm to the experienced artilleryman. In all cases artillery should be commanded by artillery officers. Except in the cases of advance and rear guards in the possible case of a local action by a small unit field artillery units should never be placed under anyone below the division commander. In all cases in the handling of field artillery the field artillery commander's judgment should govern, unless he has proved himself inefficient. In this case he should be relieved by the second in command. - A.J. Bowley, Brigadier General, 6th Corps Artillery.

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If an officer is charged with the execution of a mission he should have his artillery at his disposal. There are times also when through lack of information as to the location of the Infantry, it may be necessary to allow the Infantry Commander to control the artillery fire in his sector. But I do not believe that the practice of dividing the artillery at the start under subsector commanders is compatible with the principle that force should not be dissipated. The placing of the artillery under subordinate commanders also deprives the division commander of his surest means of keeping his Infantry in hand. -H.W. Butner, Brigaderi General, 1st Brigade.

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Should not be done. -T.Campbell, Colonel, 329th F.A.

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No unit of Division Artillery should be placed under a subordinate Infantry Commander, except in the unusual case when the mission to be accomplished is by a small Infantry unit acting alone, in which case the relations of the Infantry and Artillery Commanders should be the same as those of a Division Commander and his Chief of Artillery. -Army Center of Artillery Studies.

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Under no circumstances should artillery be placed under command of subordinate infantry commanders. -A.L. Cox, Colonel, 113th F.A.

It is believed that a very limited number of guns may be used to advantage with the artillery commander at the P.C. of the infantry commander, such guns to be subject absolutely to the call of the infantry commander. The object of this arrangement is to provide aganist the absolute loss of artillery support, in case all links from the infantry commanders to the artillery commanders should be broken. There is a good deal of moral support in knowing that there is an artillery commander immediately at hand.

I must emphasize the necessity of having it thoroughly understood that the function of the infantry commander in regard to these guns is simply to call upon the artilleryman present for the support, and not to direct him how that support shall be rendered.

Most astonishing instances in connection with so-called infantry artillery have come to my attention, such as the breaking up of an entire artillery brigade just before an action by detaching all the regiments from the brigade and assigning each to certain infantry columns. There is a limited maximum beyond which detachment of artillery from the artillery commander is pernicious.

In summing up, it may be stated that the artillery organization should be constructed so that the detachment of a limited amount of artillery, say one battalion, per regiment, for accompanying guns and infantry artillery will not impair the integrety of the regiment and brigade organizations. Three battalions of two batteries each will very nearly fit this condition. -R.P. Davis, Brigadier General, 151st Brigade.

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Our infantry men complain that they have too much to do in commanding their infantry, detached machine guns and one pounders to attend to an accompanying gun too. They have been distinctly worried by its presence in action. On does "not know what to do with the d--- thing anyway"; another does not want it because it draws fire on his men; another puts it in the background and tells it to stay there until it receives orders - and no orders come; another one orders the single gun to lay a barrage - and so things have gone on in the past. There is general lack of education on the matter, lack of cooperation because of lack of coodinate training. Certainly, at present, the gun should not be placed under the direct command of subordinate infantry commanders except that the missions they wish it to execute should be conveyed by them to the artillery officer commanding the gun, who should be keen and try to carry out the missions expected of him. In general, the success of the accompanying gun in the past has been due to the energy of your artillery officers who have themselves located the targets that have worried the infantry and put them out of action solely on their own initiative. There is even greater objection to placing larger artillery commands than the the accompanying gun under subordinate infantry commanders, due to lack of knowledge of the capabilities and limitations of our arm. It seems that although a battalion of light artillery might be properly assigned to a regiment of infnatry or a single battery to support a battalion of infantry, that to put the command of artillery in the hands of more subordinate commanders than these would, in general, be an error. -C.J. Deems, Colonel, 57th Brigade.

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Artillery should never be placed under the command of subordinate infantry commanders. If the infantryman will tell the artillery what he wants done and leave the method to the artillerymen the desired result will probably be attained. During the action north of Charpentry, France October 4th, 1918 to 11th, 1918 I was in liaison with infantry brigade commander. He called on me for work he wanted done and left the methods up to the regimental commander. In this way he coordinated the fire for his two infantry regiments and did not permit the demands of either of his infantry commanders to interfere with the accomplishment of the mission for the brigade as a whole. -W.H. Dodds, Colonel, 6th F.A.

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Forward guns and accompanying batteries should be so placed to co-ordinate the infantry commander's local plans of action. Such artillery has cut away from rear control, and its activity must be co-ordinated to some infantry plan. As regards placing other artillery under infantry commanders, this is a situation that the orginal orders of the division can easily provide for cancellation at call. I have found that working on a well co-ordinated order that no great question is involved. Control of concentrated fire naturally vanishes under such infantry control and I believe if the artillery avaliable is relatively weak, that such control should emphatically not pass to infantry commanders, as all artillery must be kept in hand by the Chief of Divisional Artillery for needful concentrations.

During retreat it will of course be necessary to often leave artillery covering the retreat under the command of an Infantry commander.

Obviously advance and rear guards, and flank guards, and possibly outposts may require artillery very properly to be commanded by an Infantry commander. -F.C. Doyle, Colonel, 305th F.A.

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Too great a tendency exists on the part of some Division Commanders to destroy the unity of the artillery command by feeling that the artilley regiment or lower unit in order to support infantry must be under the command of the infantry. In one Division I found the two light regiments assigned to the command of one Infantry Brigade Commander who was holding the entire Division front, the other Infantry Brigade being in reserve. This Infantry Brigade Commander gave all the orders to these light regiments and the Artillery Brigade Commander had been placed in a position where he was the commander in name only as far as two of his three regiments were concerned.

The practical effect of the orders from G.H.Q. concerning accompanying guns and infantry batteries was that in some Divisions (one in particular that I could mention) whit assignment of accompanying guns and infantry batteries was ordered in Division orders simply to comply with the G.H.Q. order and without any comprehension of the roles of such guns or batteries. After such assignment the ignorance on the part of the infantry commanders concerned as to how these guns and batteries should be used resulted in their being left idle practically all of the time, and not result being that so many guns were left out of action.

With artillery officers of good judgment and infantry commanders with an appreciation of what such guns and batteries are for, and with a willingness to leave their technical handling to the artillery, these guns and

batteries can be of inestimable value and on one or two occasions have proved this to the satisfaction of the infantry within the recent experience of this Brigade; but unless the artillery and the infantry officers concerned have a thorough comprehension of the proper use of accompanying guns and infantry batteries it is much better not to attempt to use them, since no useful purpose is served and just so many guns are left out of action. -A. S. Fleming, Brigadier General, 158th Brigade.

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It is recommended that Field Artillery never be placed under command of subordinate infantry commanders. -G.G. Gatley, Brigadier General, 67th F.A. Brigade.

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I believe this to be very sad. -Q.A. Gillmore, Colonel, 112th F.A.

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Under no consideration, and at no time should any artillery of any description be placed under the command of any subordinate infantry commanders. It has been found that these officers are rarely capable of using the artillery which they have at their hands, and very seldom make but little use of it. Their one-pounders and mortars are almost invariably in the rear. -E. St. J. Greble, Jr., Colonel, 76th F.A.

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It is believed that numerous occasions will arise when small units or even batteries of artillery must be placed under the command of subordinate infantry commanders. This situation indicates the necessity for training artillery and infantry officers together, to such an extent as will permit each to understand the possibilities and limitations of the other. -I.A. Haynes, Brigadier General, 64th Brigade.

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When one arm of the service supports another, such a thing as waiting to be told what to do under every circumstances simply indicates a lack of initiative outside the question of command. Artillery ordered to support an infantry command should be under the command of the infantry supported. This command can be exercised with great lack of intelligence if there is no agent of understanding (such as the liaison officer) to guard aganist misuse or improper use. It is believed that an artillery commander who recognizes his unit as a part of the infantry command to be supported, will have fewer resulting mistakes than one who assumes the attitude of a seperate unit. Team work cannot be thus secured. The support completed, the artillery resumes its orginal position of subordination to the higher artillery commander. -T.N. Horn, Brigadier General, 7th Brigade.

I recommend that this never be done. It has been tried out but I believe always with failure or certainly not with the maximum results. One subordinate infantry commander is not fighting the whole battle. Things to him might seem very important at a particular point and that might be so while at the same time the division commander knows that the situation at another point is vital. There should not be any passing of the buck by artillery commanders to infantry commanders. The infantry commander probably knows nothing of your ammunition supply. He may be getting it hard but somebody else may be getting it harder or he may be himself half an hour later when the ammunition is low.

Give all support possible to the infantry. Designate certain batteries to fire for a subordinate infantry commander when he needs it and at his call. Have direct liaison from them to the batteries designated to fire for him to make the support as direct and prompt as it can be done but do not place artillery units under the command of subordinate infantry commanders. -J.T. Kennedy, Lt. Col., 5th F.A.

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It is not considered advisable to place artillery under the command of subordinate infantry commanders; the number of subordinate infantry commanders who have sufficient knowledge of the proper use of artillery is too few to warrant this practice. A battalion of artillery placed under the command of the infantry regimental commander in moving warfare saves much time and avoids much delay. -C.R. Lloyd, Colonel, 10th F.A.

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The artillery should be so flexible as to permit of the placing of artillery under subordinate infantry commanders on special occasions, when for the performance of the particular mission of smaller unit some artillery is necessary. It is believed that this will be the exception and not the rule, and that while our batteries should be trained for this work, it should be understood by both the artillery and the infantry, that only special tactical cases warrant this use of artillery. -A. McIntyre, Brigadier General, 154th Brigade.

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The placing of artillery under command of subordinate infantry commanders. If the subordinate infantry commander knows how to use it and will not "pass the buck" and the conditions warrant it, then put part of the artillery under his command. There can be no fixed rule. I believe that the strength of the artillery is dissipated by putting it under the infantry commanders with their present knowledge and experience. They know just about as little about artillery as the artillery does about infantry principles. R.H. McMaster, Colonel, 21st F.A.

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Should never be done. Wherever it becomes necessary for the two arms to act in conjuction the command should rest with a general officer, with a trained staff represented by both arms. An artillery or infantry officer does not and cannot be supposed to have that knowledge of other arms, its powers, its limitations and methods, to fit him for command of such a force. To place the responsibility upon either must invariably result in failure of the mission or the needless sacrifice of the other arm so assigned. -J.A. Mack, Colonel, 102nd F.A.

I site two instances from my own experience: On October 31, 1918, pursuant to orders, I reported with my Battalion at Sommerance to Brigadier General Brett, commanding the 160th Infantry Brigade who was to command the leading elements in the offensive beginning November 1st in the 80th Division Sector on the Neuse front. My orders were to furnish two guns to each of General Brett's regiments as accompanying guns and my remaining guns less one battery to accompany and support his advance. General Brett explained to me the situation and his plans, and then told me that I was an artillery officer and presumably I knew my business, that I would dispose of my units in such manner as to best assist him in carring out his purposes and that I should keep him informed of our whereabouts.

This I proceeded to do, my accompanying guns and accompanying batteries were always where he knew he could find them, no element was ever futher in on his line. On several occasions, in fact invariably when it was necessary we destroyed machine gun nexts and silence hostile batteries which were holding up his advance, and the whole operation was successful in every way. Where direct fire was necessary and advisable, it was used, but the great advantage of indirect fire possessed by field artillery was frequently taken advantage of and the results were entirely satisfactory, both to him and myself.

Later I received similar orders and reported to a Lt. Colonel of Infantry who for some reason was exercising Brigade Command in the same offensive. He placed my accompanying guns under the direct command of the majors commanding his leading infantry line, who without any knowledge whatever of field artillery undertook to exercise direct command of artillery units and the Lt. Colonel in question insisted that my guns at all times, physically and actually accompany the infantry advance. When I explained to him that this would proably result in the destruction of my horses, the killing or wounding of my personnel and the immobilizing of my guns, he replied that made no difference, the men liked to have the guns on the line.

The artillery support under this officer and his subordinate battalion commanders, would have been a total failure except for the weak resistance we encountered and the energy and initiative of my battery officers who complied with the spirit of their instructions, but took matters more or less into their own hands. They accompanied the infantry all right, having the guns never less than 1000 or 1500 meters in roar of the infantry elements, and one entire battery passed through Bouzancy and Bar were for 24 hours actually in advance of the infantry lines.

I recommend that the placing of artillery under command of subordinate infantry commanders be limited to assisting necessary artillery units to the support of specific infantry element and that in every instance the artillery officer in command of such units be fully informed of the general situation and plan as well as of the specific mission of the infantry he was supporting and that the disposition and movement of their pieces and the conduct and delivery of fire be absolutely under the control and direction of an artillery officer without interference from any infantry commander, but that the innfantry commander should of course be entitled to call upon the artillery for any artillery specific fire he might desire. I wish to add that I repeatedly saw field artillery called upon to go to places and to perform missions which were essentially the duties of one pounders whereas the one pounders were left in idleness and seldom used at all. -C.G. Mehard, Lt. Col., 321st F.A.

I see no advantage of placing the artillery under "command" of the subordinate infantry commander as the desired support of the artilley can usually be better and more promptly given if the "command" is left with the artillery and the proper liaison established. It might happen that artillery assigned for the immediate support of a particular infantry unit at one time in thc action might have to be withdrawn and assigned to a more important mission at the time. This would be difficult if the "Command" of the artillery had passed to the Infantry Commander. -E.A. Miller, Brigadier General, 6th Brigade.

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Two batteries of this regiment were used as accompanying batteries in the offensive which commenced September 26, 1918. One battery was assigned to each of the Infantry regiments. These batteries were put under the absolute control of the Infantry regimental commanders. It is thought that the best use was not made of them, due to the lack of familiarity with the powers and limitations of Artillery, which were displayed by the Infantry officers concerned. The guns were put in positions which were selected without consultation with the Artillery officers, and in some cases, were placed in places where they could do little or no good. To use batteries in this manner was a waste of time, materiel, and personnel. Unless officers under whom batteries are operating are thoroughly familiar with their powers and limitations, it would be a whole lot better to leave such batteries with their battalions, where they properly belong, or else let a trained artilleryman have something to say as to where and how they were to be used. In one specific case, a battery was run away forward, practically in the Infantry line, where it was of very little use, whereas, if it had been placed in any one of several good positions, about 2000 meters in rear, it could have done very valuable work. The placing of batteries under subordinate Infantry commanders is for the above reasons not recommended. -W.H. Rucker, Lt. Col., 16th F.A.

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As recommended by G.H.Q., I am convinced it works well. -W.R. Smith Major General, 36th Division.

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Units of artillery must always be under the command of the Commanding Officers of assauling battalions to the extent that they can call for the fire of these units and their call takes precedence over all other missions. To this extent these officers must command the batteries, battalions, regiments, or brigades designated to supply their needs. Futher than this the command over artillery by infantry officers need not and should not extend. It is the duty of the artillery to place these designated units where they can do all tasks in the interest of the infantry. The infantry commanding officer is already overloaded with duties and he has neither the desire nor the time to exercise any futher command over the artillery than to call for the fire, which he has a riight to expect. Even in this he must be mainly dependent upon the artillery liaison officer with him, who not only responds to the call of the infantry commanding officer, but who must anticipate this call by seeking out and discovering targets for the artillery aganist these targets. Proper understanding will simplify and clarify the funcitoning of artillery under infantry commands. -C.P. Summerall, Major General, 5th Corps.

The tactical control of artillery is not well enough understood by subordinate infantary commanders to justify their being put in command of Artillery. Whenever the units of this Brigade have been placed under the command of a subordinate infantry commander, the artillery has been given impossible tasks. If subordinate infantry commanders would indicate their missions to the artillery commanders and leave the tactical employment of the artillery arm to the artillery commander, good results would be obtained. For some unaccountable reason many infantry officers considered themselves critics, judges and executioners of artillery officers, and they acted accordingly.

One regiment of this Brigade was ordered by an infantry officer to leave its position about 10:00 o'clock at night and take part in a rolling barrage from a distant position at day-break. That is, it was to make a reconnaissance, take up a position, orient its guns and compute firing data for a rolling barrage all in the dark and in country over which the regiment had never manouvered and which was under hostile fire. As a matter of fact, the regiment did open fire one hour after day-break, but it was criticized for not being ready at day-break. Moreover it could have entered in the rolling barrage and carried the infantry to their objectives from its original position.

Another time, a colonel of artillery found one of his battalions under orders from an infantry officer, moving along a road to an open space which was under hostile observation and which was being heavily shelled. The colonel moved the battalion about 400 meters to the rear and placed it in a defiladed position from which place the guns had a range of at least five kilometers in advance of the infantry. For moving his battalion to the rear and placing it in a protected position he was severaly criticized by Infantry Officers.

At another time, ten minutes before a rolling barrage was ordered to start, Brigade Headquarters was informed that the left of the friendly infantry line was about 200 meters in rear of the line previously given and it was directed that the barrage line be changed accordingly before the Infantry started.

None of the above occurrences were in Divisions commanded by Artillery Officers. In those divisions the closest cooperation and the most cordial relation existed throughout the operations.

After more than thirty years service I am of the opinion that in general, artillery officers have more knowledge of the tactical employment of infantry than infantry officers have of the tactical employment of artillery. I therefore consider it dangerous to place artillery under the command of subordinate infantry commanders.

By subordinate infantry commanders, I mean colonels and other field officers of infantry.

It will often be necessary to attach an artillery regiment to an infantry brigade, in which case the results will depend upon whether or not the brigade commander and his staff have the tactical employment of the batteries to the artillery commander. In some instances, the cooperation of our regiments with the infantry brigades was close and most satisfactory to all concerned, but in other instances, and in spite of every effort on the part of our regiments to render service that would be satisfactory, the commands our officers received and their treatment generally, were in my opinion inexcusable.

Some general instructions of infantry brigadier generals and colonels on the subject of the tactical employment of artillery, I consider essential. -H.D. Todd, Jr., Brigadier General, 58th Brihade.

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Artillery should be employed only under the command of its own officers. The infantty should assign general missions only, leaving technical and tactical handling to the artillery officers. Any other method results in loss of power. -J.F. Walker, Colonel, 314th F.A.

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No advisable and with competent infantry and artillery officers in command of respective units, not necessary. G.L. Wertenbaker, Colonel, 345th F.A.

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I consider the placing of artillery under the command of subordinate infantry commanders, a great mistake. Unless infantry commanders are trained in artillery, and thoroughly understand what may be expected of it, I do not think that they should have this weapon under their charge. C.D. Winn, Colonel, 306th F.A.

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A D D E N D U M

To

ANNEX 11

Recommendations of Artillery Officers,

American E.F.

Received after the Dissolution of the Board.

PLACING ARTILLERY UNDER COMMAND OF SUBORDINATE

INFANTRY COMMANDERS.

the complete control of the Division Commander. To accomplish his mission, he will, if he deems that to be the best method to get results (as sometimes will be the case), place artillery under the command of brigade or subordinate infantry commanders. This authority cannot and should not be abridged. If the Division Commander cannot be relied upon for the wise exercise of his command, he should be replaced, but while in command his authority must continue parallel with his responsibilities. It appears to me, therefore, not a question as to whether artillery shall be placed under the command of subordinate infantry commanders, but merely the matter of how to secure the desired results when so placed.

A Division Commander, controlling a unit of all arms, is supposed to know how best to utilize each of them to accomplish his mission. Similarly, the commander of a brigade or smaller unit of infantry to which artillery is assigned should know what may be expected of his artillery and what missions should be assigned to it. In all cases, the advice of the artillery commander should be sought, missions assigned, and no attempt made to assume actual command of the artillery. If the Divisional, Brigade or Regimental commanders (end their staffs) are to be expected to know how to use the artillery in the execution of their missions, they must be trained to that end. In other words, they must know something of artillery generally- not necessarily in its technical details but in respect to those general features which are of interest (and acute interest) to an infantryman and to an infantry commander. Staff college courses are deficient in supplying such information. In short, all staff officers and commanders, or prospective commanders, should know more of artillery than generally is the case.

The essence of modern artillery methods is such centralization of control as will give the maximum of results with the materiel available. Assignment of guns to subordinate infantry commanders results in a return to the ancient system of dispersion, with all its defects, unless the very best of judgement is exercised. Judgment is but a combination of training and experience. Training in the general principles of the use of artillery in support of the infantry is essential to every infantry commander. It is believed that this is the solution and the only possible solution of this question, it being assumed also that the artillery officers are trained as to their duties in the support of the infantry. Edw. Burr, Brigadier General, 62nd Field Artillery Brigade.

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1. If this is practical and good practice, then why should it be necessary to have artillery officers given special courses of training in the tactical handling of the weapons, and require any experience in field artillery work from the field officers of that arm.

2. Granting that the procedure is practical, and that some tactical training is necessary, then it should be required of the infantry officer, who is to command units of field artillery, that he familiarize himself, through a course of instruction and actual practice, with the field artillery materiel.

3. If the subordinate infantry commander can be trained to habitually delegate to the field artilleryman under his command, a definite mission and then leave it for the field artilleryman to work out the solution, the problem might be different; but when the infantry commander designates a position and tries to specify the kind of ammunition which will be used (simply because he has heard something about it) then the position of the field artillery is rendered doubly difficult and the results are bound to be disappointing, if not disasterous.

training which appears necessary to make competent field artillery officers, then we had better train all our field artillery officers as infantrymen, unify the two arms and materially shorton the time of preparation for the field.

Before entrusting the infantry, as a whole, with the command and direction of the field artillery, would it not be well to inquire into the efficiency they have attained in the handling of the machine guns and the one-pounders already issued to them. -H.M. Bush, Colonel, 134th Field Artillery.

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1. There is no objection to the placing of artillery under the command of subordinate infantry commanders, provided the officer commanding the artillery so placed is given very careful instructions as to his mission. Infantry commanders will always be reasonable and ready to follow the suggestions of artillery officers as to the modes of tactical employment of the artillery. The real difficulty in this assignment of artillery to the command of subordinate infantry commanders lies in the danger of infantry commanders giving little or no orders to the artillery under their orders; but if the artillery commander is wide awake and experienced he will not be left out of the game simply because he is overlooked by the infantry commander. -J.R. Davis, Colonel, 15th Field Artillery.

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Do not approve of placing artillery under the command of subordinate infantry commanders. These, as a rule, do not understand the proper uses and capabilities of the gun. -A.G. Fisher, Colonel, 307th Field Artillery.

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1. Artillery must sometimes be placed under the command of subordinate infantry commanders. It is not desirable, unless absolutely necessary, becuase of the lack of training these infantry commanders in the use of auxiliary arms. The plan satisfactorily followed in this brigade was as follows:

A. At the start of an operation, a plan for artillery support was made in detail at Artillery Brigade Headquarters, just as the plan for the infantry action was made in deteil at Division Headquarters. As the operation progressed, the control of the artillery by the artillery brigade commander was as complete as the information of the situation permitted, just as the control of the infantry by the division commander was as complete as the information of the situation permitted. When the artillery brigade commander got out of touch with the details of the action, one light regiment passed, without futher orders, to the command of each infantry brigade commander, the regimental commander acting in the same relation to the infantry brigade commander as the artillery brigade commander acts to the Division Commander. Likewise as smaller units of the infantry brigade got out of touch with the infantry brigade commander, the battalion of the light regiments each acted in support of an infantry regiment, the battalion commander acting as the Chief of Artillery for the infantry regimental commander. In the great majority of cases this plan worked successfully. Where it failed, the failure was almost always due to the fact that the infantry commander did not give the artillery commander a mission with the greatest freedom of action to accomplish

that mission. The infantry commanders were too prone to prescribe the details of the artillery action.

2. As stated above it becomes in certain instances absolutely necessary to place units of artillery under command of subordinate infantry commanders. The fact that in some cases artillery so commanded has not been successful should not lead to the retention of command by higher artillery commanders when they are out of touch with the situation, but should lead to a closer association of the commanders of corresponding units of artillery and infantry and a much broader education of subordinate infantry commanders in the use of auxiliary arms. --C.C. Hearn, Brigadier General, 153rd Field Artillery Brigade.

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Placing of artillery under command of subordinate infantry commanders.

A very unsatisfactory and inefficient arrangement, it is an effort to remedy failure to co-operate between the subordinate infantry and artillery commanders. Such failure shows inefficiency in one or the other and should be so treated. -A.I. Henderson, Captain, 7th Feild Artillery.

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This regiment was usually in liaison with the Division Artillery Commander, infantry liaison being supplemental. For special missions in minor operations, liaison should be had with the infantry commander conducting the operation with a view to assist the operation rather than to place the heavy artillery under the command of the infantry commander. -E.O. Sarratt, Colonel, 309th Field Artillery.

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The Major of a front line infantry battalion has enough to do without wondering what he has to do with a battalion of artillery. W.G. Price, Jr., Brigadier General, 53rd Field Artillery Brigade.

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Artillery commanders should retain tactical control of their commands when supporting the infantry. Infantry commanders should only determine the objectives sought to be attained by the infantry and request suitable artillery aid. Methods, kinds and rate of fire, and positions to be occupied by the artillery should not be prescribed by the infantry commanders. Much trouble can be avoided if the artillery commander will get in close touch with the commander of the infantry he is supporting and talk it over. Personality has much to do with it. -G.A. Wingate, Brigadier General, 52nd Field Artillery Brigade.

Headquarters First Division,
American Expoditionary Forces,
Montabaur, Germany, 6 Mar., '19,
U.S. Army, P.O. #729.

Brigadier General Wm. C. Rivers,
5th Field Artillery Brigade,
Dudolango, Luxembourg,

Dear Rivers:

* *

The inclosure particularly pleased me and, without awaiting your authorization, I am going to publish it to the Division with the following preface,-

> The following paper is so full of common sense and sets forth so simply many principles governing the use of divisional artillery that it is republished for the information of everybody. It is recommended for consideration by all officers.
>
> I cannot express any better than that my approval of your paper.

* *

Very sincerely yours,

E.F. McGlachlin Jr.

Dear Ernest: See what a nice compliment McG paid my little Art. paper, of which I sent you a copy. The Corps folks also made a memo. on it and bore out every point I made. Think I'll ask to go to your school up at TREVES--went up there to see Herman Hall yesterday, and seems to be good thing. The future of the F.A. -Cav. Regts is on the knees of the Gods I suppose like all army matters.

5TH ARTILLERY BRIGADE
16 FEBRUARY '19

MEMORANDUM FOR G-3, 5th DIVISION

RELATIVE TO FORM OF PARAGRAPH IN DIVISION ORDERS RE USE OF DIVISIONAL ARTILLERY.

The helpful critique we had at the end of the terrain exercise on Friday, and the Division Commander's questions about the use of the artillery, set me to thinking about the matter, especially after I had had a chance to talk over the work of the day with the artillery regimental commanders.

My brief experience in the artillery has been limited to the command of a regiment in two major and one minor engagement, and of a brigade for a regiment in two major and one minor engagement, and of a brigade for a month in a sector that included several minor engagements, so I don't feel like generalizing too much. Still, as a regimental commander on the Marne I had fourteen batteries, and when my regiment was detached to work with Summerall's Division at St. Mihiel I had first one, then a second and then a third regiment attached to us for tactical purposes; but that very soon developed into mostly a billeting proposition after the first couple of days where we were.

My experience has been brief therefore and has been mostly at the practical end of the line rather than the contemplative end. We have had, however, a tromendous lot of literature sent us from various Artillery Headquarters, based on observations in many engagements, of men with a great deal of experience at both ends of the line. To me, it seems that a good deal of the diversity in writings on this subject comes from a failure to hold to one or two general principles, and to fully understand the meaning of one or two words:-

(a) The Division Commander must have someone generally responsible to him for the effectiveness of the Artillery;
(b) The meaning of the word "Support", an old word in our Field Service and other Regulations: "support" means to assist, to hold up, to sustain;
(c) Our slowness, due to the speed with which we had been injected into warfare, to yet fully comprehend the meaning of the word "liaison", which we were not accustomed to find in our old books.
(d) The American tendency to give play to individual iniative and to the skill of individual men, rather than to test out fully the doctrine laid down for us by the General Staff, in books like Combat Instructions, Sept. 5, 1918, which G.O. 207 that we are now working under tells us to follow.

My understanding of the orders in the exercises on Friday, and that of my umpire also, was that the light regiments were taken entirely from my command and that I had only very general responsibility to the Division Commander for the use of his artillery. Therefore, it seems to me our Division Order of Friday went counter to both (a) and (d) above. I never happened to see an order that went so far in

that direction. One brigade apparently understood the order for a battalion of heavy guns to support the brigade as giving authority to give direct orders to that battalion, which in one case were contrary to orders it had received from the Artillery Brigade Commander, alos direct orders for fire on targets which had already been covered, which tends to cause confusion and dissipates ammunition. One of the Infantry Brigades gave orders of a general nature to an artillery regiment under their command, while the other Brigade gave more detailed instructions, sub-dividing the unit of artillery. I beleive the colonel doesn't even yet know just whether sub-units were futher divided up. In one regiment at a time when an enemy attack seemed imminent, one battalion of artillery, instead of firing an OCP on enemy front line, was ordered, by infantry regimental commander, on counter-battery work, (task for Corps Artillery, or Divisional 155's), firing of gun shells on an enemy strong point, and harrassing fire on a road. Ammunition goes faster than it can be supplied if used like that, and then the writings of our General Staff Observers contain warnings that in some instances they saw infantry depend too much on such artillery fire, failing to use to the full extent the fire power of the several weapons under their own command.

Another thing touching the responsibility of the Division Commander is that where control of the artillery is centralized as much as the situation allows, it ought to help keep the liaison between the two Infantry Brigades and also ought to help the Division Commander to get accurate information as to the situation in the front; because if the Divisional Artillery Officer is well informed through his own lines the Division Commander gets this additional data and checks on the information coming through the Infantry Brigade lines.

When we all get to thoroughly understand the liaison means not merely a sort of courier service connection, but it means understanding other peoples arms and mehtods and difficulties, etc., we will be better able to make use of that word I think there will be fewer attempts to carefully define "who's P.C. shall be with who's P.C.", etc. As a practical matter of fact we all know that in many places good for one P.C. there is not physically room enough to put in a P.C. of an artillery regiment, even when lightened as much as possible, with their horses and fourgons and mess outfit, in addition to the paraphenalia of the Infantry Brigade Commander or infantry regimental commander. Sometimes the artillery regimental commander ought to be with the Infantry Brigade Chief, but many times he ought to be with, and is with, the forward or most-needing infantry regimental commander, where again they are often unable to be physically in the same room. Each one has a lot to do as a commander, in locking supplies and ammunition and stock, and it takes a lot of people coming and going to do this, and if orders are too rigid they get in each others way, and a physical confusion ensues that really damages the tactical liaison.

The Artillery units were rushed through schools with a course of about one month instead of the three that had been planned, so that there is no doubt that many good officers did not have the time to fully catch the idea. The smartest and quickest ones caught on, but the truth is regimental commanders just had to hold on to them (or such of them as were not kept back as Instructors for new schools) for battery commanders and battery executives so as to make their regiments function with certainty. This fact, combined with what I call our slowness to comprehend the many meanings of the word "liaison", undoubtably made some regimental commanders send to infantry commands what you might call the good second grade artillery officers for liaison work.

That gave bad results and naturally made infantry commanders want a direct control over the artillery to an extent greater I believe that they have neither the time, the staff in numbers and training, or the physical strength to continuously and effectively carry out. This same defect in forward artillery officers I believe partly caused the demand for accompany guns and infantry batteries to become general and to be assigned at times when they were not used at all. Of course there are times when both are very necessary, but it seems to me the great constant need of the infantry in the front is "accompanying eyes", of skilled artilleryman, who can not only execute the meaning of liaison, but who can personnally adjust fire quickly, and accurately put down fire where the infantry needs it. I remember one day on the Ourcq I was supporting one of the regiments of the 32nd Division which was held up by machine guns in a farm. We had an accompanying gun somewhere out in front but we were not getting forward much. I put the man I considered my very best battery commander up at the front edge of the woods and told him to adjust us on that farm and to take command of me and both battalions and to put all 24 guns on that farm if he needed them.

I suppose an unusual man will always find some way to work a poor system and I know a poor man won't make much headway even under an ideal system; so there is the difficulty of trying to dogmatize too severly.

SOME QUOTATIONS

Combat Instructions, A.E.F., September 5th, Pars. 11, 12, 13, and 14.

French G.H.Q., Armies of the N.E. - 25th October:- This too long to quote, but the gist of it is that it attaches only batteries or sections to infantry regiments and battalions and it summarizes as follows:-

"To Sum Up:

- batteries or sections of artillery should be attached to regiments and battalions of infantry, to accompany them in the attack;

- It is necessary for the Division Commander to keep under his orders and control the operations of the remainder of the Divisional Artillery;

- the artillery command must be organized so as to facilitate the above and also so as to be able to pass from centralization to a more or less complete decentralization, and the reverse;

- the artillery must keep in close liaison with the infantry, by means of liaison detachments organized, instructed and used for this mission (Signed) "PETAIN"

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Army Memo -1st Army, 7th November:-

"What I believe to be a serious misconception of the roles of

infantry batteries and accompanying guns exists. This misunderstanding evey embraces the artillery regiments supporting the infantry sub-sectors. For example, in one Division I found the two light regiments assigned one to the infantry commander of each sub-sector. The Artillery Brigade Commander had apparently exercised no control over his artillery regiments which were de facto commanded by the infantry Brigade Commander whose two regiments were on the line. Prior to my correcting this condition the following incident occured:-

The Infantry Commander had ordered the Colonels of the two light regiments to prepare a program of fire which included a heavy concentration of all twelve batteries lasting 30 minutes and a barrage lasting 15 minutes, calling for a total expenditure of about 4000 rounds of ammunition.

There is I find a general idea that the artillery designated to support the infantry in a sub-sector has no other mission than to deliver any and all fire called for by the infantry." (Thus neglecting to take advantage of the G-2, and A.I.S. and other data coming to artillery brigades).

NOTE:- This reminds me to the frequent call for "barrage" from infantry regiments (or battalions) where they have direct command of artillery, without always understanding the limits of a barrage. For example in our sector 5 K. wide yesterday, had we fired an effective barrage we would have needed over 200 guns instead of 48. Still, as the Infantry gets to know more about the artillery and visa versa, this kind of liaison will improve of course. Some of us are apt to get a little mixed on the differences between the use of a formal barrage, where you have a great concentration of reinforced artillery, and the concentrated fire of a more limited number of guns on successive points that are holding up the infantry in the case of moving warfare.

G.H.Q. Information Bulletin No.22 about artillery, November 22, 1918, Page 15, says:-

"Actually the amount of artillery assigned for use as infantry batteries and forward guns depends on the character of the country as well as on the infantry mission. I recommend that Division Commanders order the assignment of such battaries and guns only on the recommendation of their Chiefs of Artillery or after consultation with them, and that until a greater appreciation of the method of their use obtains general instructions be issued from Division Headquaters to those under such guns or battaries should be returned to the general artillery control as soon as the attack or advance is over, unless especial reasons to the contrary exist in particular cases."

2nd Army Artillery Memorandum on the Tactical Employment of Artillery, 6th Feb. '19:-

"The Division Artillery Commander regards himself as a Staff Officer of the Division Commander, and maintains the closest personal relations with him.

A light artillery regiment should be assigned to the normal support of an infantry brigade. This does not place the regiment under

the command of the Infantry Brigadier, and the regimental commander is always under the direct command of the Division Artillery Commander.

He simply renders normal support to the Infantry Brigade and complies with calls for artillery fire made by its commander.

The regimental Commander should, in all cases, be in close personal relations with the Infantry Brigadier and their command posts should be together whenever possible.

When the movements of the Infantry Brigadier would cause a break in the communication of the regimental commander with his battalions and batteries, the latter remains in his command post and maintains the liaison by means of a liaison officer, with such assistants as may be necessary.

It is essential that the chain of command be maintained, and as the post of the Infantry Commander is determined by his ability to communicate with and command his units, so the artillery commander must go to, or remain in, the place from which he can exercise command of his guns."

The whole thing seems to take a good understanding of liaison and support. You can't support a man if you hang back and you don't know what support means, that it means to give him help and give it quickly; and not only that but to shove help on him and keep shoving it on him, even if he himself has not seen that he needs it, without sitting back and waiting for him to feel the necessity for it or to ask for it, if it is at all possible to discover or help him discover what his needs are.

Confusion of thought may arise unless one has a clear idea as to how a battle has to be won viz., by the infantry; aided by the Division High Command and the artillery and the engineers, and others.

I seemed to get news from the Division Friday, and was not cut off like the umpire thought G-1 and G-2 were, but looking back on it I feel I was cut off too much before the Division Order assigned the artillery, the first I knew being the formal completed order.

I wonder if we would go far wrong in such orders if we continued to use the familiar word "support" in a Division Order, a work we have been accustomed to, instead of getting new words and then having to define and learn their meanings and limitations?

(W.C. RIVERS)
Brig.Gen'l.

P.S. In the Mauso-Argonno ono did not need more than a regiment to get considerable "experience" most anywhere. I'll study the parts of the new I.D.R., par.529 etc., about Art. also:-just received after the above was written.

General Headquarters of
The Armies of the North
and to the North-East.
Staff.
3rd Bureau.
33.398.
Distribution:
To be distributed down to
and including regiments
Infantry,Artillery,Cavalry.

G. H. Q.

October 25, 1918.

NOTE ON THE USE OF THE DIVISIONAL ARTILLERY.

In Circular (Directive) No. 5 it was pointed out, as regards the missions assigned to the artillery after breaking through organized positions:

that it may be advantageous to place batteries or sections of artillery under the immediate control of commanders of divisional infantry, of infantry regiments and battalions;
that the division commanders should retain under their direct orders, for use as a whole, the greater part of their artillery.

It apperars, as a result of recent operations, that the preceding paragraphs have in some cases been wrongly interpreted; their exact meaning will be set forth more clearly herein.

I. The batteires or sections of artillery placed at the disposal of the commanders of divisional infantry, regiments or battalions are intended for the immediate accompaniment of the infantry. Their small strength and their mobility permit them to take full advantage of the terrain and in case of need to move across open ground (the use of this artillery by sections will be the ordinary method employed over good ground).

The battalion (groupe) from which these units are detached must furnish them the scouts and liaison agents which are indispensable and is responsible for their supply.

The accompanying batteries or sections assist in the reduction of strong points; they attack enemy guns used for close defense as well as hostile tanks.

First of all they assist the infantry to which they are attached, being ready however, if need be (similarly to the infantry troops) to give neighboring units the benefit of their support.

The infantry commander lays down the missions of this close accompanying artillery and as a rule it approximate location: he does not concern himself with questions concerning its exact position nor the execution of its fire.

The commander of the close accompanying artillery stays as a rule with the infantry commander under whose orders he is; questions concerning the conduct of fire and placing guns in battery may, however, make it necessary for him to momentarily take direct command of his unit when it goes into action.

He keeps himself constantly informed on the progress of the action. He engages on his own initiative any obstacle which stops or impedes the progress of the infantry. he must not lose sight of the fact that his ammunition is limited and the nearer he approaches his objective the quicker can he make his adjustment and the more surely and less expensively can he destroy it.

If he lacks horses he calls on the infantry for assistance in moving the guns; this assistance must be furnished to him in all cases when the circumstances permit.

II. Thus assisted by close accompanying artillery, infantry with good maneuvering ability will generally overcome local resistance; but in front of certain obstacles, either on account of their size or their strength, the means at the disposal of the battalion, of the regiment or of the divisional infantry will prove insufficient. In this case the assistance of a part or even of the whole divisional artillery will be necessary.

Under these circumstances the movements of the divisional artillery will be carried out with the maximum of rapidity and elasticity:

if it has been divided into groupings (groupements) each corresponding to one of the infantry regiments in action, having as its normal zone the zone assigned to this regiment, keeping close contact with it by means of the liaison detachment and ready to respond on the initiative of the commander of the grouping to the first call for assistance that this detachment transmits;

if, in case of need, it can concentrate the greater part of the whole of its fire on the objective designated by the general commanding the divisional infantry;

and, consequently, if the change from centralization to decentralization of command, or the inverse, can be effected very rapidly.

These principles for the use of artillery have been occasionally misunderstood during recent operations, which have shown a marked tendency towards the permanent decentralization of the command of artillery, make impossible all elasticity in this command.

In certain divisions nearly the whole of the artillery has been divided at the start among the infantry regiments; commanders of artillery regiments have been required to stay with commanders of infantry regiments.

In a short while the circumstances of the action have resulted in carrying these posts far forward the better to control the action of the infantry regiment; the artillery liaison has thus been extended excessively and has become precarious; the commander of the artillery regiment has had to turn over his command to a battalion commander (a very poor solution, as during an action is the wrong time to seperate a unit from its habitual commander), the staffs have, on account of this, become disorganized and have functioned badly, and the control of the divisional infantry commander over his artillery has thus been exercised under very irregular conditions. The combat has rapidly degenerated into a series of local actions uncoordinated and barren of results; in spite of a frequent excessive expenditure of ammunition the attacks have ften broke down in front of local resistance that would have been quickly overcome by proper concentrations of fire.

Such mistakes must not be repeated in the future.

A rigid participation of the whole artillery strength (and especially of its fire) between the infantry regiments cannot be justified; the general commanding the divisional infantry, assisted by the colonel commanding the divisional artillery, must be able to use his batteires, to move them and to direct the fire according to the circumstances of the action.

The commanders of groupings, of regiments or of battalions of artillery must above all be ready to receive and to execute orders coming from the general commanding the divisional infantry. They take station so as to assure, under the best possible conditions, their command of units placed under thier orders, liaison with the higher command and observation of the field of battle. They may have to change their positions in order to carry out reconnaissances preparatory to changing position and to get into contact (as frequently as possible) with neighboring units of infantry and artillery and to exercise a personal influence, which frequently is necessary, in the batteries and observation stations.

The commanders of groupings, of regiments or of battalions of artillery always maintain close liaison with the infantry operating in their normal zone of action by means of the liaison detachments. (1)

As stated above, these normal zones of action ordinarily correspond to the zones of attack of the infantry units, which facilitates the task of liaison detachments, permits their number to be reduced as a result allows them to be organized with more care. But it is indispensable that the commander of the artillery grouping is always able to concentrate his fire during an action on the parts of the front where the enemy is offering the most resistance.

RESUME.

-Batteries or sections of artillery to be provisionally attached to regiments or battalions of infantry for the immediate accompaniment of attacks.

-It is necessary for the general commanding the divisional infantry to keep under his orders and to handle the greater part of the artillery.

-The artillery command must be so organized as to facilitate the above and so as to be able to pass from centralization to more or less complete decentralization and the inverse.

-The artillery must, under all circumstances, preserve close liaison with the infantry; this liaison is best assured by the artillery through its liaison detachment which is organized, instructed and equipped with this end in view.

(1) (Note: The instruction of the personnel of these detachments, prescribed in paragraph 61 of "Directive 2bis" is going to be futher covered by changes in this "Directive", which prescribes that the artillery liaison detachments shall pass through the Army Center of Liaison Instruction.

This instruction has already produced satisfactory results; at the present time liaison detachments are in general commanded by officers who are of especial energy and of considerable experience, with chosen personnel and provided with necessary equipment.

On many occasions the first information concerning the progress of attacks has reached the Command by means of artillery liaison.

These detachments have proven their worth: it is only just to put confidence in them).

P E T A I N.

General Headquarters of
The Armies of the North
and of the North-East.

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3d Bureau
No. 14.560

G.H.Q. -12 July 1918.

To be distributed down to the Division.

Circular No. 5.

CONCERNING OFFENSIVE ACTIONS.

From now on the Armies must look forward to the resumption of the offensive.

The Command in all the echelons will prepare for it; it will resolutely turn all its energies towards putting into practice simple, bold and rapid methods of attack.

The troops will be instructed with this in view and their offensive spirit will be developed to the maximum. (While waiting for the distribution of the "Instructions of October 31, 1917, on the Offensive Action of Large Units in Battle," this note ((Including Annex III of 10 May 1918)) will be considered as a summary of the technical methods from which the command may freely choose for the preparation and conduct of coming offensives, following in general the outlines of this circular).

I. GENERAL CONDITIONS.

The conditions essential to the success of an attack are the following:

Training of the Command, the Staffs, and the troops.
Secrecy of preparation.
Launching the attack by surprise.
Rapid execution and development in depth.
Immediate and thorough exploitation.

TRAINING OF THE COMMAND, THE STAFFS, AND THE TROOPS

The Command and the Staffs of large units must keep themselves constantly in touch with the combat methods of the enemy in order to plan our mehtods of preparation and conduct of attack accordingly. They must work constantly to perfect the discipline, training, and instruction of the troops.

The instruction will conform to the principles set forth in "Directive No. 2 bis," of December 30, 1917, with the idea of developing especially the spirit of maneuver and the ability for movement.

The troops must acquire the ability to progress rapidly not only across organized zones but across open ground. This rule applies to all arms, which must act in unison and in intimate liaison, and it applies particularly to the Infantry,

who, making an intensive use of its own weapons, must know how to advance even if it is momentarily deprived of all or a part of the assistance of the other arms.

It is the duty of all commanding officers to keep up faity in success.

SECRECY OF PREPARATION.

The preservation of secrecy is a matter of honor for the Command and for the Staffs.

The working out and the transmission of plans and orders will be subject to the strictest suprevision.

While an attack is in a state of project only, no mention of it should be made below the Army Corps.

The Generals commanding the Groups of Armies, Armies and Corps, will be personally responsible for the studies carried out, and will take the necessary precautions to guarantee the absolute secercy of the project.

The Chiefs of service will receive only the most necessary information, as circumstances may require.

Officers who commit any indiscretion or even a simple imprudence will be subject to the most severe punishment.

The plans will not be made known to those who are to carry them out; the preliminary instruction of the troops, the organization of the zones in the rear, the bringing up of supplies of all kinds (especially ammunition), will be carried out in such a way as not to disclose the intentions of the Command.

The orders given in this connection will appear to concern simply the normal life of a defensive sector exposed to probable attack, or else will give the impression that they are for the purpose of giving a false impression to the enemy.

The operations orders will not be drawn up until the latest possible date.

They will take the form of simple and concise orders accompanied, if necessary, by maps or charts.

For purposes of information, they will be sent only to the next higher authority.

They should leave to each commander the greatest possible initiative in accomplishing his mission; a simple plan of action executed by the one who orginated it is far more desirable than a better plan less well adapted to the temperament of the executant.

On a front where a surprise attack is to be made all visible preparations must be avoided.

It is the duty of the Command to prepare long in advance different parts of the front where there is any probability of an offensive. With wide sectors of the front prepared in this manner the Command will have great latitude in the choice of the points of the attack and for each point of attack it will be possible to make the final preparations in secret and to launch the attack suddenly.

The troops will be placed in position and the necessary reconnaissances carried out in such manner as not to arouse the suspicions of the enemy.

The troops will be kept as long as possible far from the front of attack, and all precautions will be taken to conceal their concentration as well as their assembling in their waiting positions.

They will not be brought to their jumping off position until the last moment, at night and taking advantage of all natural cover (forests, villages, etc.)

As a general rule the reinforcing artillery will carry out no adjustments and will limit itself to a careful preparation of fire followed if necessary by a few rounds (accrochage) fired under conditions strictly laid down by the Command.

Camouflage will be used with the greatest care.

The strictest of discipline will be observed both in the front and rear areas, under the direct control of the Armies concerned, in order that all movements and concentrations, by day or by night, are not observed by the aerial observation and espionage service of the enemy.

LAUNCHING THE ATTACK BY SURPRISE.

A strategical surprise will be obtained according to the degree in which the preparation has been kept secret.

The tactical surprise will be obtained by the rapidity with which the attack is launched;
either with a preparation, by artillery and by bombing planes, as short and as violent as possible;
or, without preparation, using tanks to open the way for the infantry and artillery.

The jump off at day-break- or even before day-break, will usually give the best results as in this case the troops can be put into position at the last minute unnoticed.

The use of liberal quantities of smoke shells will make it possible to conceal certain preparations and movements of the troops.

RAPID EXECUTION AND DEVELOPMENT IN DEPTH.

The attack should:

surprise the enemy on his advanced positions - that he is occupying in small strength and where he will make only a weak defense;
break the line of resistance and his barrage line;
capture his artillery;
advance futher.

These different steps must be carried out in quick succession in order that the attack may have a large development before the enemy can react.

In order to advance rapidly the average rate of advance is not to be increaded but the important thing is to over-come methodically all the difficulties presented as a result of detailed plans made in advance.

To accomplish this the Command must:

have complete information on the defensive value of the enemy works over the entire depth of the zone of attack;

know the disposition and the quality of the enemy troops and consequently their possibility of resistance, counter-attack, etc;

assign in proportion to the difficulties expected the means to over-come them (which does not mean that, the greater the difficulty the more directly the powerful means for over-coming it should be applied: for an obstacle can be outflanked as often as it can be destroyed);

make a proper estimate of the time necessary for breaking through the obstacles met with in the attack;

as a consequence plan for the duration of the halts, points in the attack where it is necessary to move forward the artillery and where supplies of all kinds must be brought up.

In order for the attack to penetrate to a distance it is necessary to have in mind distant objectives; care must be taken, however, that the chances of success of the immediate attack itself are not endangered.

The possibility may even be considered of progressing beyond the objective first fixed upon; therefore the large units must be given general marching directions and zones of action beyond these objectives.

To capture as soon as possible the ground occupied by the mass of the enemy artillery will be, in all circumstances, the surest guarantee of a rapid and deep advance.

LOCAL AND DISTANT EXPLOITATION.

Experience shows that success gained in the early stages of an attack has generally been developed too late.

Every tactical success should be exploited to its limit.

This remark appleis to small as well as to large units.

The small units (sections, groups, battalions, regiments) must not stop when one of them finds its progress momentairly checked before an obstacle: on the contrary the continued progress of the units that can advance is usually the surest method of capturing the obstacle.

The commanders of the large units will bring up and throw into action at the proper time the reserves which they have at their disposal (infantry and light tanks, artillery, cavalry and other weapons) so as to assure the continuity of the attack and to keep the enemy from making a stand.

The necessary steps to carry out the above will be foreseen and provided for as compeltely as possible.

But everyone concerned, when the attack is pushing forward successfully, will remember that a quick bold decision taken on the spot is worth more than anything else; it is necessary to see, to decide and to act quickly.

The Command must show in its actions the activity that such a form of offensive renders indispensable.

The P.C. will be moved forward along with the advance making long rather than short and too frequent moves which make communication and the exercies of command difficult.

The commander, in all units, must follow and conduct the action.

His principal weapon is his reserves and therefore he must always be able to use them judiciously and at the proper time.

II.PARTICULAR CONDITIONS FOR THE USE OF LARGE UNITS AND OF DIFFERENT ARMS.

In the application of the general principles which have just been set forth the Command will adopt the means of employment of large units and of different arms to the results desired.

LARGE UNITS.

The attacking forces will not be distributed uniformly along the front.

The general plan employed will be such as to break the enemy lines at certain points, making breaches through which will pass the main body of the attacking troops followed closely by the reserves, with the purpose of:

pushing rapidly on toward the distant objectives which have been assigned;
carrying out at the same time flank attacks which will effect the enlarging of the breach and the destruction of the enemy defensive system.

At the points where breaches are to be made, first line divisions will occupy fronts of less than 2,000 meters. They will be closely supported by 2nd line units.

At other points, where the attack at first is only for demonstration, covering or liaison, the first line divisions may be spread over wider fronts and may not have to be supported by 2nd line units.

INFANTRY.

The Infantry will be echeloned in depth so as to replenish the attack to permit the flanking and the encircling of enemy strong points and so as to assure under all circumstances the protection of the flanks and resistance aganist counterattacks. Above all it is necessary to obtain:

initiative, boldness and freedom of maneuver in the push forward, in liaison with flanking troops but with no thought of alignment - the infantry will not hesitate to boldly push forward beyond the limits of the zone of action of the mass of the friendly artillery;
an intensive use of all infantry weapons.

The infantry must be firmly conviced of the fact that it is provided with weapons which permit it to exploit its first successes, and to continue its progress by reducing local resistance, through its own means, without the aid of the artillery.

We must have infantry leaders (especially in the small units) who are bold, devoted and capable of making quick decisions.

ARTILLERY.

The methodical destruction by the artillery of all the enemy defenses requires considerable time; no surprise effect can be obtained in this.

Consequently when there is an artillery preparation this preparation must be as rapid and as violent as possible and will include a large use:

of non-persistant poison gas, especially on the enemy artillery;
of yperite, on zones which our attacking troops will not have to cross;
of smoke-shells, especially before the jump off, in order to blind the observatories and the principal organs of the defensive system;
of high explosive shells and of shrapnel for the destruction of all obstacles and materiel, for the neutralization of personnel and for interdiction on the assembling points and routs of access of the reserves.

The trench artillery will use violent bursts of fire for the destruction of all nearby obstacles.

Whether the attack is preceded or not by heavy tanks the artillery must be able to support it as long as possible:

by its accompanying fire, paralyzing the defending troops, forcing them to take cover unitl the attacking lines can reach them and blinding the observatories.
by its counter-battery, interdiction and fire on fugitive targets.

The accompanying fire will have to be:

made to conform to the contemplated movements of the infantry instead of consisting simply of regular and parallel barrages;
particularly dense and covering considerable depth at the points where the infantry will meet the most resistance, in order to neutralize the automatic weapons which can hold up the attack.

The ammunition expenditure heretofore considered necessary for the accompanying fire may be reduced on parts of the front of attack where tanks are employed.

The moving forward of the artillery will be prepared and executed in such manner as to assure the infantry a consistant and as powerful as possible support during its advance, no matter to what depth it may progress.

It may be found advantageous to place batteries or sections of artillery under the immediate orders of divisional infantry, regimental and battalion commanders.

However, the division commanders will keep under their direct command, so that it can be used as a whole, the greater part of their artillery.

AIR SERVICE.

The assignment of air service units to attacking armies will tend to bring about aerial supremacy over the sector of attack.

The Command, in its own proper sphere, will lay down with great exactness the missions of bombardment, combat, observation and liaison intrusted to this arm whose role in battle is of the highest importance, and which enables all arms to work together as a co-ordinated whole.

TANKS.

The assignment of tanks will depend upon the nature of the attack and on the terrain.

On the parts of the front where the break through is to depend upon heavy tanks an effort must be made to provide a heavy tank for each 50 meters of front to be penetrated.

Light tanks are intended to accompany the infantry, to permit it to break down the resistance which opposes its progress and to repulse counter-attacks: a battalion of light tanks will as a rule be assigned to a division operating over ground where tanks may be used with best results. (See note 9.809, June 3,1918, on the use of light tanks).

CAVALRY.

The cavalry will be held ready to take part in the action:

at first, with its light elements (patrols, bicycles squads);
later, with its squadrons of auto machine guns, auto cannons and artillery.

P E T A I N.

ANNEX 12.

Recommendations of Artillery Officers

American E.F.

AMMUNITION TRAIN AND MOBILE ORDNANCE REPAIR SHOPS.

M.

AMMUNITION TRAINS AND PARKS; COMBAT AND FIELD

TRAINS; M.O.R.S.

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There should be for each division an Ammunition Train, as now constituted. Until all artillery is motorized, the horsed section will be a necessity for the Division Artillery, both for the service of ammunition to artillery positions off the road and, to a certain extent for the replacement of personnel, horses, and caissons for the combatant units in emergency.

The Division Ammunition Train should, at all times, be under the immediate direction and control of the Division Artillery Commander. The present Ammunition Train is deemed adequate in personnel, animals and materiel.

The Corps Parks, as a present organized, are satisfactory but there should be a certain number in reserve and avaliable for use in major operations.

In the pursuit of the enemy, such as occurred in the Marne-Vesle offensive, and in the Argonne-Meuse operations of November, 1918 the long hauls involved over bad roads, made the service of ammunition extremely difficult and at times well-nigh impossible.

Sufficient ammunition reached the guns only after almost superhuman efforts on the part of the Corps Parks and Divisional Ammunition Trains.

Combat and Field Trains as now constituted have proven themselves adequate and should be maintained.

There should be in each division a Mobile Ordnance Repair Shop, under the direction of the Division Ordnance Officer. These repair shops were in the main satisfactory except for the occasional interference of the Division Staff(G-1).

It is believed that they should be more closely connected to the artillery brigade, even to the extent of making the ordnance officer, to a certain extent, a staff officer of the Division Artillery Commander. -D.E. Aultman, Brigadier General, Army Artillery, 2nd Army.

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In the operation of the American Army Artillery Brigades were frequently separated from their own divisions; indeed, their service with other divisions than their own was the rule and not the exception. For this reason it is believed that the supply of ammunition for the infantry should be separate from that of the artillery and that the artillery ammunition train should be an integral part of the Field Artillery Brigade. The motor section of it should be provided with a motor truck capable of carrying both ammunition and supplies; i.e., it should have a body similar to the 3-ton Packard truck of the Q.M. department, with a four-wheel drive, but with a two-wheel steering apparatus.

The 4th Ammunition Train had a remarkable espirit de corps, due it is believed to its intimate association with the Artillery Brigade, which it served loyally regardless of the hours of labor and of exposure. It has been proposed, unwisely it is thought, to pool the motor units. There is no doubt that this would sacrifice that spirit of loyalty and service which was so pronounced in the 4th Ammunition Train, for they would no longer be identified with combat units with whom they were familiar, and whose confidence they wishes to earn and maintain. It is well not to lose sight of the personal element even in a big war.

The horsed battalion of the Ammunition Train, or so much of it as accompanies the artillery, should be provided with escort wagons, which could be used for hauling ammunition, or in emergency, rations.

It is appreciated that in peace time there will be some abuse of the use of the materiel refered to above by Post, and possibly higher commanders, but the general shortage of transportation which occurred in this war, and which doubtless will be equally prevalent in subsequent wars, will, it is believed, justify the use of what might be called a universal truck or wagon, capable of handling any kind of supply that may be needed.

NOTE: It is noted with dismay that in the recent Staff Manual referred to in Par. (a) above, it is proposed to have the Ammunition Train under G-1 of the Division (See Par.86 page 17). The Manual also charges the commander of trains with the training and administration of this unit. The purpose of an Ammunition Train, so far as it relates to artillery, is to supply ammunition in battle. To do this effectively the personnel should be at all times intimately associated with the artillery regiments. The ammunition train and the regiments should feel a part of one unit having the same aims. One of the reasons for the great service rendered by the Ammunition Train of the 4th Division to its artillery, was the service together in the training camp at De Souge. The personnel of the Ammunition Train were, and felt that they were, a part of the Artillery Brigade, and that they gave the best that was in them in their service of ammunition to the regiments. We got no such service from the Corps trains, which service was impersonal and lacked that comradeship which made our Ammunition Train carry ammunition right up to the batteries under fire, when by so doing the service of ammunition to the guns was faciliated.

There is no objection, when in permanent billets, or in a training area, to the detachment of the Ammunition Train from the Brigade for the purpose of supply; indeed, that is implied in the recommandation that the trucks should have a cargo body. -E.B. Babbitt, Brigadier General, 4th Brigade.

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Recommended that allowance of ammunition trucks for 155 mm. howitzer regiment motorized be increased to enable such regiments to handle their own ammunition supply.

Frequently between November 1st and 11th I was forced on account of lack of ammunition, to reduce the rate of fire of my battalion to 25% of that ordered, while considerable ammunition remained at positions occupied one or two nights previously. At one position 27 differeent lots of powder were delivered to the battalion making accurate adjustment impossible.

Also numerous boxes of G.P.F. charges were dumped at my position which, of course, were of no use whatsoever.

Considering instances above mentioned and the condition in which primers and powder charges were frequently delivered, I believe the ammunition supply should be handled by the regiment and sufficient ammunition trucks allowed it for that purpose. -J.K. Boles, Lt. Col., 330th F.A.

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(a) Ammunition supply.

The present regulations make the divisional artillery commander responsible for the complete ammunition supply of both artillery and infantry. The Field Service Regulations place the ammunition train under his command during times of combat. Existing orders have placed the ammunition train under the orders of the train commander when the division is not in combat. This latter system proved extremely faulty. The artillery commander who was responsible for the effiency of the ammunition train during combat had no control over the train when not actually fighting. The result was that the train commander often times interfered with the efficiency of the ammunition train. He would transfer officers and men from one unit to another. In many instances he was a disearded colonel who had been relieved from his command because of inefficiency and given command of trains. In others, he was a colonel without a job and not necessarily suited to train command. The result was failure to properly administrate the train. Futher disadvantage was the fact that the ammunition train command had two bosses, one in the time of fight and the other in the time of peace. The train commander in some cases was interested wholly in washing wagons and trucks in order that he might produce the proper camouflage for an inspector. Little did he know and often times less did he care about the condition of engines and horses. The ammunition train was frequently used by the commander of trains and by G-1 for the transport of infantry and infantry supplies, notwithstanding the fact that regulations distinctly prescribed that this train should be used for ammunition and ammunition only. Of course, there are occasions when the scarcity of motor transportation will necessitate the use of ammunition trucks for purposes other than ammunition but if the command of the ammunition train is left in the hands of the artillery commander misuse of this privilege will not be so apt to take place. An example of the interference by train commander is given in the case where one train commander removed all of the governors from the trucks, stating as his reason that in case the train was fired upon it was desired to have the trucks speed up in order to get out of range. The artillery commander, having succeeded in having a divisional order issued placing the train under his command at all times, promptly secured governors and put them back on the trucks in order that the trucks could not speed up if they were fired on by the enemy, experience having shown that fewer losses will occur from trucks handled quietly at the speed of 12 miles an hour than trucks that are out of control running 30 miles an hour. It is my belief that the ammunition train should be divided into two parts, one for infnatry and the other for artillery. The artillery train should be under the artillery commander and the infantry trian should be under the infantry ammunition officer who is part of G-1. My experience has shown me that some infantry organizations do not appreciate the use of a combat train. In many case the combat train was left well to the rear and there was no liaison between that train and the regiment. The regiment would move forward in action and would soon scream for ammunition, although its own regimental combat train had the full complement of rifle, machine gun

ammunition, hand grenades, pyrotechnics, etc. I futher noted a favorite trick of regiment ammunition officers to cache the ammunition from regimental combat trains in the brush, then go back to fill up. In some cases they would cache as many as three complete leads from their regimental combat trains, then move forward and laeve the discarded ammunition to be salvaged by the over-worked infantry ammunition train. I believe that greater attention should be paid to instruciton in the employment of infantry, regimental combat trains.

(b) Mobile ordnance repair shop

This institution should be wholly under the command of the divisional artillery commander. It should not be detached and concentrated at the corps on the excues of concentration of supplies. The mobile ordnance repair shop of a division is part of that organization. It should be shoved to the front where it can be used. Its mechanics are often needed at forward gun positions. If detached with the corps when the division moves away often the mobile ordnance repair shop remains in place, and is thereby lost to the division. Team work is essential in all cases. The mobile ordnance repair shop is a part of the team for unity of control. It is best that there should be but one commander. The biggest part of the work of the shop is for the artillery and therefore the artilleryman is the logical commander. The shop itself should be divided into two distinct parts, the infantry section and the field artillery section. If for any reason the infantry seperates from the artilelry, the infantry section should travel with the infantry until the entire shop can be re-assembled. When the mobile ordnance repair shop was put under the divisional ordnance officer there was a decided tendency on his part to use the personnel of that shop for the purpose of securing supplies, thereby interferring materially with the legimate employment of the repair shop. Such a method deprived the Divison of the full use of the shop. -A.J. Bowley, Brigadier General, 6th Corps Artillery.

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An Ammunition Train with a cargo capacity equivalent to that provided in the Tables of Organization has been found sufficeint to satisfy the maximum requirements of the Divison. The exclusive use of the Escort Wagon, instead of limbered caissons or combat wagons, cannot be too strongly urged. If the Horsed Battalion of the Ammuniton Train is equipped with say 75 escort wagons, exclusive of non cargo carrying wagons, the entire Train becomes flexible as regards service rendered. With such equipment - and this condition existed in the First Division - any vehicle can carry any class of ammunition.

The Ammunition Train should invariably be placed under the command of the Divisional Artillery Commander at least one week prior to its entry into a sector, and should remain under his command during the entire period that the Artillery is in line. The C.O., Ammunition Train should never be the Division Munitions Officer. It is believed that this latter officer should be a member of the D.A.C.'s staff, with an assistant to work in the officer of G-1 to handle Infantry Ammunition.

M.O.R.S.

The Divisonal M.O.R.S. should be at all timesunder the jurisdiction of the D.A.C. and attached to the Ammunition Train for administrative purposes. This arrangement has been followed in this Divison with highly satisfactory results.

Artillery Combat Trains.

Combat Trains for the 75 mm. regiment as provided in the Tables of Organization are adequate and are deemed essential. It is believed that any attempt to replace horse drawn 75 mm caissons with other means of transport should be suppressed. The combat train for the horsedrawn 155 mm. howitzer regiment is considered inadequate. Horse drawn vehicles with a cargo capacity of 40-50 rounds should be designed and supplied to such organizations at the rate of two vehicles per gun. Sufficient motor trucks should be attached to Regimental Headquarters Co., to carry the balance of 1 day's fire. In the case of motorized howitzer regiments the horse drawn ammunition vehicles should be replaced by a like number of tractors and trailers.

Combat trains should be consolidated within the regiment into Regimental Combat Trains and under the immediate jurisdiction ofthe Regimental Munitions Officers. -H.W. Butner, Brigadier General, 1st Brigade.

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I believe that each regiment of Field Artillery should have its own ammunition train. -T. CampBell, Colonel, 329th F.A.

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Recommended that the Divisional Supply and Ammunition Trains be combined and operated under the one head. -

As to the equipment and personnel of an Ammunition Train, I can make no recommendations which, in my opinion, would improve the present tables of organization of such a Train. -G.M. Cannon, Major, 304th Ammunition Train.

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Recommended that the supply of ammunition in the Division be consolidated with the supply of rations and equipment, all to under one head. An assistant to be in touch with all ramifications of each item of supply to be a part of the Staff of the C.O. of Supply train.

Recommend that the use of infantry and artillery caissons in the horse section of the Ammunition Train be discontinued and escort wagons or some similar vehicle substituted. -W.E. Caton, Captain, 304th Ammunition Train.

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The Divison Ammunition train should consist of motor and horse transportation assigned definitely to the F.A. Brigade. This train normally will handle the F.A. and all other ammunition of the Division and will operate under the orders of the Division Munition Officer who must be on the Staff of the F. A. Brigade Commander. This officer has as his assistant an infantry officer for munitions of the infantry brigades. In the event that the F.A. Brigade is detached from the Division that part of the Ammunition train used for F.A. ammunition remains with the Brigade, whereas the part which is used for the infantry ammunition stays with the Division operating under the orders of the Assistant Munition Officer.

This ammunition train normally delivers ammunition from Corps to Regiment dumps but must be trained to deliver ammunition to battery positions, thus cooperating in every way with the ammunition batteries of the regiment. Heavy motorized F.A. must have regimental Motor transportation of its own for ammunition supply, and the ammunition trains as now constituted should be assigned to H.A. Brigade. The M.O.R.S. must be considered and integral part of the Division. It should contain about 100 men, operate under the Division, O.O. and consist of 3 sections.

1° Artillery rep. Section.
2° Small Army Rep. Section.
3° Div. Supply Section.

Whenever the organic F.A. brigade is detailed from its Div. its artillery repair work must be done by the Div. to which it is temporarily attached.

Heavy M.O.R.S. must be provided at the rate of 1 per H.A. Brigade. -Army Center of Artillery Studies.

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Ammunition train officers have been found to be deficient in their knowledge of ammunition and fuses and should be thoroughly instructed. They have continually mixed lots of ammunition and otherwise disregarded fundamentals of successful firing. Regimental and battalion commanders are made responsible for the supply of ammunition, but under the circumstances that have existed, they have had no control over the obtaining of such supply. AL. Cox., Colonel, 113th F.A.

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Ammunition Trains should be provided with a certain number of caterpillars for facilitating the getting of ammunition to the batteries, particularly the horse drawn batteries, and for purpose of hauling trucks out to difficult situations. Same is true of horse combat trains. The M.O.R.S. has been most satisfactory. -R.H. Dunlap, Colonel, 17th F.A.

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The following recommendations are submitted for change in Ammunition Train organization:

(a) One motorized company to be equipped with 20 - 5-ton standard tread trucks. These trucks would be very useful in hauling from rear to forward sumps, where the condition of the road will warrant their use, and their larger tonnage facilitates loading and unloading, which factor is very important one in such dumps, as the element of time there, is often the greatest hindrance to progress.

(b) Three companies to be equipped with 20 each, 3-ton four wheel drive trucks. All truck bodies to be of sufficient width to take in a 75 mm. gun.

Experience has shown that a four wheel drive truck will go over roads impossible to two wheel drive trucks; that they will extricate themselves from bad places in roads where a two wheel drive truck will have to be pulled out of.

(c) Train and Motor Bn. Headquarters to be equipped with two each, light delivery trucks.

To go on errands which to send a heavy vehicle is a waste of gasoline.

(d) Each Ammunition Train to have on Ordnance Detachment for light repair work. Detachment to be equipped with machine shop truck and two light delivery trucks.

If such a detachment is with a train at all times, repairs can very often be made, which if it is necessary to send the truck to the M.T.O. may become aggravated by the extra trip, and hense take four or five days to repair. The machine shop truck to be used for this light repair work, and two light delivery trucks to be used to go after supplies and to carry aid to crippled or disabled trucks on the road.

(e) Each company in Motor Bn. to have an officer, whose sole duty is to look after condition and repair of trucks, and subordinate to Company Commander.

A highly trained technical officer in this capacity would be useful in inspecting and supervising trucks, a duty for which the present number of officers in a company do not have the time under field conditions, and very often lack the necessary knowledge.

(f) The 33 limbered combat wagons in Horsed Bn. to be replaced by escort wagons.

The limbered combat wagon is a horse killer. It accomodates only a few kinds of boxes in th partitions for that purpose, and often the Ammunition comes in different boxes. Its use is too limited to warrant its being hauled and its only good feature is that it is more easily turned. An escort wagon answers every purpose of the combat wagon, and in addition can be used to advantage for artillery ammunition. Indeed many Artillery Officers prefer the escort wagon to a caisson.

(g) Each Division to have four tractors to keep for snatch purposes on bad hills in Divisional area.

All who are familiar with traffic conditions at the front, have seen traffic blocked for hours on a hill where the road was too slippery, or bad for trucks to go up loaded, under their own power. The hills have been cleared by pushing, towing and maneuvering for several hours, where, with a tractor, all tracks could have been hitched together by their two ropes, and with their own power, supplemented by a tractor in front, the hill could be cleared in a short time. This has been demonstrated. -G.I. Faddis, Lt. Col., Inf., 4th Ammunition Train.

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ORGANIZATION:

Following out the idea of the present Commanding General, 155th Field Artillery Brigade (Brigadier General J.H. Bryson, U.S. A.), which disposes of the horse drawn vehicles, animals and personnel of the present Ammunition Train, by placing them as an additional battery in each battalion for ammunition hauling purposes, under control of the battalion commander of each regiment of artillery, in which plan the writer concurs, and bassing the actual Ammunition Train upon truck drawn vehicles entirely, the following organization of an artillery brigade is indicated:

2 Regiments light artillery
1 Regiment heavy artillery
1 Ammunition Regiment,

the latter to be organized as follows: one Colonel, an experienced soldier; one Lieutenant Colonel, motor transport expert, to be M.T.O. of the regiment; one Captain, Adjutant; one Captain, Supply Officer; one Captain commaning headquarters company of sufficient size to include a supply section, and three battalions - each battalion to consist of one Major; one Adjutant, Captain; one M.T.O., Captain; one Supply Officer, 1st Lieutenant, Battalions to be as follows:

1 battalion of heavy trucks - say five ton
1 battalion of medium trucks - say three ton
1 battalion of light trucks - say one and a half tons,

with sufficient number of enlisted personnel to provide for dump and loading detail, actual statistics as to enlisted and commissioned personnel, as well as number of vehicles, etc., to be worked out by the General Staff by means of actual experiment on the field under conditions approximating those of active service.

REASONS:

It has been proven in this war that divisions cannot always count upon having close and direct communication with railhands, especially for ammunition, nor can Corps, or the transport of higher units be depended upon to accomplish all the hauling from the rear to the Corps dump. For example; At Chateau Theirry, the 2nd Ammunition Train, under the command had to haul frequently from the Army Dump at Pierre Levee, about 15 miles in rear of the train park and 20 miles in rear of the front line of infantry. Wherefore - heavy trucks are for such hauls, as well as for 155 ammunition at the front. The medium trucks are suggested for steady all around work and the light trucks for high speed, say 25 miles per hour, to be used in pushing up small arms ammunition within range of infantry combat trains, as well as in the haul of artillery ammunition across fire swept zones where a heavier truck would have put slight chance of survival.

Following up the suggestion made in Paragraph 2, for which General Bryson is the authority, it is not believed that horse drawn and motor drawn vehicles should ever be combined under one regimental command. It is impossible to move or operate such a train together as a whole. Should the train move at horse rate for any distance, it is inevitable that the clutches of the motors would burn out; should the train move at truck rate the teams would be ruined in a very short time.

The ammunition regiment should be a regiment in every sense of the word and its commander equal in grade to other commanders of regiments of the brigade, or which latter the ammunition regiment should at all times be an integral part.

In regard to the M.O.R.S. it is not believed that this unit should be part of the ammunition train, but that it should be a unit of the artillery brigade, under its own commander and in direct communication at all times with the commander of the brigade.
-J.C. Fairfax, Lt. Col., 305th Ammunition Train.

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It has been necessary to increase the size of Train Headquarters Detachment by details from Companies and also to use Privates for duties of such responsibility that additional non-commissioned officers should be authorized in Tables of Organization.

The Wagon Company has never functioned in action as a part of the ammunition Train. Owing to its being under horsed, in comparison with the six horse ciassons, it is unfitted to march with the caisson companies. Owing to the comparatively small number of privates, it has been unable under stress to maintain its animals and equipment on a par with the animals and equipment of the caisson companies. The Commander of the Horsed Battalion who commanded this Company during action recommends the addition of 28 Privates to the Company.

An Ordnance detail trained in the handling, storage and classification of ammunition would have been of great assistance many times.

Very good use could have been made of two caterpillar tractors had they been avaliable to pull trucks out of ditches etc.

It is believed that all deliveries made by the caisson companies could have been made by tractor drawn vehicles and that more efficient service could have been rendered had the Horsed Battalion been so equipped.

It is believed that better service could have been rendered by the Motor Battalion had two of the Truck Companies been equipped with the 3 ton cargo truck instead of the Nash Quad.

The Nash 2 ton trucks showed serious defects in steering mechanism which greatly reduced their efficiency. With the ammunition body they were of little value as ration and baggage trucks. The 3 ton cargo trucks are well suited for the handling of ammunition, under ordinary conditions, and as ration and baggage trucks.

Light delivery trucks, had they been avaliable, would have saved many miles of heavy truck transportation.

There was a constant lack of passenger cars, much valuable time being lost in consequence. The motorcycle and side care were found to be very unreliable. - T. Fitzgerald, Lt. Col., 308th Ammunition Train.

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The status of the ammunition train should be clearly defined. In many orders and instructions eminating from G.H.Q., etc., the train is generally considered as more or less attached to the Brigade but not an integral part thereof. Unless the artillery Brigade Commander actually commands this train he cannot count on it for efficiency or for satisfactory services, and will often find parts of it detached at critical times. It should be an inherent part of the artillery brigade. In one Division I am informed the Train Commander habitually exercises command over the ammunition train. It should be unnecessary to say that the Train Commander should have nothing to do with the ammunition train, except when it is marching or billeted as part of the general system of trains.

The wagon company which transports small arms ammunition cannot march as fast as the caisson companies and consequently is a continual drag on the latter. The former should have the same mobility as the latter, or else should not be a part of the same battalion. At least one company of the motor battalion should consist of caterpillar tractors drawing trailers in order that the ammunition can always be gotten to the guns without the use of horse power. During the recent campaign there were frequent instances when the trucks, even those of four wheel drive, could not approach the immediate vicinity of the battery positions, thus entailing unloading the ammunition and reloading it into horse drawn vehicles. It might be well to substitute for the horse drawn caissons small caterpillar tractors with trailers.

(b) Combat trains have been included in (a).

(c) Field Trains:

The present organization is amply sufficient for the batteries at authorized strength provided the organization of the supply company is well planned. It was found by experience that it was necessary to prescribe this organization and a copy of the order issued on this subject is attached hereto. -A.S. Fleming, Brigadier General, 158th Brigade.

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Motor Transport.

It is recommended that in equipment of Ammunition Trains that trucks not to exceed 2-ton capacity be furnished the Motor Battalion for use in hauling ammunition.

It is recommended that the Horsed Battalion of the Ammunition Train retain the two caisson companies but that the Wagon Company be equipped with either escort wagons or a light wagon of similar type instead of the limbered combat wagon now in use. It has been found that less than five percent of the hauling required of an Ammunition Train is small arms ammunition. The limbered combat wagon is avaliable only for this purpose, leaving the wagon company almost useless in combat, whereas, if a wagon of general utility was used the wagon company could haul both small arms of artillery ammunition as the needs might present themselves.

It is also recommended that the M.O.R.S. be a distinct and seperate organization and at no time be attached to or come under the jurisdiction of the Ammunition Train. Experience has shown that this organization is purely a Divisional unit, serving the Infantry Brigades as well as the Artillery, and it is also recommended that it be provided proper equipment for carrying the two spare guns now carried by the Ammunition Train and that it be so arranged that it would be able to carry at least one of each of guns used by the Division of which it is a part. -Geo. J. Frank, Major, 117th Ammunition Train.

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The ammunition train assigned to the Brigade and working under the control of the Brigade, is considered to have proven in most cases to have been a failure. Either the train did not function at all, or apparently had little interest in its work, or the ammunition was placed in dumps inconvenient or inaccessible to the regiment, and in many cases except for the efforts and double work of the Regimental Ammunition officer, would not have arrived. It is most strongly recommended that there be organized in each regiment an

ammunition train consisting of eight 3-ton trucks, four 5-ton trucks, two 55 Holt tractors for the purpose of assisting trucks over bad ground, two Ford vans, and one Dodge 5 passenger car, one trailer fitted with spare parts, and tools, etc., for repairs; two 2nd Lieutenants, one First Sergenat 17 chauffeurs, 17 assistant chauffers, 30 privates, 2 chief mechanics, prescribed, and to the augmented by six 3-ton Peerless Trucks, and futher, the supply officer to be supplied with one Ford van. -E. St. J. Greble, Jr., Colonel, 76th F.A.

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To be under the command of the Brigade Commander, in all matters of training and discipline. This has been the status of the Ammunition Train in the 39th Division. I.A. Haynes, Brigadier General, 64th Brigade.

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The Ammuntion Train organization is considered satisfactory if a band was added, but there should be in Train Headquarters an additional Captain, as Munitions and ammunition Executive. The combat wagon pintles are a failure and the wagon itself very heavy. The pintle of these combat wagons should be of the swivel hook pattern, as they constantly break. No recommendations as to field or combat trains except this, if the 5 animals team is accepted as superior to the 6 animal, every artillery vehicle should have a set of special draw bars and single tree attachments for that purpose, or similar contrivance.

The composition of field and combat trains is believed to be satisfactory.

No data as to M. O. R. S. -T.N. Horn, Brigadier General, 7th Brigade.

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M.O.R.S. should have spare fire-control and orientation insturments and should be authorized to make minor repairs on this class of insturment. -R.D. Johnson, Lt. Col., 18th F.A.

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(a) Experience disclosed the need for a proportion of Motor Trucks of 1½ and 2-ton cargo capacity. (This Train was equipped with 3-ton A.E.C. trucks.) Recommended that one of the Motor Companies be so equipped for delivery of small orders, such as pyrotechnics. Facility of operation in areas close to front, conversation of gasoline and road space are features also involved.

(b) Existing Tables of Organization provide 1-Five Passenger Motor car and 4 Motor-cycles with side cars for each Truck Company. While the maximum number issued to the entire train at any time totalled but three passenger cars, and 9 motor-cycles with side cars, thus imposing a serious handicap, it was obvious that small cars (ford runabout type) would be a more suitable vehicle for Chiefs of Convoys, for reasons of mobility and economy. Size of convoy is regulated by ammunition demand, and direction and control by Chiefs is best assured by providing suitable vehicles to enable them to keep in touch with all elements while on the road, and reconnaissance of positions of Batteries, and other points of delivery.

(c) When trains are equipped with Motor Trucks a percentage of necessary spare parts should accompany them, together with spare part and light repair

trucks. These essential feature of a truck train equipment were never issued to this organization, and only through the ingenuity, capability and initiative of supply officers and mechanics was upkeep of trucks maintained.

(d) Limbered combat caissons issued to the wagon company posses no practical utility. Excessive in weight, and restricted to type of construction to transportaiton of small arms ammunition-use for any other purpose in emergency is precluded. I am of the opinion that the wagon company in a train should be replaced by a fifth motor truck company. In any event the limbered combat caissons should be eliminated in future operations. Wagons of the escort type are far more desirable, as such may be used for transportation of other mateirel as well as small arms ammunition, and, what is a factor of utmost importance, will impose less burden upon animals.

(e) Battery and store wagons issued to caisson companies, serve no useful purpose, and should be replaced by wagons of escort type- thus affording cargo carrying capacity, and saving two horses per vehicle for other requirements.

Above recommendations have been made by me from time to time, and are here renewed after experience of nine months actual work of ammunition transportation at the front, under most difficult service conditions. -W. J. Kelville, Lt. Col., 101st Ammunition Train.

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The question of ammunition trains has always been taken up in the subject headed "A". The recommendation, however, is repeated here. That either the ammunition train be made an integral part of the artillery brigade, or that the artillery brigade commander be relieved from responsibility for the ammunition supplied the division. The M.O.R.S. shoud be under the division ordnance officer. -A. McIntyre, Brigadier General, 154th Brigade.

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In regard to the use of packs of supplying artillery ammunition, as advocated by Colonel Weld, the conclusions reached by him are, in some respects unsound. In point of weight carrying capacity, it is well established that pack animals are about 1/3 as efficient as draft animals. This is based on long experrience in our own service. The advantages of pack animals under conditions where draft is impossible are equally well known. It is generally impossible so to arrange equipment that it will be perfectly adapted to all conditions which may be encountered. If equipment is made so complete as to make it useful to the maximum under all conditions, it is so cumbersom as to make it impractical. Light artillery when horsed is designed and intended for use under conditions where draft is impossible.If draft is not possible, pack artillery is suitable. Under the peculiar conditions described by Colonel Weld pack transportation was undoubtedly most expeditious, but whether such conditions are sufficiently prevalent to warrant carrying pack equipment as a standard equipment for light batteries, is extremely doubtful. In the opinion of this section under no conditions should a change from caissons to pack animals be considered. L.J. McNair, Brigadier General, Field Artillery.

1. Respectfully submit the following changes in the organization of an Ammunition Train:

(a) Supply Company, consisting of the following:One (1) Captain; Three (3) Sergeants; one(1) Corporal; three(3) Drivers; Three (3) Assistant Drivers; and Ten (10) Privates. One (1) Automobile, and Three (3) Trucks. The present organization of an ammunition train does not call for a Supply Company.

(b) Motor Battalion should have four (4) officers per company, instead of three. One (1) Captain; Two (2) First Lieutenants, and One (1) Second Lieutenant.

(c) Horsed Battalion ; Caisson Companies should have four (4) officers instead of three; One (1) Captain, Two (2) First Lieutenants, and one (1) Second Lieutenant. Wagon company (Small arms) should be equipped with American Escort Wagons instead of combat wagons. Think Pack Company would be better still, and should be with the Infantry and not with Ammunition Train of Artillery. This company should have (4) officers.

(d) Veterinary Detachment should be assigned to Ammunition Train instead of Headquarters Trains. -T.E. Marchant, Major 105th Ammunition Train.

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Divided responsibility of power without responsibility, does not tend to efficiency. When I first joined, the Ammunition Train was under command of a commander of trains; being released to the Field Artillery Brigade Commander when in action. Thus the officer most vitally interested in the efficiency of the train had no say as to its personnel or training. This was changed and the train put under command of the Artillery Brigade Commander at all times. The Artillery Brigade Commander was charged with the full responsibility for ammunition supply. The Ammunition Train Commander was made Munitions Officer of the Division thus power and responsibility were concentrated, alibis were elimited and good service resulted. -R.P. Rifenberick, Jr., Colonel, 2nd Ammunition Train.

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Ammunition Trains did exceedingly efficient and valuable work at the front. It is thought that the Regimental and battalion munitions officers should be given more leeway in the selection of their respective munitions dumps. In many cases the location of these dumps was made by the officers of the Ammunition Train, and they were not always placed to the best advantage. The principal difficulty seemed to be the desire of the Ammunition Train to stick to the good roads, which was a perfectly natural thing to do. This sometimes necessitated establishing battalion and regimental dumps in places which were too far distant from where the ammunition was to be used, and this made it necessary to make long hauls with animals transport, with the result that casualties among animals, due largely to overwork, were far too heavy.
-W.H. Rucker, Lt. Col., 16th F.A.

The ammunition trains as now constituted are satisfactory except that they have almost never been complete. On account of the number of trucks becoming stalled on the roads and the difficulties of exercising them, as well as to meet the necessities for hauling dameged materiel, both guns and trucks, to the repair shops, each ammunition train and each park should have added to it twelve light caterpillar tractors.

The combat field trains should remain horsed as now constituted. However, at least six trucks should be supplied each regiment for making the long hauls of forage and rations often required pending the construction and repair of railways.

The M.O.R.S. is satisfactory and should be retained practically as now organized. -C.P. Summerall, Major General, 5th Corps.

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The limbered combat wagons should be replaced by escort wagons which can in addition to carrying small arms ammunition as well as the combat wagons, carry other supplies which the combat wagons cannot carry.

When not engaged in carrying small arms ammunition these wagons of the 108th Ammunition Train did nothing, although wagon transportation was always greatly needed and there were days at a time when they were not required for hauling small arms ammunition. -H.D. Todd, Jr., Brigadier General, 58th Brigade.

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The difficulty of obtaining horses of sufficient stamins and in sufficient numbers to properly handle the ammunition supply during combat, together with the serious obstacles preventing their being kept in condition for the undue strain of daily labor, generally at night, has caused the gravest concern to artillery commanders at the front.

It was generally necessary to placed batteries in positions, which, while accessible during occupation and immediately thereafter, became most difficult of access after a few days because of the constant sheiling of the area; and while, for the first few nights, caissons could be bought up to the batteries during the night, it soon became impossible, on account of the great number os shell holes,to bring them within a reasonable distance of the guns. The heavily loaded caissons also were too much for the teams to pull over the rough country, especially when it was as hilly as that in which we operated, so it finally became necessary to man-handle all the ammunition over quite a distance, which was unsatisfactory - firstly, because it took a great number of men away from their work - and secondly, because of the small number of rounds that could be moved in this way during a given period.

Finally a solution was found in providing a simple canvas pack-carrier with pockets over a kind of wooden saddle-tree, carefully fitted over a blanket to the horse's back, and with a capacity orginally for eight rounds, and finally, by slight changes, increased to twelve rounds per horse.

It was tried as an experiment, and from the outset proved extremely practical. A team of six horses hitched to a French caisson could make but one trip per night and carry ninety-six rounds, wheras the same six horses with the loaded pack-carriers could carry seventy-two rounds on each trip and could make two trips in about the same time that it took the caisson to make one trip, and where usually we were able to get the ammunition trucks within a reasonable

distance from the positions, they could make three or four trips per night without tiring the horses as much as a single trip with the caissons.

Observation of the results in the use of these carriers showed that there were no sore backs, that the horses were remarkably fresh after the night's work, and that where the required supply was not too great, the few trips that were required gave the horses more opportunity for rest, especially during the morning hours.

Many positive advantages were also shown after the adoption of this method, the principal ones being:

1st - That road congestion was absolutely avoided.
2nd - That, in cases where the train had to pass through shelled areas, the danger of destruction of a large amount of ammunition by a single shell was reduced to a minimum.
3rd - That the horses could be made to rapidly and easily pick their way through the shell holes so that all the ammunition invariably reached the battery.
4th - That, in case of a very heavy attack, the horses could be led into trenches and thus pratically protected aganist flying fragments.
5th - That the road space taken up by the ammunition train was very much reduced.

My conclusions, therefore, are that under all conditions a light artillery regiment could be more mobile, move rapidly with sufficient ammunition, and be kept more regularly and positively supplied with ammunition, if, in each gun section, the ciasson was replaced by eight or ten horses with pack-carriers, and the entire combat caisson section be composed of led horses similarly equipped.

The experiment of substituting mules for horses was also tried but this was not a satisfactory change, as the former animals were more likely to stampede during shell fire than the horses, who could be better controlled and invariably made to perform their mission. -D.C. Weld, Jr., Colonel, 105th F.A.

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1. Ammunition trains were far too short of track tonnage. The part for small arms should funciton entirely under orders of Division Ammunition Officer. Part for artillery should consist of at least 250 trucks tons and 36 caterpillars tractors with two caterpillar trailers, exclusive of supply, repair and tank trucks, and should function entirely under orders of Artillery Brigade Commander.

2. Horsed battalion of ammunition trains should be abolished as obsolete and worthless.

3. Corps ammunition dumps must be kept on accessible roads and reasonably near the front.

4. M.O.R.S. are inadequately supplied with transportation and kept so far to the rear as to seriously restrict their usefullness.

5. The matter of supplying batteries with the tremendous amounts of ammunition was one of the biggest problems which the artillery had to solve. The satisfactory supply of ammunition can only be accomplished if the Corps parks keep Corps dump accessible and well forward. The Corps Ammunition officer should be of the highest type and untiring in his efforts to help the brigade. - G.L. Wertenbaker, Colonel, 345th F.A.

The Q.M. limbered combat wagon is useless and should be abandoned. The use of the horse drawn caisson companies carrying F.A. ammunition is muhch to be questioned If decided they are necessary, they with the S.A.A. section should be equipped with escort wagons, which carry more, draw better, and are more universal in their use.

It is believed that trucks are much superior in every way in the ammunition train for F.A. ammunition than horse drawn, vehicles. The truck can make its regimental dump, and go back to refill. The regimental trains can haul from this dump. This is, however, the experience in France only. Consideration must be given to the lack of good roads in America before abandoning the horse drawn companies.

Army Artillery Park.

The Army Artillery Park under Colonel Tobin reported for duty just before the Meuse-Argonne offensive and was placed under my orders as my office handled munitions for Army Artillery.

In the emergency, the Park was used simply for the supply of ammunition to Army Artillery and was very efficient. Forward army artillery munition depots were opened at Neuvilly and Esnes, each manned by a park battery of 300 men which did all loading and unloading at these depots. The 3rd Park Battery was used as a loading unit at the army stockages and at the railheads from which army artillery drew ammunition. The motor companies of the Park were primarily used to stock the army artillery depots from the rear, but when concentrations of ammunition for particular mission were needed, hauled ammunition from any place often direct to the battaries.

It was continually a matter of debates when to put the Park batteries on to the work for which they were orginally organized, namely the maintenance of a rolling artillery material reserve. At least G.H.Q. informed me that this was the reason for their organization, although I have never found anything in writing on the subject. The Park was not allowed to handle artillery material for two reasons:

1° There never was enough reserve material avaliable.

2° The Ordnance Department kept what little there was at Saubesmes, and opposed releasing anything to the artillery.

As a munition handling unit it was particularly efficient. But this part contained a large number of excellent artillery personnel and it is my belief that these men should have been used on artillery work rather than on munitions handling which, except for the foremen, is merely labor work.

It is recommended that the matter be studied, and worked out in detail as to the future of such a park. The place for this park as a reserve for artillery reserve parts must be definitely defined in orders, and the system of supply from Ordnance Department to Park and thence to units must be made dinifite. Futhermore whether the parts to be handled by this park are to be for all artillery of the army or only for army artillery must be decided. As previously stated, the Ordnance Department believes the Park has no place handling reserve artillery material, but should merely ba an ammunition park. I believe it should handle all possible artillery material, and then be used for ammunition handling when its function as artillery reserve depot so allow.

This unit must be under the Division Ordnance Officer, who must be held responsible for its efficiency.

This unit must have some form of light transportation absolutely its own in order to make the deliveries to units and the inspections. I recommend 4 Dodge deliveries.

This unit must be one unit and must stay with the Division. If the F.A. of the Division is detached, the F.A. must automatically come under the M.O.R.S. of the division to which it is attached. The M.G. Section and the artillery sections are merely 2 sections of one complete unit. The men of one section help in the other section as exingencies of the service demand.

The M.O.R.S. is ably fitted to be expended by the addition of a 3rd section, that of ordnance supply. This section should carry replacement ordnance stores, and be organized as a miniature depot company. The troops themselves should not carry reserve equipment, but the M.O.R.S. can do so, build up on a half a stock for replacement and ship the balance where necessary on moving, always having the most essential minimum stock with them for time of need. Roughly this section should be one officer and 40 men. -P.H. Worcester, Colonel, 146th F.A.

A D D E N D U M

To

ANNEX 12

Recommendations of Artillery Officers,

American E.F.

AMMUNITION TRAIN AND MOBILE ORDNANCE REPAIR SHOP

Received after the Dissolution of the

Board.

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1. It is believed that each artillery Brigade should have its own Ammunition Train as an integral part of the Brigade. It is futher believed that there should be two Ammunition Trains in the Division, one of which should be the Artillery Ammunition Train in the Artillery Brigade, the other being the Infantry Ammunition Train under the Divisional Trains Commander. The artillery should not be responsible for the delivery of ammunition to the other arms. Neither should the Train which works in combat for the artillery be administered in peace time by another commander. The organization of the artillery ammunition train should be as a present, a motor section and a horse section with a Lieut. Colonel as Train Commander. The Horse Section should be commanded by a Major and should consist of two companies equipped with escort wagons, 18 wagons to a company. The Motor Section should be commanded by a Major and consist of three companies equipped with 25 ammunition carrying trucks each, with the necessary vehicles for the transportation of the officers. The Train Headquarters should be motorized. The Train should also have a Supply Company, with a Motor section and a Horse Section.

2. The present organizaiton of Field Trains is satisfactory. Combat trains, however, should be organized into one organization for each battalion of light artillery as recommended, making the batteries merely firing batteries.

3. The Repair Shop organization should be thoroughly reorganized. It is believed that the repair organization of an Artillery Brigade is of the utmost importance and should receive the careful attention of the people who prescribe the new organization. The Ordnance Department should not be permitted to prescribe the organization of the Repair Shop in the future. Attention is invited to the recommendations of the C.O. of the Mobile Ordnance Repair Shop which operates with this Brigade. The officer making those recommendations are for the most part approved by the Brigade Commander. It is particularly recommended that the repair work within the Brigade, whether it be reapir or motors of of guns, be done by the one repair organization. It is futher recommended that this repair orgainzation be not charged with the repair of any material other than that in the organizations of the Brigade. In other words, that there be a smaller shop under the Trains Commander for the reapir of Infantry material. The organization recommended by the C.O. 303rd M.O.R.S. is the organization which his experience and his observation of other shops in operations has led him to believe to be correct. It is thought to be particularly important that all repair parts for all vehicles be requisitioned through the M.O.R.S. and that any reserve of such parts be kept in the base shop of the M.O.R.S. It is believed that the amount of transportation in an Artillery Brigade organized in accordance with the recommendations contained in this paper, together with the artillery materiel is sufficient to warrant this independent repair organization. The present scheme of Divisional Shops does not work. The Repair Shop of the Artillery Brigade should be a complete organization not attached to the Ammunition Train.

4. The organization and administration of both the Ammunition Train and M.O.R.S. should be the same for peace as for war. Any other system will cause a violent disruption at the very time (the time of beginning active operations) when there is greatest need for smooth running machinery. There is nothing to be gained by difference in methods of peace and methods of war. - C.C. Hearn, Brigadier General, 153rd F.A. Brigade.

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A.- Organization of the Repair Shop.

It is recommended that the entire Ordnance Personnel of the Brigade be consolidated into an organization under the command of the Commanding Officer of the Mobile Ordnance Repair Shop. This applies to the personnel charged with the repair of motor transport as well as artillery and ordnance materiel.

As at present assigned there are Ordnance Detachments in each of the light regiments, one in the heavy regiment and one with the Ammunition Train. These detachments are all independent of the M.O.R.S. which is responsible for the upkeep of the artillery ordnance materiel, etc. and draw their supplies independent of it. This occasions a serious duplication in maintenance of reserve supplies as well as difficulty in obtaining same, the detachments making requisitions direct to the Supply Depots or the Division Ordnance Officer, and also drawing the same items from the M.O.R.S. It is recommended that all ordnances supplies with the exception of personal, horse equipment, and cleaning and preserving material, be requisitioned and issued through the M.O.R.S.

It is recommended that the M.O.R.S. be equipped with five three-ton cargo trucks of Packard type, three 1 ½ ton trucks, three side cars, one equipment truck for repair of small arms and one machine shop truck, the latter being equipped with heavier machine tools than those now supplied.

It is recommended that the Personnel of the M.O.R.S. be increased to 50 men, four officers (one 2nd Lieut. in charge of small arms; one 1st Lieut. in charge of Artillery; one 1st Lieut. in charge of motor transport; and a Captain in command), and 100 enlisted men.

It is recommended that during active service one squad of this organization, one cargo truck, and one side car be assigned to each regiment, the cargo truck to be equipped with everything necessary to repair the regimental equipment aside from machine work which would be handled by the M.O.R.S. A stock of spare parts for the regiment would also be carried by this detachment and requisitions for replacements would be made by it on the reserve stocks carried by the M.O.R.S. This would permit of the guns being repaired in the battery positions, thus climinating long hauls over roads congested with traffic and reducing the time of a gun out of action to the minimum.

Should the regiments be motorized a second squad and truck should be assigned to each motorized regiment, the truck equipped for repair of motor transport, to carry a stock of spare parts and the personnal of squad trained in motor transport repair. Whatever addition necessary to furnish repair personnel, transport and supplies for motorized regiments should be added to orginal equipment and personnel of the M.O.R.S.

In the repair of motor transport other than that in the motorized regiments, it is recommended that two cargo trucks properly equiped and two squads be assigned to this work. One squad and truck to be established as far forward as possible and the second one midway between this forward point and the M.O.R.S., the latter acting as a base shop and making the heaviest repairs. This would obviate the necessity of making long tows, relieve congestion at base shop of cars needing minor repairs, and materially reduce the lose of working hours per car due to break down.

B. Technical Defects of Materiel.

155 mm.

1. In order to prevent distortion of the trail and consequent bending of spade shaft and locking shaft, there should be a reinforcing plate attached to the top of the trail, the shaft bearings made longer and the shafts 1¼" larger in diameter.

2. To prevent breakage of the elevating gear housing the housing should be again redesigned in order to provide for a spring tension or series of Belleville washers on top of the elevating worm.

75 mm.

1. Tools, gauges, etc. should be provided so that the shop may check pressures in the 75 mm. cradles. Under present conditions it is impossible for the shop to state whether the real function of a gun is caused by too high, too low pressure, or other causes. Neither can it be certain that now cradles in replacements are correct before sending them forward to batteries in position. -W.L. Kerlin, Captain, 303rd M.O.R.S.

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Ammunition Trains should at all times belong to and be a part of the Divisional Artillery Brigade, and it should at no time be a part of the Field Trains of a Division. I would suggest that one horse drawn Company and one truck Company, together with an additional motor Company be assigned permanently to the Field Trains so that when an Artillery Brigade is detached from the Division with which it is acting, it takes with it its Ammunition Train under the command of Major or Lieutenant Colonel. An instance: When this Brigade was detached from the 28th Division and sent into Belgium in support of the 91st Division, its Ammunition Train was taken from it and it arrived in Belgium without any means other than horse drawn caissons of supplying ammunition. The 91st Division had but a small Supply Train, the troops were moving repidly, no railroad transportation, and it would have been impossible for this Division to have advance any futher than the line it held at the time the armistice was signed, and at same time receive the support of the Artillery, for the reason that the French ammunition dumps were necessairly so far in the rear that it would have been impossible to have kept the guns going and advancing with the horse drawn caissons as the only ammunition supply, plus the limited number of trucks avaliable, which at same time supplied Infantry with its necessary supplies. When the Artillery Brigade is thus detached, having its ammunition train with it as a integral part of the Brigade, it has the added advantage of its being used as a Supply Train for the Artillery and thus preventing the disarranging of the supply system of the Infantry which it is supporting, and has in all probability just joined. It is a simple practical proposition. -W.C.Price, Jr., Brigadier General 53rd F.A. Brigade.

(a) Organization: The Ammunition Train should consist of 13 companies as follows: 1 supply company, 6 motorized comapnies divided into three battalions of two companies each, each battalion under c mmand of a major; 6 animal drawn companies divided into three battalions of 2 companies each, each under command of a major, the Train to be commanded by a Colonel with a Lieutenant-Colonel second in command.

This would allow each Artillery Regiment of the Artillery Brigade to be served by a particular motor and animal drawn Battalion. It is believed that for various reasons better service would result from this method.

(b) Equipment: No Train should be placed in active service until it has been equipped; make shifts are inadequate. If an Ammunition Train is to haul nothing but ammunition, it's cargo trucks should be of the Quad type and of the best, all parts strong and enduring. A certain number of three ton trucks, such as the Packard, Pierce Arrow, Riker, etc., should be assigned each unit for the transportation of that unit's baggage, rations and ordinary impediments. Repair trucks, tank trucks, motorized rolling kitchens, motocycles (with side cars) and the necessary roadsters for battalion and company officers should be avaliable.

For the animal drawn battalions, mules only should be furnished for draft purposes. The proper allowance of riding horses for officers and riding mules for non-commissioned officers should be authorized. Horses for draft should be eliminated. To each company a number of pack mules should be attached. Limbered combat wagons and caissons for an Ammunition Train are unsuitable and unserviceable. A "cut-under" type of escort wagon is believed to be best suited for the work required. The former types are not avaliable for the transport of anything other than ammunition; the combat wagon, as used in the late hostilities, was extremely heavy load for its animals even before a shell was placed in it.

No good reason was discovered for the difference in enlisted strength of the horsed companies. It is believed that all should be of the same numerical strength.

The number of officers for each company, motorized or animal drawn, was inadequate. There should be one captain and four lieutenants to each company except the supply company.

No Ordnance Detachment should be attached to the train. Every motorized company should have it's own force of expert mechanics for the repair of it's own trucks. an officer, well versed in the construction, repair and handling of motor vehicles, should be a member of the staff of the Train Commander.

The Medical personnel should be equipped with bathing and de-lousing apparatus, complete in itself. The Veterinary personnel, both commissioned and enlisted, was entirely inadequate. It should be large and permanent and not a part of the authorized allowance of the Divisional Trains.

Revolvers, not rifles, should be issued to all members of the Train. A certain number of machine or anti-aircraft guns should form a part of the equipment of the Train.

All draft animals should be driven from the wagon seat. The method of mounting drivers on the animals backs is considered wrong for two reasons: first, it is useless added weight for the usually overworked animals. Second, more men are required for driving than is necessary.

(c) Commissioned Personnel: Officers should have a knowledge of both motor trucks and animals, in order that they may serve either in one class of company or the other. It is possible that the officer of a horse company might obtain the idea that his "branch" of the service is more important than is the truck "branch," and vice-versa; a clannish spirit might easily arise, naturally detrimental to the efficiency of the train as a whole. This feeling could be dissapated quite easily if the officer was interchangeable.

(d) Enlisted Men: Great care should be exercised in the selection of the men. Only those should be assigned to the Train who have had experience in the handling of motor vehicles and with the knowledge of animals and driving. Efficiency will be attained much better if this is the case.

(e) Supply: The Train Supply Officer should deal directly with the Division of other supply departments. Time is lost by submitting requisitions through the intermediate officers.

(f) Dumps: In many instances, dumps were entirely too far to the rear, necessitating extremely long hauls. Adequate use of the railroads was neglected. At different times there were no regimental or battalion dumps, and ammunition had to be taken to the gun positions. This caused confusion and delay. Commissioned and enlisted details for the Train should be in charge of the Division and Brigade dumps.

(g) It is believed that the Brigade Munitions Officer should be the Commander of the Ammunition Train or an officer of his staff. The proper allowances of ammunition per battalion or regiment should be communicated to him by an officer of the Brigade staff, preferably by the Operations Officer, and an equitable distribution of ammunition could be made to the several regiments, the required amounts more readily maintained, and battalion and regimetal munition officers eliminated, thus removing the confusion and resulting from the attempts of one ammunition officer to secure more than his allowance at the expense of some other. In other words, the entire supply and distribution of ammunition will be more efficiently performed, the fewer hands the orders and requisitions for same are required to pass through.

(h) Miscellaneous: The practice of transporting shells in boxes from the rear dumps to the battalion or regimental dump was wrong. They should be taken out of the boxes; the boxes added useless weight to the load and took up space which might have been utilized for transporting a larger number of shells. The empty boxes will be nearer to the railheads for quicker transportation to the refilling plants.

(i) If the Artillery Brigade is to be an administrative unit, seperate and distinct, it is believed the Ammunition Train should be an integral part of the brigade; in which case other means must be provided for the supply of ammunition to the Infantry Brigades of the Division. -John N. Stratt, Colonel, 303rd Ammunition Train. (Colonel of Infantry).

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Ammunition Trains and parks; combat and field trains.

1. I believe that the officers of brigade ammunition trains should be trained artillerymen. -Guido F. Verbeck, Lt. Colonel, 106th F.A.

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The Commanding Officer of the Ammunition Train should act as Munitions Officer. His rank gives him the required authority, and his close touch with the Ammunition Train greatly facilitates the work of supply.

The Mobile Ordnance Repair Shop should remain with the Ammunition Train and with the Field Artillery Brigade. The one attached to the Ammunition Train of this Brigade was taken away upon arrival in France, and never rejoined. Its loss was a distinct embarassment. The Combat Train for this Brigade was extemporized from escort wagons, forguns and chariots de pare. No battery and store wagons were provided, except the combination one for Headquarters Companies, and as a result there was no proper means of transporting tools or supplies. Some type of light spring vehicle should be provided for transporting signal and Engineer equipment of Regimental and Battalion headquarters and Batteries. -G.A. Wingate, Brigadier General 52nd F.A. Brigade.

ANNEX 13.

Recommendations of Artillery Officers

American E.F.

TRENOH MORTAR BATTERIES.

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TRENCH MORTAR BATTARIES.

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Trench Mortar Batteries of the 6 inch calibre should not be included in the organization scheme of an Artillery Brigade. They are essentially an offensive weapon to be used in close cooperation with the infantry in local offensive actions and liaison with the Infantry Commander thru the Artillery is not close enough. Trench Mortar Batteries to be of the most value should be organized into tactical units not smaller than a Battalion in order that concentration of batteries could be effected at any desired point upon short notice. It has been the practice to hold Divisional Trench Mortar Batteries at the disposal of the Artillery Commander - this is not considered good practice. The Commander of the Trench Mortar is not considered good practice. The Commander of the Trench Mortar Battery upon entering a sector should be officially authorized to report immediately to the Infantry Commander and remain thereafter in close touch with him in order that full advantage can be taken immediately of any opportunity which might suddenly arise to cooperate with the Infantry. This is desirable also from the standpoint of ammunition supply, as it is rarely possible for a Trench Mortar Battery to provide sufficient personnel for ammunition carring parties and this matter could be arranged with the Infantry Commander arrival in the sector. -Charles I. Anderson, Captain, 310th Trench Mortar Battery.

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The Trench Mortar was devised solely as a substitute for artillery in the stabilized war-fare that obtained before the United States came into the war. For its efficiency it depended upon a large target and thickly held front lines.

In the spring of 1918, with the adoption of the present deeply echelonned and elastic defense, the range of the trench mortar did not permit it to reach targets extensively enough to warrant its employment, and there after few, if any, of our trench mortars were held in position or were used for more than very special purposes, then only rarely. For effensive purposes there value was nil.

A light mobile trench mortar might be of value as an accompanying gun, but the trench mortar in its present form has ceased to be of any value.

These batteries should, therefore, be dropped from the Divisional organization until experiment shall have developed a trench mortar that is useful in the echelonned defense or in mobile warfare. -D.E. Aultman, Brigadier General, Army Artillery, 2nd Art.

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Trench Mortar Batteries with equipment as heavy and cumbersome as 6" Stokes have no place with divisional artillery. They have a very limited field of action and should be a part of Army Artillery and be supplied when occasion demands. -E.B. Babbitt, Brigadier General, 4th Brigade.

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Trench Mortar Batteries should be a part of the Army Artillery, and assigned to Divisions when their services are required. -H.W. Butner, Brigadier General, 1st Brigade.

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It is thought that a trench mortar battery is not properly part of an artillery command. -R.P. Davis, Brigadier General, 151st Brigade.

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Trench Mortar Batteries should be a part of Corps Artillery and taken out of the Divisional Artillery entirely. -C.J. Deems, Colonel, 57th Brigade.

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1. This Brigade has had no practical experience in Trench Warfare. In two instances the artillery preparation, which was on a large scale, included th use of the Trench Mortar Battery, which under cover of darkness was, during the two nights immediately preceding each preparation moved forward through the woods and emplaced within a few hundred yards of the hostile works. On both occasions this battery rendered valuable service. In the second attack its work was so excellent, its losses so heavy, and its steadfast courage so remarkable that it was promised a citation as a unit by the Corps Commander. Nevertheless as a weapon for open warfare the C" Newton Stokes mortar is too heavy, to difficult to transport and emplace to constitute a suitable weapon for this purpose, but I am satisfied that a field for a suitable weapon for open warfare of this character is open. It should be possible to develop a field trench mortar of ten or eleven cm. bore which could be transported on a light two wheeled carriage and drawn by two horses or else transported in a light truck. -A.F. Fleming, Brigadier General, 158th Brigade.

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It is recommended that all Trench Mortar Batteries be armed with the Newton 6" Stokes. -G.G. Gatley, Brigadier General, 67th Brigade.

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Trench Mortar batteries should be separated from Field Artillery Brigades. Q.A. Gillmore, Colonel, 112th Field Artillery.

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Trench Mortar Batteries of an Artillery Brigade should consist of one battalion of two batteries, twelve mortars each, with proper battalion staff. -Ira A. Haynes, Brigadier General, 64th Field Artillery.

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The Trench mortars should be developed and made more mobile. The batteries should be organized into battalions and attached to the Infantry. T.N. Horn, Brigadier General, 7th Brigade.

Trench Mortar Batteries should pertain to the Corps or to the Army and not to divisions. In this war they could be used when and where needed and suitable. It often happens that a division will be situated or fighting where trench mortars could not be used. -J.T. Kennedy, Lieut. Colonel, 5th Field Artillery.

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The trench-mortar batteries should not form a part of the peace organization of our field artillery brigade. Provision should be made for their temporary organization when necessity requires. Training in their use would easily be given to all officers and soldiers of filed artillery. The keeping of this organization as a permanent one for use in exceptional cases would be condemning certain officers and men to an uninteresting branch of the artillery work, and would usually result in the most backward officers and men being put into it. I consider that it would be far better to make all officers and men finished artillerymen, to have on hand a sufficient number of trench mortars for instructions purposes and to provide for them in the equipment of a brigade, and provide for their being manned by temporary organizations formed from the personnel of the brigade. -A. McIntyre, Brigadier General, 154th Brigade.

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Trench Mortar Batteries should be organized into battalions and be assigned to the Corps Artillery. R.A. Millar, Brigadeir General, 6th Brigade.

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(a). ARMAMENT: The Armament of the Newton Six-inch Trench Mortar Battery could be greatly improved by the addition of two defensive platoons, one a machine gun platoon and one an automatic rifle platoon. These two platoons to be trained only in the use of their respective weapons. The remaining members of the organization to be armed with the automatic pistol only as the rifle alung is a decided obstruction in the manipulation of the pice, particularly so, in the bomb shelter. The use of the grenade for defensive purposes is also suggested and every man in the organization should be taught the use of this weapon. The projectile or bomb of the Six-Inch Gun from a ballistic standpoint is very much inferior to other bombs used for this purpose. A bomb with a much sharper nose is suggested.

(b). TRANSPORT: The use of a small cart drawn by men, particularly, in the area of operation has a decided advantage over the present motorized transport. A cart also for the transportation of ammunition to accompany guns on an advance will be an advantage. For long distances the use of the motor truck is necessary.

(c). PERSONNEL: The present (177 men) is not sufficient for maximum results, even under present conditions where there are no machine guns or automatic rifles as defensive weapons. The Six-Inch Newton Gun is rapid user of ammunition and with all guns manned signal detachment and train section absent, a few casulaties would mean guns out of action and at all times would mean an overtaxing of the personnel to provide carrying parties from ammunition dump to gun position. It is suggested that a personnel of at least 250

men per battery be provided to insure maximum results.

(d). TRAINING: The present method of training is, in the opinion of the writer, efficient.

(e). SUPPLY: Supplies for a Trench Mortar Battery under the present organization have always proven a difficult subject. Arrangement should be made whereby supplies of all kinds will have drawn directly from local Quartermaster or Ordnance Officers thru the unit supply officer, without the recourse of the Brigade supply officer. -Allison Owen, Colonel 141st Field Artillery.

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These batteries, as they have existed, are not mobile enough, other wise they are very useful, but their mobility, as well as the method of more easily transporting ammunition, should be worked out. -W.R. Smith, Major General, 36th Division

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Trench Mortar batteries are not properly a part of the Divisional artillery. These constitute an element of the army artillery and should be assigned wherever military operations make them desirable. The 58m/m trench mortar is of too little value to warrant its retention. Three types of trench mortars are recommended.

A light trench mortar that can be moved by two men in the trenches with a range of not less than 1,000 meters.

A medium trench mortar corresponding to 6 in. type with a range of not less than 2,000 meters.

A still heavier trench mortar, which should be developed, firing a heavier charge for the destruction of trenches and dug-outs, with a range of not less 2,500 meters. -C.P. Summerall, Major General, 5th Corps.

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For a few hours on September 26th, the 108th Trench Mortar Battery - the Trench Mortar Battery of this Brigade - did excellent work in destroying hostile barbed wire and front line trenches. At no other time throughout the operations of this Brigade did it have an opportunity to fire a single shot. An attempt was made to use it on November 1st, but in order to reach suitable objectives, its mortars - 6" Newton Stokes - had to be placed where they could not be camouflaged from aerial observation. The result was that hostile artillery fire destroyed in the day time the emplacements prepared at night. While much a weapon was undoubtedly of use in permanent trench warfare, it had little or no use in the Operations of the 1st American Army. Owing to the immobility of its weapons, a skillful and highly disciplined fighting unit of this Brigade was confined to the duty of procuring the transporting supplies. -H.D. Todd, Jr., Brigadier General, 58th Brigade.

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A D D E N D U M

To

ANNEX 13

Recommendations of Artillery Officers,
American E.F.

TRENCH MORTAR BATTERIES.

Received after the Dissolution of the

Board

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It is not believed that a trench mortar battery should form a part of the field artillery brigade. The trench mortar battery has practically no place in open warfare. In trench warfare where trench mortars are required they should be furnished from Army or Corps Artillery. -J.R. Davis, Colonel, 15th F.A.

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Trench Mortar Batteries should be eliminated from the Divisional Artillery. All Trench Artillery other than the Infantry Trench Mortars should be organized in large groups and detached for service where needed. C.C. Hearn, Brigadier General, 153rd F.A. Brigade.

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Some other use should be found for the Trench Mortar Batteries during long period of idleness when their particular arm cannot be used, as was the experience in this Brigade. In the Argonne I used several sections to man captured guns and ammunition, and the training of Trench Mortar Batteries might include the service of a gun or howitzer, or they could be made part of an Ammunition Train and their trucks and personnel used for ammunition supply, as was done by this Brigade in the Argonne and Belgium. Their use as above described perhaps does not come under the head of Trench Mortar Batteries, but there is much time and are long periods when these organizations have little or nothing to do in open warfare, and it is an economic wast for 164 men and 5 officers to be maintained for no other service than Trench warfare. -W.G. Price, Jr., Brigadier General, 53rd F.A. Brigade.

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Trench Mortar Batteries are useless in open warfare. In any warfare they would be better if attached to Corps Artillery and formed into groupements. The motor equipment was too heavy to get the guns and ammunition sufficiently near the front line, which is the only place the guns can be used. The 102nd Trench Mortar Battery of this Brigade rebuilt machine gun ammunition carts to carry its guns and ammunition, attached a steel bed plate with flangs for spades permanently to the gun base, which enabled it to move anywhere and go into action quickly, and was trained for a quick withdrawal if necessary. The Commanders of Infantry Brigade and regiments which this Brigade supported would never consent to have the Trench Mortar Battery go into action on their front, for fear of drawing enemy artillery fire, except on one occasion, when I put them in action one night to cover the withdrawl of the Infantry on being relieved by another Division. They went into action after dark and were withdrawn before daylight, no artillery reply to their fire having been received. -G.A. Wingate, Brigadier General, 52nd F.A. Brigade.

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ANNEX 14.

Recommendations of Artillery Officers.

American E.F.

SCHOOLS AND TRAINING.

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SCHOOLS AND TRAINING CAMPS

Junior Artillery Officers need very much more training than it was possible to give them in this war. It is believed that the Regular Army could contain a relatively large number of trained Field Artillery Officers. -E.B. Babbitt, Brigadier General, 4th Brigade.

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(1) A light artillery school comprising all fairly mobile guns horse or tractor drawn.

(2) A Heavy Artillery school composing heavy tractor drawn and R.R. guns and guns for the permanent fortifications.

The first part of the course of instruction in each should be practically the name, and any artillery officers could go to either for this instruciton.

The second part of the course to be such as pertains to the particular artillery; light or heavy, and confined to one or the other school.

A third part should be for specialists:

(a) Light artillery - Equitation and harness, gun construction, observation of fire, map making and map reading, battistics (as needed), tractors, communications, liaison, chemistry of explosives, aeroplanes observation, Staff duties, etc., etc.

(b) Heavy Artillery - Ordnance construction, chemistry of explosives, aeroplane observation, ballistics, electricity (as needed) map making and map reading, R.R. engineering, armament of fortifications, seacoast engineering, Staff duties, etc., etc.

In both shchools only officers should receive special advanced technical instruction who are shown fitted for such. In either school officers showing aptitude for advanced work at the other school should be transfereed.

Both schools should be located where special facilities exist. The entire plant of either need not be in the same locality. Existing plants can be largely utilized.

This organization and school System can be and should be made so elastic that aptitude on the part of the officer for any particular line of work will result in his being sent to it.

3. I would again emphasize he vital importance of eliminating feeling between the various arms. Esprit de corps often impledes efficiency if confined to narrow limits.

Once equality in promotion is established an Esprit will develop in each arm accompanied by a healthy rivalry and free from envy or friction.
-Charles J. Bailey, Major General, 81st Division.

In time of war the principal school of value to the field artilleryman is the school of fire, such as was operated at Valdahon. At Valdahon all essentials were taught. Draft and horsemanship should be added where time and opportunity permit. To train new officers in the theory of fire without giving them the practical experience is of little use. It would be far better for these officers to receive practical training in the handling of men by serving with organizations. To remove officers from regiments on the line to send them to a corps artillery school where they received black-board instruction in firing at the hands of a kid lieutenant or someone else less experienced than themselves is a great waste of time. To detach officers from regiments to send them to so called signal schools where a great deal of time is spent in doing squads east and west is also a waste of time. Efficient schooling in all signal work, telephone, busser and wireless, should be taught at the school of fire. A school for older officers of field Artillery and Infantry such as was established at Langres by Colonel Locke, will undoubtedly be of great value in securing valuable information from experienced officers and in disseminating this information to the service. -A.J. Bowley, Brigadier General, 6th Corps Artillery.

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There should be one School of Instruction for Field Artillery with departments to include:

(a) Basic course in materiel and elementary gunnery.
(b) Fire and reconnaissance.
(c) Transportation (motor and horse)
(d) Communications.
(e) Staff - Operation, information, liaison, munitions.
(f) Artillery Center.

-Army Center of Artillery Studies

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1. Suggest a school of conference for Regimental Personnel Adjustants before they assume such dutues. The following should be taken up:

Office organization:
Army paperwork - morning reports and payrolls;
Methods of tabulation of data and statistical bookkeeping;
Methods of checking payrolls, rosters, reports and returns as to accuracy;
Study of procedure in the case of various exigencies;
Methods of filing and control of documents, correspondence, orders, etc.
Army Regulations and General Orders, A.E.F.

2. That greater emphasis be placed on the training of specialized non-commissioned officers as computers of firing data, observers, and assistants to the Battery Commanders in the conduct of fire. It is believed that the greater part of this work could be done as efficiently by carefully trained non-commissioned officers as by officers. This would relieve officers for other duties, which would be advantageous, in as much as a battery in action never has as many officers as it needs.

Instruction in schools and training camps should be standardized. The difference between C.A.C. and F.A. methods has caused considerable waste of effort in schools. -A.S. Conklin, Colonel, 303rd Field Artillery.

The great fault to be found with schools and training camps has been the absolute lack of coordination in the instruction. The course at Saumur seems to have given the best results. It is recommended that when enlisted personnel is chosen and sent to the service schools to prepare for commission, that when commissioned such personnel should be returned to their orginal commands. This would not only serve to increase organization pride and espirit de corps, but would also have the tendency to make organization commanders at all times sent their best men. -Albert L. Cox, Colonel 113th Field Artillery.

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There should be a central school for the training of selected officers to be instructors in brigade and regimental schools. Only officers should be sent to these schools who have shown qualifications for becoming instructors, and they should be graduated as such. If not graduated as such, they should not be allowed to exercise the funcitons of instructiors in their organizations. Schools in the organizations should be conducted on rigid rules, with graduated instructors from the central school in charge of the various departments, the instructors and student officers being members of the organization. These organization schools should be both for officers and enlisted men.

The development of technical schools in our organizations has been the weakest point of our military work in the past. The strength of a military organization is in direct proportion to the instruction received in that organization from its own officers. The weakness of the training centers as they existed here in preparation for this war was the system of instruction, both for officers and men, which had as its base Getalied instructios not of the organization.

It is believed that a system of schools and training camps should be developed on the lines laid down above. I will not try to get into the details, but have outlined what I consider the fundamental principles. R.P. Davis., Brigadier General, 151st Brigade.

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Schools and training camps should be utilized to the fullest extent. These schools should be of two distinct classes. One for training of officers and men (Initial course.) and the other in the nature of a post graduate's course. To this latter school should be sent officers who are good artillerymen in order that they may not become rusty in the set ods, tc. of firing and also to keep abreast of the latest improvements in methods and mateirel. The latter course should be a short one of from two to three weeks. The same should be applied to enlisted specialists and non-commissioned officers. The initial course should be one similar to those already in vogue in our artillery schools. -W.H. Dodds, Colonel, 6th Field Artillery.

This regiment learned a great deal at Camp de Souge, but I believe the lecture courses should have been greatly reduced and specialists given more time to perfect themselves in their specialties.

Also searcely any time existed to proprely supervise stables, at least that is the opinion I hold.

I believe in schools and training camps. -F.C. Doyle, Colonel, 306th Field Artillery.

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1. I could say so much on this subject that I forbear. General Kilbreth and I were in such thorough accord at the School of Fire, Fort Sill, that I am content to have him represent my views on schools of that character.

2. I think the entire training of new artillery officers should be done by the artillery. The Officer's training camps which were held all over the United States at the beginning of the war were not of much value to the artillery officers. Had they been trained from the beginning along well coordinated lines, which included the artillery duties of enlisted men, so as to fit them for entrance into a school like Fort Sill the result would have been vastly more uniform and far better. General Kilbreth is familiar with the plan submitted by the School of Fire while he and I were there together, which plan with certain modifications, especially as to the place the preliminary training should be, was afterwards put into effect by General Snow and it is still in operation unless it was suspended on the signing of the armistice.

3. Training Camps in France:

I am competent to judge only of the training this Brigade received while in billets prior to going to Camp Coetquiden and later at that camp. The instructors were not uniformly trained themselves; their methods and teaching were different. The course of instruction in my opinion was entirely too much along the lines of trench warfare, though I succeeded in modifying the course materially in this respect as far as the training of my own Brigade was concerned.

4. To be successful, training camps must be thoroughly coordinated by a single agency and this coordination must be insured by constant supervision and inspection of methods. -A.S. Fleming, Brig. General, 158th Field Artillery Brigade.

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Not taken up in detail. Can be Regimental but it is suggested for officers, they be Divisional under supervision of the Division Chief of Artillery.
E.St. J. Greble, Jr., Colonel, 76th Field Artillery.

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Assuming the duties to be the same, or approximately the same as they have been in the last six months, the following recommendations are submitted:

Brigade Commander should be the Director of Instruction. There should be no other Director. All instructors, either belonging to the Brigade or not, should be under the immediate orders of the Brigade Commander.

A Secretary should be appointed and should be fairly permanent. He should be an assistant to the Brigade Adjutant.

It is believed that only one Brigade should train at a time at one place. My observation and information lead me to believe that there are very few, if any places, able to accomodate properly more than one Brigade. The Commanding Officer of a Brigade Training Center should be called the Executive, and should report to the Brigade Commander, and be announced as a member of his staff. He should carry on the ordinary duties pertaining to administration and supply. -Ira A. Haynes, Brigadier General, 64th Brigade.

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The Shcools and Training Schools in France are the result of emergency, wherein frequently some remarkable results may have been obtained. Certainly the F.A. Schools of Instruction have not been able to train in reconnaissance and open warfare liaison. More time should be given to reconnaissance selection and occupation of position after the course in firing and specialists has been finished.

The following general scheme of instruction is recommended starting from the ground up:-

A Training Camp intensive School of the Soldier 3 months. Brigade F.A. School of Instruction in elementary F.A. work 3 months Specialist Schools to include conduct to fire. materiel, communications, etc. and reconnaissance where <u>trained units</u> in reconnaissance are avaliable 2 months.

Firing instruction only, at a Brigade Firing Center, 1 month followed by 1 month combat firing exercises.

Training with Division, and manoevers, 2 mos.

This makes a complete training course of one year at the completion of which a man of ordinary intelligence should be able to meet any enemy. -T.N. Horn, Brigadier General, 7th Field Artillery.

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An attempt should be made to fill requisitions for technically trained officers, from the technical schools. It is believed that this technical training can be best secured away from the front. -R.D. Johnson, Lieut. Colonel, 18th Field Artillery.

1. Schools.

There should be one Field Artillery School in the United States, Fort Sill, Oklahoma. This school should be an advanced school for the study of Field Artillery. Experiements and tests should be held there. Propositions tried out, policies formed, etc. The work formerly done at Fort Sill should be done at training camps and in the regiments and Brigades.

2. Training Camps:

Every reservation should be used as a training camp for three months each year, August, September and October. Officers should be selected as instructors according to suitability and not according to rank. This period of training should be preceded by the Garrison Schools in winter. The character of work performed during training should be very much like that now carried out at the training camps in France, but not quite so intensive. A liberal allowance of ammunition will be essential, although a great deal can be done by black-board and tarrain board. The work would include, materiel, telephone, radio, reconnaissance, artillery firing and tactical handling and use of artillery. -J.T. Kennedy, Lieut. Colonel, 5th Field Artillery.

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The question of schools and training camps is based, to a great extent, upon whether or not we are going to have compulsory military service in the United States. If we have this service, with the supply of officers and soldiers coming into service at a fixed time each year, programs of instruction will be much simplified. Schools should be established for specialists, both officers and enlisted men, i.e., for aerial observation; radios; telephony; motors; horse-shoeing and saddlers, the latter of which are already provided for. A field artillery school, similar to the coast artillery school at Fort Monroe, embracing a rear's course, should be established, embrascing subjects of ballistics, topography, traction of all description, communication, firing and tactical exercises. To this school it is recommended that the senior officers, vis., field offiers, be sent first. Eventually, this method would result in the course being entirely for junior officers. There is a tendnecy among many officers to wish to establish schools of all descriptions to instruct all junior officers in all the details connected with their grades. This feeling has been brought about, to a great extent, by neglects of regimental and battalion schools going into all these details will be going to an extreme and will be encouraging the higher officers to do less in the organization and instruction to their regiments regiments and battalions than they have done heretofore, and would stop all development and initiative in the regiments. In my opinion this would be a step backwards in our military organization. A method more effective than the methods heretofore used, requiring organization commanders to keep their organizations up to a certain standard, would be of far greater value to the service than the establishment of primary schools.

Training camps should be so arranged that all artillery brigades, assembled, will spend at least three months at these camps at the end of the years training and if possible, a considerable part of the time should be devoted to working with actual infantry, not hypothetical infantry. The ideal, of course, would be work with the division. -A.McIntyre, Brig. Gen. 154th Brigade.

The system whereby selected officers, usually the best, were taken from regiments for this work is considered badly defective, approaching the fatal, and not sound in principle. It resulted in vitally crippling the combatant organizations at a critical time. A corpe of instructors should be organized as a separate organization and maintained from volunteers for the duty, convalescents, and by susingly the physically unfit, whose work could be kept up to date by attaching them, for short periods of duty, to combat front line units. -J.A. Mack, Colonel, 102nd Field Artillery.

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(a)- The preliminary educational requirements for officer canidates of Filed Artillery were not sufficiently strict.

(b)- Elementary and preliminary training in Field Artillery materiel, hyppology and equitation, and the mechanics of gas engines and motors, were entirely too superficial.

(c)- Officers were frequently required to take up work in th School of Firtag which would proably be classed at "Post Graduate" without having had sufficient foundation either as to general education or technical field artillery training.

2. I recommend that whatever system may be followed in time of peace a strict standard be established and maintained as to preliminary education which must be met before a man can even be considered as a potential officer of Field Artillery.

3. That through training lasting at least six months be given in the elementary work of the battery before any attempt is made to perfect an officer in the technique of the conduct of fire.

4. That following such course of training officers be classified as best fitted for light artillery, mountain artillery, 4.7 rifles or Howitzers, 6" or 155 (rifles or Howitzers) etc. and that subject to necessary revision from time to time they serve centinuously with the arm for which they have been particularly trained.

5. That all officers whether in the regular army, Reserve Corps, or if it continues to exist as such, the National Guard be required to satisfactorily complete the course at a School of Fire similar to that at Fort Sill, Okla., covering a period of three months and devoted essentially to the conduct of fire, reconnaissance, liaison and tactics of Field Artillery in combination with other arms before they can be commissioned beyond the grade of 1st Lieutenant, and I futher consider it distinctly advisable and absolutely necessary that officers of other arms who may be called upon to handle field artillery in combination with infantry or cavalry, be given a course of instruction which would give them some idea at least of the possibilities and and limitations of field artillery. -C.B. Mehard, Lieut. Colonel, 321st Field Artillery.

(a) What the future will develop as regards the education of the personnel avaliable for training in the telephone work of the army, I do not attempt to foretell. In my personal experience in the current emergency, the amount of education possesed by men detailed to telephone work has varied very widely. Often, good (practical) men, men with linesman experience with telephone companies, have been very difficult to train in the theoretical side of telephone work; have been very poor mateiral in paperwork in keeping station records, writing out messages, etc. Other men with more education have had to be held back to obtain a standard degree of proficiency in the whole detail. It is necessary, therefore, in planning any future school to systematise very thoroughly the instruction and start from the very fundamental principles. My suggestion is for a study which will lead to the standarization of a complete course in telephone instruction.

(b) The lack of co-ordination has been very much evidenced between the work in the A.E.F. and in the U.S., in moral, in telephone instruction, and in general instruction of artillery. Systematising of future instruction should receive careful study, no-ordinating more closely the work of various schools. -Allison Owen, Colonel, 141st Field Artillery.

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As to schools and training camps, I have some ideas. I believe the schools for the training of officers, as existing in the states, were quite good. However, in the training camps usually little was done. In the 62nd F.A. Brigade, I divided the officers into two equal parts, one half attending all drills and practical exercises for the day, and the other half going to school for eight hours, and studying for two hours, these halves alternating for four days of the week. The 5th day everybody went to drill, and in the evening I held examinations. The 6th day everybody went to inspections. W.R. Smith, Major General, 36th Division.

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Schools and training camps. Equip artillery schools with the best aerial personnel and materiel obtainable, in order that this work may be properly developed. My experience with aerial observation in training has been unsatisfactory due to old machines, old aerial equipment and apparently untrained personnel. I knew that this observation is capable of producing excellent results, but that it has not done so in my training camp, with result that my regiment has an erroneous idea about it, instead of expecting anything valuable from them they expect nothing and look upon the service as the merest kind of an incident.

In organizing Schools, trained artillery should be furnished to aeiral schools for training observers, but at artillery schools only trained aerial personnel and this especially selected for its excellence should be permitted.

At all firing schools organize a department of "Operations" to cover the subject of "plans and orders". F.W. Stopford, Colonel 80th Field Artillery.

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It is believed that schools for each type of instruction and training camps for each type of artillery should be maintained. Officers must specialze in technical duties and training camps must adapt themselves to one line of instruction. The mixing of schools and training camps is not productive of the best results. C.P. Summerall., Major General, 5th Corps.

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As stated above this Brigade went into a Training School for about two months after its arrival in France. The relative status of the Brigade Commander and the Commandant of th School was not clearly established. While the officer in charge of the School was able and energetic, his ideas and mehtods of discipline were totally different from those of the Brigade Commander and at first orders and regulations were not exact in regard as to who was in command and it required a good deal of tact to arrange matters to that the Brigade benefited by the instruction. Matters of this kind should not depend upon the personality of the officers concerned. It should be clearly understood by the officer in charge of instruction that he is on the Staff, for the time being, of the Brigade Commander. -H.D. Todd, Jr., Brigadier General, 38th F.A. Brigade.

A D D E N D U M

To

ANNEX 14

Recommendations of Artillery Officers,

American E.F.

SCHOOLS AND TRAINING

Received after the Dissolution of the

Board.

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1. There should be one School of Instruciton for Field Artillery, with departments to include:

(a) Basic course in mateirel and elementary gunnery
(b) Firing and reconnaissance
(c) Transportation (Motor and horse)
(d) Communications
(e) Staff Operations, Information, Liaison, Munitions
(f) Artillery Center.

2. The above school should be equipped in all departments except (f) with courses for enlisted men analougous to those for officers. -C.M. Bunker, 308th Field Artillery.

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It must be borne in mind always that the infantry and artillery of a division form a team and that team work is essential to success in training as well as in operations. Facilities for training infantry and artillery are ordinarily not found in the same area and artillery training requires a period of concentration on technical work under complete artillery control. This necessitates, without doubt, specail artillery training centers or camps as was found to be the case in this emergency. At the same time, artillery units should not be segregated in such camps for their entire periods of training. They should be assigned permanently to infantry divisions, train with them as far as possible, be sent to artillery camps in rotation, for special artillery training, and return to their divisions with the shortest practicable period of absence. This is essnetial, since the best teamwork is possible only through the initimate association of the various human units concerned, as well as by the working together of the military organizations. And in active service, an artillery brigade should invariably serve with the division to which it regularly belongs, whenever the division is the line, as is the custom in the French and other services. -Edw. Burr, Brigadier General, 62nd Field Artillery Brigade.

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The selection of enlisted men should be left entirely and absolutely in the hands fo the officers in closest touch with the men. Having sent something more than one hundred men to training camps and schools without one failing to get his commission or to make good afterwards and having in his own regiment men who were selected otherwise and aganist the judgment of the battery commanders go and fail or else make very medicore officers, the foregoing cannot be made too strong.

The work done in and the results of the two training camps with which the writer is familiar speaks for itself. No school can elimenate the personal equation.

In the various schools, for good and obvious reasons, there wree too many instructors with no practical knowledge of the subjects they taught.

Too many instructors were taken from the graduating clases and if this had continued long enough it would have resulted in dry rot.

The courses at Fort Sill and Camp de Souge were thought by many to be opposed one to the other. To the writer's mind they served as admirable complements.

Many of the things insisted upon at the schools and especially by the French instructors were found to be unknown or not done at all in French regular regiments (2) which this regiment relieved.

Too much repetition in the lectures, especially those from the balloon-airplane lectureres.

That the schools and the instructors were giving all that was in them should be recognized. Where they failed or were short cannot in fairness, be charged aganist them. At Camp de Souge officers and men had a splendid courses of instruction and those departments which were weak were strengthened as we went along. All in all I consider that nothing better could have been done under the circumstances.

There was a decided tendency to call for officers, N.C.O.'s and privates in excess of the number allowed by the Tables of Organization. H.M. Bush, Colonel, 134th Field Artillery.

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My only experience with training shcools in France was at Camp Valdahon, first course. At this camp nearly all of the training of Officers was training for the grades which they then held, the certainity of the early promotion of many officers being to a large extent ignored. Officers were kept away from their batteries most of the day, and as a result the batteries got very little training. I was a battery commander and found it very difficult to perform even the administrative work in my battery. Though early promoition in my case was practically certain I received little training other than that which was necessary to fit me to be a battery commander. I spent much time in running traverses and similar elementary work. - J.R. Davis, Colonel, 15th Field Artillery.

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1. Commissioned Personnel.

(a) Every specialist officer should know the duties of the executive and orientation officers.

(b) It should be required that all staff officers from battalion up to the Army serve at least six months as line officers at the front.

(c) There should be some form of mounted service school which would provide a graduate for each battery or organization before going to the front. This officer to have charge of battery echelon.

2. Enlisted Personnel.

(a) More time devoted in training to School of the Soldier.

(b) Batteries should receive horses long enough previous to departure for front to properly train drivers.

(c) A squad of selected men in each battery should have simple engineer training for repair of roads, bridges, consturction of shelters, etc.

3. General.

(a) More emphasis should be placed on training in care of horses and care and fitting of harness.

(b) All artillery officers should have a short period of training with infantry untis.

(c) Supply organization should have training in the proper leading of wagons. - A.G. Fisher, Colonel, 307th Field Artillery.

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It is fifficult to criticise the schools and training camps as we have seen them because of the time requirements which we all know to have existed.

It may be said, however, that artillery training was not complete in that it consisted for the most part in the technical training of the battery officers and gave little or no attention to the training of those same officers in the handling of their organization in the field or in giving them proper conception of the tactical employment of their weapon. It was also incomplete in that it lacked proper training of staff officers. This particular branch of the training was especially lacking in the matter of Liaison. Reference is had to liaison with the Infantry especially. It is thought that the training of artillery personnel, both commissioned and enlisted, must be continuous and that any scheme or recommendations for a scheme of training must necessarily be affected by the time avaliable before an organization must fight. It may be said, however, that training should include the subjects of gunnery and material, supplemented by the reconnaissance and occupation of positions and firing from those positions, as well as courses in transportation, both motor and horse, and the different funcitons of the staff. The thoroughness of this training is entirely dependent upon the time avaliable. As long as there is time training should never stop. It cannot be said that any one of the above subjects is relatively more important than another. Perfection in each must be the goal of a finished organization. -C.C. Hearn, Brigadier General, 153rd F.A. Brigade.

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O.E. as at present.- W.C. Price, Brigadier General, 53rd F.A. Brigade.

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The training of the commissioned personnel, enlisted men and organizations should be based on the funcitons that they will have to perform in the field. Certainly there was a great deal of lost motion in the preparation of the American Army of War. The training should bear in mind characteristics of the army and should be freed from the controversial clashes of differing schools of thought. The 155 mm. Howitzer organizations and 75 mm. rifle should not be under the same control. If the permanent military establishment is to retain its prewar organization it is suggested that the training of the 155 mm. Howitzer and larger caliber artillery be placed for training purposes under the direction of the Chief of Coast Artillery.- E.O. Sarratt, Colonel, 309th Field Artillery.

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As part of the training at schools, I believe line officers should have a brief course in aerial and balloon observation. Time directly educating artillery officers in the possibilities and limitations of these services in co-operation with the artillery.- G.F. Verbeck, Lt. Col., 106th F.A.

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Schools were so intensive that officers became mentally exhausted and did not do their best work. Too much time was devoted to theoretical work, and attempting to explain mathematical reasons underlying methods. The explanation was hurried, and resulted in confusion. In such hasty training as was necessary, it was sufficient to lay down the rule to be followed.

Schools neglected horse training, care of animals, harness and draft, which was in a large degree responsible for the great loss in horses. Saumur and Souge graduates knew nothing about horses. The Fort Sill course was good, but was based on training a horse for a year, and few organizations had a month to train theirs.

The instruction at Camp Wadsworth, U.S., was good. The artillery fired barrages with service ammunition over its own Infantry, during the latter's attack in maneuvers.- G.A. Wingate, Brigadier General, 52nd F.A. Brigade.

ANNEX 15.

HEADQUARTERS CORPS ARTILLERY FOURTH CORPS
AMERICAN EXPEDITIONARY FORCES
FRANCE.

8 October 1918.,

From: Chief of Artillery, 4th Army Corps, American E.F.

To : Commander-in-Chief, G.H.Q., American E.F.
(Through Military Channels).

Subject: Artillery Building Plan and Organization.

1. The following is submitted as a report of experiences in our recent operations:

CALIBERS AND RANGES.

1. I think it is important to consider our Artillery Building Plan and Organization Scheme in the light of the present phase of the war and of the phases that are apt to meet us in the near future. Our building plan and organization scheme were laid down some time ago, and we run the risk of not adapting them quickly to a rapidly changing situation.

Up to about six months ago, the two hostile forces faced one another with their lines only 300 or 400 meters apart. Now, both sides have adopted the disposition in depth so that the line of principal resistance is, in each case, drawn back about 3 kilometers from the line of contact. The main body of the troops is in rear of the line of principal resistance, and only outposts are kept in the forward zone. Thus, between the two main boddies there is a interval of 5 or 6 kilometers, and the guns are distributed in depth in rear of the main bodies so that only long-range guns can reach important parts of the enemy's defense scheme. We can scarcely close us without disclosing our intentions to attack. The German policy for the present is evidently to draw back still futher as soon as he sees preparations for a great attack.

Under these circumstances, the trench mortars and short-range antiquated French guns that we install and supply with ammunition with so much labor are of little or no use. They pound an expty space, and we cannot move them forward over No-Man's Land and supply them with ammunition. Our policy to meet this situation would appear to be a quick concentration at an unexpected place opposite the enemy's lines, a moderate mass of long-range guns to smash his second lines, and tanks and rolling barrage to get our infantry through the lightly held outpost zone.

For the present phase of the war, then, range is a most vital consideration. The Germans have increased the range of all of their guns so that they have attained ranges something like the following:

CALIBER	:	RANGE
77	:	10,500 meters
105 Gun.	:	12,500 "
105 Howitzer	:	11,00 "
15 C.M. Gun.	:	23,00 "

The foregoing are the German guns most in evidence, and as shown in this table their possible ranges have been carried considerably above what was considered obtainable at the commencement of the war. To contend with these German guns, or in other words, to meet the conditions in the existing phase of the war, we must have guns and howitzers of long range.

What the next and subsequent phases of the war are going to demand in the way of artillery materiel is, of course, difficult to foretell. As we push the Germans back we will undoubtedly run aganist strongly fortified positions. The question is whether we will close up on these positions, as was done in the first phase of the war a..d report to trench and siege warfare once more, or whether our numerical superiority will permit us to turn his strong defense. At all events, to complete with the German guns, our guns and howitzers must have range at least equal to his.

Our divisional and corps artillery guns must be capable of extreme ranges, as follows;

D I V I S I O N A L	
75 mm.	11,000 meters
155 mm	11,000 meters
CORPS	
155 mm	11,000 meters
4.7 Gun	12,500 meters
155 G.P.F	16,000 meters

As for the long-range army guns, railway and tractor-drawn, we should have a tractor gun capable of 23,000meter range to complete with the German 150 mm.; railway guns capable of 25,000- and 30,000-meter range, respectively; a heavy howitzer capable of 12,000 meters, and another capable of 17,000 to 18,000 meters. I think we should concentrate at once on types of guns and ammunition which will give the ranges mention above.

ORGANIZATION

2. Divisional Artillery.

The present organization of divisional artillery has, I think, proved very satisfactory.

I believe, however, that the trench mortars should be removed from the divisional artillery, and that those regiments, manning 6-inch Newton Strokes mortars, should form a part of the general reserve of artillery of the army; this to keep up development in the use of trench mortars, in case the necessary for their use should arise in the future, and to insure the personnel being trained and used under expert trench mortar offices.

To furnish accompanying guns for the infantry, I think there should be for each division eight tanks, or eight caterpillar mounts, each carrying a 75 mm. gun. I would assign these to the divisional artillery and have them trained in conjunction with the infantry regiments.

3. Corps Artillery.

The divisions come and go. The corps headquarters, the corps artillery, and other accessories stay and are constantly in action. Though units of corps artillery may be temporarily attached to other corps for special purposes, I think it essential in order to develop teamwork, that each corps should have, organically, the guns necessary for the average conditions of service. 155mm. howitzers are needed for counter battery; 4.7 guns, for counter battery and interdiction; and 155 G.P.F.'s especially for interdiction. A regiment of each type, of 3 battalions of 2 batteries each, is recommended as contituting the normal corps artillery. These three regiments, moreover, should constitute a bridge and a bridge commander should be the heavy artillery commander of the corps, his staff furnishing the necessary personnel for the G.A.C.'s office. Thus, there would always

be in each corps a permanent commander and staff acting under the chief of Artillery of the corps to carry on counter battery and other corps artillery work and to keep in constant liaison with the observation and aeronautical sections assigned to work with the corps. Experience has shown this to be most necessary.

4. Army Artillery.

I think the mass of the guns to carry on the fight should be assigned to divisions and corps, and that only the special long-range guns should be handled directly by the army artillery. The mission of the divisional artillery is to break down resistance in front of the infantry; of the corps artillery, to hold the enemy guns in check and to prevent his reserves from being brought up, by fire delivered on all routes of approach in the immediate rear of the enemy's main line of resistance; of the army artillery, to prevent movement and concentrations far in the enemy's rear by firing on railway junctions and important centers of traffic. The corps and divisional artilleries should thus be given all missions requiring direct and immediate touch with the infantry, such as counter battery and such as interdiction on territory liable to be passed over by the infantry. If the army artillery attempts to perform these same duties, there is overlapping, division of responsibility and undue multiplication of observation stations, telephone lines and liaison agents; the principle of unity of command is violated. The Corps artillery by its intimate liaison with the divisions violated. The Corps artillery by its intimate liaison with the divisions and by its organized system of observation should know quickly what annoys and stops the infantry and should have the means to overpower this resistance.

Army artillery groups are sometimes established with the idea that they are to do counter battery work for two or more corps. Where I have seen it attempted it did not work. The army artillery group commander, having no direct touch with the troops and no complete system of observation and liaison, did not know what was going on until the divisions or corps asked him to shoot, and the tendency was to pass missions forward and back. The counter battery of today is not a prearranged affair. The enemy moves his guns about so much that we do not know a position is occupied unless it is active. The machinery for counter battery must be organized so that our fire, either of neutralization or destruction, will commence shortly after the hostile battery is signalled in action. Moreover, the front occupied by one of our large army corps is too great for an army artillery group to act efficiently for more than one corps. I have seen it occur in two engagements that the army group acted for the corps in whose territory it was located, but was not much concerned about affairs in neighboring corps. The guns might much better have been put under the corps artillery commander who then would have had the sole responsibility and also the necessary means.

The conclusion I reach then, is that no guns should belong organically to the army. The guns not belonging to the corps or divisions should pertain to the general reserve of artillery under G.H.Q. to be assigned to separate armies as needed.

5. General Reserve of Artillery

Artillery not pertaining to the divisions or corps should belong to a pool known as the "General Reserve of Artillery," similar to the R.G.A. of the French. This reserve should comprise guns of all calibers, avaliable for assignment to divisions, corps, or armies for offensive action. A specially selected officer of high rank, pertaining to the office of the Chief of Artillery, G.H.Q., should be in command, and a general officer in command of the groups of each type of artillery in the pool: that is, the 75's, 155 howitzers, long-range tractor guns, railway artillery and trench mortars. These officers would be responsible for the upkeep, the administration and the technical instruction of the organizations concerned.

Artillery are: Primary reasons for the establishment of this General Reserve of

(a) To meet the actual conditions of service which demands that there shall be a reservoir of guns of all calibers -- light, medium, heavy and super-heavy -- from which units undertaking offensive action may draw for reinforcement.

(b) To avoid the overhead charges involved in having this reservoir split up and divided between the different armies with a large staff in each case to administer it and attend to its upkeep.

(c) To relieve the Chief of Artillery of the Army of administrative duties and permit him to devote his whole time to his essential duties: that is, to prepare projectal of estimate the artillery and ammunition needed for different projects; to allocate this artillery and ammunition to divisions, corps and to the army; to assign missions and zones of action; to employ the special groups assigned as army artillery; to insure the steady improvement in technique of all artillery serving with the army -- divisional, corps or army; to study and recommend improvements in materiel; etc.

The Chief of Artillery of a division is relieved of administrative duties by his colonels; the Chief of Corps Artillery is similary relieved by the Heavy Artillery Commander; the Chief of Artillery of the army must likewise be relieved by some agency. A single agency for all our seperate armies, this agency to be under the direct orders of G.H.Q., is believed to be the most appropiate solution.

As for the size and composition of the General Reserve of Artillery, a rough estimate is made below, based on the assumptions of a Grand Army of 60 divisions, of a general attack on a front of 48 kilometers, of 24 divisions in the front line of attack, 12 reinforcing divisions, and of subsidiary attacks and demonstrations by the other 24 divisions of a character not requiring immediate artillery reinforcement. It is also assumed that each division has 2 regiments of 75 and 1 regiment of 4.7 guns, and 1 regiment of 155 G.P.F.'s.

GENERAL RESERVE OF ARTILLERY.

FOR REINFORCING DIVISIONS AND CORPS	75 mm.	24 Regiments, motorized
	155 mm	16 " "
	4.7" Gun	16 " "
	155 mm. G.P.F.	16 " "
	8" or 9.2" Howizters	14 " "
	240 mm. Howitzer	14 " "
	6" Newton Trench Mortars	3 " " Each of (3 battalions of 3 batteries
FOR ASSIGNMENT TO ARMIES	194 mm. Gun.	240 guns, motorized.
	10" Gun.	60 guns, railway.
	14" Gun.	20 guns, railway.

6. Recommendations:

(1) A building program that will give us as quickly as possible the guns and the ammunition required for securing the increased ranges demanded by the present phase of the war.

(2) Establishment of a General Reserve of Artillery under the Chief of Artillery, G.H.Q., from which allocations may be made to divisions, corps and armies as needed.

Wm. LASSITER
Major General,
U.S. Army.

WL/M

OFFICE, CHIEF OF ARTILLERY, A.E.F.,
HEADQUARTERS ARMY ARTILLERY, FIRST ARMY, A. E. F., FRANCE

11 October 1919.

From: Chief of Artillery, 1st Army.

To: Commander-in-Chief, A. E. F.

Subject: Artillery Building Plan and Organization.

1. Herewith is a copy of a letter furnished me by the writer. As I differ in opinion in some respects I submit the following.

2. With paragraph 1, I agree with the following exceptions, -

a. - I think the 155 mm. G.P.F.s are not suitable organic corps guns. They are too good at harassing, prohibitive and retaliatory fire at long ranges and ever bread fronts to be given over the corps for counterbattery work. In such general engagements as are now in progress they can be most effectively and economically used as Army guns. When operations special to a corps are undertaken they can be loaned to it on the principle that the responsible agent should have all the means at his disposal.

b. - I think the ranges mentioned are not great enough. In fact we have actually in use of disposable some guns with longer ranges.

3. With paragraph 2 I agree with the following exception, -

The accompanying tank or caterpillar 75's should be in the Army Artillery or in the General Artillery Reserve, if one is organized, because 8 tanks are not enough to constitute a pool from which a sufficient number would be always avaliable. Neither do divisions always operate in country where tanks can be used. These machines seem to get tired more quickly than men and animals. The unit would be too small. A large pool would be more economical and effective.

4. I agree with paragraph 3, except as follows, -

a. - See paragraph 2 for opinion regarding 155 mm. G.P.F.s.

b. - I think interdiction should not be a corps artillery mission except when the corps is undertaking a special task by itself, which will be unusual in this war.

c. - One regiment of 155 mm. howitzers and one of 4.7-inch guns should be a very suitable brigade, not too large to follow a corps in its movements and easily supplemented with powerful howitzers from the Army Artillery for counter-battery work aganist well organized positions.

5. I disagree largely with paragraph 4.

a. - The duty of Divisional Artillery is preparation and counter-preparation; of corps artillery, counter-battery; of army artillery, harassment, prohibition of movement and concentration, and destruction of distant objectives. Their duties are not strictly so schematic as this but they may be no classified in a general sense.

b. - In the operations now in progress all guns suitable for counter-battery have been placed in corps artillery commanders with the exception of the French 16 cm. Marine gun, for which the ammunition supply in France is almost exhausted and which has such a long range and great accuracy that is was kept in Army Artillery.

c. - From the testimony of prisoners the Army Artillery guns in the operation of the past month have accomplished splendid results.

d. - One Army Grouping has time and again supported the action of three corps very effectively and two others have repeatedly accomplished excellent results for two corps. On the other hand, one entire grouping has been turned over complete for two days to corps for a special operation. Moreover, liaison has been very good, indeed, so that groupings have been called upon constantly by corps to perform important tasks, which they have done promptly, while carrying out other missions entrusted to them by the Army.

e. - The front of three American Army Corps in an offensive since Sept. 26 has averaged about 26 km. or any 9 km. to a corps. I think it would be a waste of long range guns to give them exclusively to corps.

f. - If guns are given to crops it is not to be expected that they will support neighboring corps as freely as if retained in Army control. One of our faults is that divisional and corps artillery is almost entirely devoted to its own front. If the argument for placing almost all guns in corps is sound it might with equal logic be used to assign almost all guns to divisions.

g. - Generally speaking guns which have long enough range and sufficient mobility of traverse to cover a front of more than one unit should be in the mext higher unit.

h. - I do not agree that the argument sustains the conclusion but I believe it not to be at all necessary that there should be organic Army Artillery. (*)

6. I agree generally with paragraph 5, except as follows, -

a. - I think the 155 mm. G.P.F. is not a corps gun.

b. - The range of the 8-inch howitzer is too short to admit it to ideal table.

c. - But the table should include all the useful artillery we can lay our hands upon.

7. With paragraph 6 I agree except as follwos, -

a. - The present building program should not be disturbed by any new one.

b. - The value of railway guns is probably much exaggerated by the type of warfare to which Europe has become accustomed and the difficulty of successfully designing tractor artillery of great power.

c. - I think that very great expenditures for the purpose of developing tractor-drawn or tractor-carried artillery of great power, accuracey and range would be fully justified.

(signed) E.F. McGlachlin, Jr.,
Major General, U.S.A.,
Chief of Artillery.

(*)
NOTE:

Feb. 18, 1919, - Gen. McGlachlin in conversation with me at C.H.Q. went futher than this. He stated that there should be no organic Army Artillery.

Ernest Hinds
Major General,
Chief of Artillery, A. E. F.

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LJM

Annex 16.

GENERAL HEADQUARTERS AMERICAN EXPITIONARY FORCES.

France, July 4, 1918.

MEMORANDUM FOR ASSISTANT CHIEF OF STAFF, G-3

SUBJECT: Aerial Observers.

1. It is believed that the 4th indorsement on the attached paper as prepared in this Section should be sent, as being a correct application of the present policy, on which there is no disagreement. The two observers of the 35th Division were originally detached in accordance with theis policy, and there is no reason to believe that their subsequent service has not been with the Air Service in accordance with policy. To provide others in their place as you suggest would duplicate the Division's quota. If this procedure were followed generally and repeatedly, a large excess of observers would result.

2. This correspondence illustrates very well the clumsiness and impracticability of the present system. The Air Service must keep accurate record of the organization. When a vacancy occurs in the observers of a particular organization, the Air Service must communicate with this organization and cause replacements to be detailed. The organization will have no personal interest in the observers detailed and the best material will not be obtained. In general, the detail will include those who desire to leave the organization, or those whom the unit desires to lose.

3. It is considered important to reconsider this question generally and adopt a working organization, which should be made clearly known to the troops and to the troops and to the Air Service, here and at home. There is a general lack of understanding at present. The following is believed to be a correct statement of principles:

(a) The Air Service must train the observer, for he works in the air and with the Air Service.

(b) The Air Service must be held responsible for satisfactory aerial observation of all kinds. It is unsound to divide this responsibility between the infantry or artillery for the observers should not be placed on the same status and simplification would result if they were so placed.

4. Three general systems are avaliable:

(A) To keep the observer continually with his line organization except when observing. He would work only with the air unit serving his organization at the time.

(B) Make the observer an officer of the Air Service.

(C) The present system, which is a combination of (A) and (B).

5. (A) Not consistent with (a) and (b) paragraph 3. An observer must be trained in other subjects than the technique of infantry or artillery observation. If the infantry and artillery are to retain the observers, they should train them. Such training would involve a duplication of the work of the Air Service with, in principle, lessened efficiency, or else a complicated system of combined training with no clear division of responsibility. No good reason is known from actual experience why the infantry or artillery observer should be an active officer of these arms. The observer's work is primarily and fundamentally that of an air man. The following is quoted from a translation of a German regulation:

> "For the artillery aeoplane observer, the principal thing is to be able to see correctly. For this he requires natural aptitude and much practice. Only a limited general knowledge of artillery is necessary..... It is not absolutely necessary that the observer should be an artillery officer."

A later edition states, in part, as follows:

> "For the observer, the chief essential is to be able to see correctly. For this he requires natural aptitude, careful training and constant practice. The observer must have a good eye for country, and must have a knowledge of the artillery's method of fire as far as this effects air observation .....".

These two quotations indicate that probably there was some question in the German service as to the advisability of the aerial observer being an artillery officer, but the second quotation indicates that this matter is no longer under discussion.

The British Aerial Observers is in the Air Service permanently, either from civilian life or by transfer from other Arms.

The French aerial observer is attached after the manner of our system at present, but practically under the present conditions he never actually serves with the artillery.

If the infantry or artillery observer remains constantly with his own organization, he will not be as available for other purposes as would be the case were he regularly on duty with the Air Service.

6. (B) This system would clear up the present difficulties and comply with the principles stated in paragraph 3. There is nothing to prevent aerial observers being temporarily attached to infantry or artillery units for whatever training is found necessary.

By such a system the observer will be established and recognized where he actually works, in the air.

It should be noted that such a system would not prevent airplanes from being permanently assigned to divisions or other units, and this is now contemplated. Its sole object is to place the observer on a satisfactory status and permit a system which will supply a sufficient number of uniformly and well-trained observers.

Satisfactory cooperation between the observer and the infantry or artillery is a question of liaison rather than exchange of personnel.

7. (C) The present system is objectional from the standpoint of (c), paragraph 3, and because of the complications touched upon in paragraph 2.

Consideration makes it apparent that the present system offers no attraction for the young infantry or artillery officers who is trying to establish himself in his arm. The Air Service, which best knows his ability, has nothing to offer him. He is absent from his organization to such an extent that he can hope for little recognition there. This will undoubtedly react on the quality of observers, and, in fact, indications of this are already reported.

8. It is, therefore, believed that action should be taken at once, to the end that all aerial observers be commissioned permanently, or detailed, in the Air Service, and that Tables of Organization be revised so as to eliminate aerial observers from all organizations except those of the Air Service.

9. Previous correspondence on this subject, in addition to the letter referred to in paragraph 1, is attached.

Early action in this matter is consider important.

(shd) H.B. Fiske,
Colonel, General Staff,
A. C. of S., G-5.

wjm
1 incl.

U.B. Jr.
(G-3).

GENERAL HEADQUARTERS AMERICAN EXPEDITIONARY FORCES.
THIRD SECTION, (G-3).

July 19, 1918.

MEMORANDUM FOR
A. C. of S., G-5

SUBJECT: Aerial Observers.

1. The principles enunciated and the conclusions reached in the G-5 memorandum are not concurred in.

2. It is believed -

(a) That so far as concerns observation, the air service must be the servant of the ground units.

(b) That a great deal of care must be exercised to prevent the growing up of any system that makes the position of the ground units one of dependence upon the air service.

(c) That there will be a greater tendency toward independence in aerial observation if both pilots and observers belong to that service, than if observers belong to ground units.

(d) That the responsibility of the observer to the ground units for his work will be more direct, and his co-operation with them more close, if he belongs to and is a part of the ground units he is serving.

(e) That it is extremely important that the observers shall at regular periods return to service with his own arm in order not to lose touch therewith.,

. It does not seem that there should be any great difficulty connected with applying the principles covered in Par. 2. In doing so -

(a) The Air Service can train observers and send them to divisions.

(b) The quota of trained ovservers actually detailed on observation service in a division can be maintained at a maximum at all times.

(c) Additional trained observers can be serving with the division and avaliable for replacement at any time.

(d) It is not believed that trained observers who have demonstrated their efficiency and shown by their work their appreciation of their responsibility to their ground units will in any way be prejudiced in their prospects for advancement in their own arm.

4. In view of the difference in point of view in connection with this subject, it is suggested that there be held a conference on the part of G-3 and G-5; and if this is believed to be necessary or desirable by the Asst. Chief of Staff, G-5, Colonel Birnie and Lieut. Colonel Gorrell will confer with any of the members of G-5 Section at any time that may be fixed upon by them.

(sgd) FOX CONNER,
Colonel, General Staff,
Asst. Chief of Staff, (G-3).

2 incls.
teq.

General Headquarters
American Expeditionary Forces.

20 July, 1918.

MEMORANDUM for: Chief of Artillery, G.H.Q. A.E.F.

1. Attached here to is a copy of a memorandum from the Chief of the Training Section, Air Service, concerning the observers who are to be trained for work with the Artillery. I regard this matter as of extreme importance and ask that you give this memorandum careful consideration.

2. Referring to paragraph 11, whether or not the status of these observers is regarded as definitely settled, the matter is so important that I believe it to be wise to clarify it at this time.

M. M. P.
MASON M. PATRICK,
Major General, N. A.
Chief of Air Service, A.E.F.

MMP/mcw

19 July, 1918.

MEMORANDUM FOR : C. A. S.

Subject : Detail of Observers from Artillery.

1. It has become evident that the personnel furnished to the Air Service for training as observers is so deficient both in respect to number and quality as to seriously threaten the efficiency of the Artillery, for which airplane observation is to be provided.

2. This conclusion is based on the facts below stated, viewed in the light of the following premises:

a). That the success of Artillery operation is in direct proportion to the excellence of the observation furnished.

b). That the decisive factor in the quality of the airplane observation furnished to the Artillery is the character and aptitude of the individual observer.

c). That a good observer must possess, in addition to a thorough mastery of the methods and practices of modern observation, a knowledge of the fundamentals of Artillery.

d). That the requisite ability can only be found in officers who have voluntarily assumed the burden of the highly technical training necessary and the increased risk involved in this service.

3. The present program, approved by the General Staff, calls for the introduction into training of 60 student observers every 10 days. It was contemplated that these observers would reach the Observation School at Tours from two sources:

a). Schools of aerial observation in America, which in turn drew their pupils largely from the Artillery in the U.S.

b). Artillery Brigades of the A.E.F., which had not detailed their observation personnel for instruction in America.

4. This method was expected to insure the training of officers in Artillery fundamentals prior to their admittance to the Tours school. However, the working of this system is subject to the following criticisms:- First, the Artillery has been unable at any time to furnish the Air Service with information as to the number of officers to be detailed from Brigades in France and the dates on which these details would be made. This has made the estimates of the Air Service for the number of observer students to be called from the U.S. a mere matter of guess work. Second, the personnel detailed by the Artillery to Observation has in general not been of the requisite quality. This is true both with respect to personnel detailed in the U.S. and that detailed in the A.E. F., and is probably due to the fact that the importance of the selection of preperly qualified men has not been appreciated, and also to the fact that individual commanders were called upon to furnish personnel have been reluctant to let go capable men whose loss seemed to them to conflict with the development of their individual unit.

5. As examples of the foregoing, the Air Service was not advised as to how many officers would be detailed from the Artillery for the courses commencing

the 5th and 15th July until July 1st. It was then advised that 22 observer students would be furnished for the course commencing on July 5th and 33 for the course commencing on July 15, making a total of only 55 students as aganist 110 required. Of the 22 students who reported for the course commencing July 5, 4 were found to be physically unfit; 3 stated that they were not volunteers and asked to be relieved at once from a duty which they had no desire or special qualifications to perform, and 3 have since the commencement of their course stated that they felt themselves temperamentally unfitted for the service and have asked to be relieved.

6. Of the 33 reported to have been detailed for the course commencing July 15th, 3 have arrived to date and the Air Service is now advised (July 19) that no more needed be expected. These men were wired for on July 2nd, in response to the telegram of the Artillery, dated July 1st, stating that they would be detailed.

7. It is evident that under these circumstances the method of supply of observers from the Artillery in the A. E. F. is a failure and only prompt arrival of students now on their way from the U.S. can prevent a serious shortage resulting at a later period.

8. In respect to the quality of the personnel furnished, it has been found that from 15 to 20% of the total personnel detailed has failed to meet the standard of Observation training in the A. E. F. Of a detail fo 9 officers assigned by a Heavy Artillery unit for Army Artillery Observation, 4 failed to pass the required mental tests and had to be returned to their organizations 1 failed to pass the physical examination, - this in face of the fact that Army Artillery observation requires a high and very special quality of Artillery observer.

9. The causes of these unsatisfactory conditions can be found in the failure in the past to fully understand the importance, position and work of the airplane observer and to make adequate provision for his selection, status and future.

10. Up to the present time, completed lack of uniformity as to the status of airplane observers has existed in the U.S. and in the A. E. F. In the U.S. , offices detailed to observation were mostly recommissioned in the Aviation Seciton, Signal Corps, and became part of the Air Service personnel. THEY were seperated permanently from and lost all touch with their Artillery units; their promotions were regulated by the Air Service and their advancement thereafter lay with the Air Service and not with the Artillery. On the other hand, in the A. E. F. observers were detailed from the Artillery in some cases believed that upon completion of training as observers these men should be reassigned to their special units, to function as observers whenever aero squadrons were attached for service. On the other hand, the Air Service has consistently maintained the position that observers must remain continuously with their squadrons in order to keep up with the technical developments of their duty to insure the cooperation between them and their pilots necessary in its exercise. It has seemed to the Air Service as impractical to attach observers to squadrons merely during periods of action as it would be to attach officers to ground troops only during periods of active combat.

11. These questions of status have not yet been definitely settled. Although observers in the U.S. Are still transferred to the Air Service, by recent order of the War Department, all observers have been given the privilege of returning to their units. This privilege, if exercised by a considerable number of observers, will to a large extent defeat the efforts that have been made to prepare officers for this class of duty.

12. The result of this confusion has been the creation of profound discontent among all offiers detailed to observation. This discontent is primarily due to the unbalanced condition of rank and advancement, resulting in large part from the above conditions. Thus, observers who retain their status in Artillery regiments, and have the advantage of lineal promotion, have attained in many cases a rank which unfits them for duty, as where an observer becomes a Captain by lineal promotion in the Artillery and is called upon to serve under a flight commander junior to him. On the other hand, in cases of officers detailed from the Artillery, who have not the advantages of lineal promotion, no provision for their advancement in this service seems to have been made, and in cased where men are recommissioned in the Air Service their chance of advancement is definitely limited, since it is the accepted policy that flights and squadrons must be commanded by flying officers, while in the Artillery the chance of advancement is subject to no such limitation.

13. From the point of view of the young artillery officer, therefore, a detail to observation has come to be regarded as a misfortune, and the result if that the more competent officers have been able in most cases to avoid this detail. In addition, the impression has become general that the airplane observer runs a greater risk than officers of corresponding grade in the Artillery, and this fact has perhaps, in some cases, led young officers to feel that the above conditions constituted an injustice to them.

14. There seems to be only 2 possible remedies for this condition: either the assignment of suitable officers from the Artillery to Observation without reference to their personal preferences, or if observation is continued as a voluntary service, the creating of conditions which will give to officers volunterring for it such privileges or advancement as will make it attractive to them. If the first method is adopted, the best results attainable cannot reasonably be expected. The alternatives are to render the voluntary system effective by providing opportunity for advancement and additional privileges to volunteers whose performance so merits or to draw the personnel entirely from the Air Service and cause the Artillery to provide special training for it.

(sgd) W.G. KILNER
Lt-Colonel, S.C.
C.T.S.

PAC/GM

GENERAL HEADQUARTERS
AMERICAN EXPEDITIONARY FORCES.

July 24, 1918.

MEMORANDUM FOR CHIEF OF ARTILLERY, A.E.F.

Subject: Aerial Observers.

1. Reference Memorandum from the Chief of the Air Service, A.E.F., in which he states that the matter of artillery observers is so important that he deems it wise to clarify the situation at this time;

2. As will be noted from a reading of the papers herewith, G-3 and G-5 are not in agreement; nor can it be said that Hatch and De Armond are in agreement.

3. I am strongly of the opinion that:

(a) The aircraft service should own, organize, train, equip, replace, reward and punish its artillery observers.

(b) The artillery mission is one of the many missions of the aircraft arm of the service, which service has a variety of missions, just as have infantry, cavalry and artillery.

(c) The artillery desires and must have satisfactory information bearing upon the accomplishment of the artillery mission. In this respect the air service is one of the agents to which the artillery must turn; we should hold them responsible for adequate results, and by proper criticisms, etc., it is believed that we can get good service.

4. In my opinion the views held by G-3, G-5, Hatch and De Armond, although apparently opposed are not entirely out of harmony. What Hatch wants is good service, and I have gathered from conversations with him (and it is also indicated in his memorandum) that the results desired can best be accomplished by having the artillery observers live their lives in the atmosphere of the artillery game. He states that the present methods of handling the question is fundamentally sound, in that it places in the hands of the artillery commander the control of all the agencies which affect the accuracy of his fire.

I believe that the setting aside fo the necessary aircraft and aricraft observers for service with a heavy artillery group or groupment will work out just as well insofar as control of the incidents of fire by the artillery commander is concerned, and much better insofar as concerns the broader condiderations of discipline, promotion, replacement, etc., etc.

It appears to me that the observers in the case of heavy artillery will naturally form a part of the artillery life, and that the closest contract will be maintained between the artillery commander and his agencies of information.

In a memorandum on this subject dated September 17, 1917, I wrote the following:

> "It is not hard to see that a single group might do better work if its artillery observers were a part of its daily life, &c.; but the best average solution (Having in mind the field artillery and the heavy artillery) lies in holding the air service responsible for its share in the general mission."

5. In paragraph 6 of Hatch's Memorandum he states:

> "I believe that the question of supplying and maintaining heavy artillery observers should be considered seperately and should not be affected by any decision as to the most practicable method for furnishing and maintaining observers for light artillery and for other branches of the servece."

I do not agree with Hatch in this; I believe that a great coordinate service like the aircraft arm will respond to the call of the heavy artillery. -- I feel that the air pilot and the air observer are the real team that we should have in mind, both of them working for the artillery.

6. I agree with the recommendations of G-5. (Par. 8 page 3).

7. Enclosures as follows:-

(a) Memo. to C. of A., from Chief of Air Service, July 20, 1918.

(b) Memo. from General Hatch, dated July 24, 1918.

(c) Memo. of Colonel Kilner, dated July 19, 1918.

(d) Memo of G-5, dated July 4, 1918.

(e) Memo. of G-3, dated July 19, 1918.

(f) Memo. of Colonel De Armond, dated July 21, 1918.

(sgd) W.I. WESTERVELT,
Brigadier General, N. A.

6 incls.
hph.

C. of A. F.A.
EHD

GENERAL HEADQUARTERS AMERICAN EXPEDITIONARY FORCES,

France, July 21, 1918.

MEMORANDUM - FOR THE CHIEF OF ARTILLERY.

Subject : Artillery Aerial Observers.

1. In the Memos. herewith the first raises the question of Observers School at Chatillon. This matter appears to be one that can be decided only by the Fifth Section, General Staff.

2. In regard to the general subject of aerial observers detail from the Field Artillery, the status at present is decidedly unsatisfactory. This is very clearly se. forth in the memorandum of Col. Kilner. It is felt that difficulty will exist so long as the following conditions obtain:

(a) Officers detailed as aerial observers are thereby shut off from promotion, or

(b) If detailed under circumstances whereby the secure promotion they would be by decision of the Air Service shut off from command, and

(c) The general feeling which must exist until they are recognized part of some branch, preferably the Air Service, having in that branch all the rights and privileges both to promotion and command, possessed by any other officer.

It seems to me that until officers can be placed upon this status no half-way measure that may be taken will benefit the general service, This matter so far as effects the Artillery Service alone could be arranged in any one of the following three ways:

(a) Officers could be detailed from the artillery and Tables of Organization changed so that they might have the grade of 2nd Lieut., 1st Lieut., and Captain.-- To remain as artillery officers permanently detailed as aerial observers without the expectation of advancing beyond the grade of Captain.

(b) Detail of 2nd Lieutenants from the Artillery Service who after qualification as aerial observers would be promoted to the grade of 1st Lieutenants. Those officers to be returned to the Field Artillery Service after having served a period of 6 months or so as aerial observers on the front. Upon their return to be assigned to positions in the Field Artillery and to be replaced in the Air Service by 2nd Lieutenants.--The relief of the former officers from the Air Service to be permanent.

(c) The selection of all aerial observers by the Air Service and sent to the Field Artillery to secure proper artillery instruction. This method by far the best method will never be a success unless these officers are placed on the plane of equality with pilots and other officers of the Air Service. At present, if this policy was put into effect it would provide absolutely no relief for the present unsatisfactory condition. The right to acquire command in proportion to rank is one as greatly desired by all officers as the right to rank itself.

Practically all brigades arriving from the U.S. at the present time have furnished nearly the full quota fo Aerial Observers in the States, and it would be too great a drain upon the resources of the artillery in officer personnel for the artillery to make additional details of aerial observers after the brigades have arrived in France. This office had been informed that when aerial observers were desired for training by the Air Service they would be called for by that service. This in connection with Paragraph 5 of the Memo. submitted by Colonel Kilner.

(DE ARMOND)

C of A 2642 H A
LCC

GENERAL HEADQUARTERS

AMERICAN EXPEDITIONARY FORCES.

July 24, 1918.

MEMORANDUM: For the Chief of Artillery, A.E.F.

Subject: Detail of Aerial Observers.

1. I believe that steps should be taken at once to correct the existing situation as regards artillery airplane observers.

2. A memorandum dated July 1st and signed by Lieut. Colonel Kilner of the Air Service recited in detail the unsatisfactory condition now existing; and as this paper is now before you, repetition of its unnecessary here.

3. I am of the opinion that the best results will be obtained by adhering to the present Tables of Organization and requiring each regiment to furnish it's quota of observers.

4. These observers should remain a part of the regiment and return to it when their training is completed and have been given some experience at the front. After that time, they should remain with their organization and be avaliable for observation of its firing.

5. I believe that the present unsatisfactory condition is due to failure to carry out this policy. This method is funfamentally sound in that it places in the hands of the aritllery commander, the control of all the agents which affect the accuracy of his fire. Moreover, the questions of a supply of satisfactory officers and the promotion of these officers and will be settled.

6. I believe that the question of supplying and maintaining heavy artillery observers should be considered seperately and should not be affected by any decision as to the most practicable method for furnishing and maintaining observers for light artillery and for other branches of the service.

(Sgd) H.J. HATCH
gjm Brig. Gen., N.A.

AMERICAN EXPEDITIONARY FORCES
Office Chief of Artillery

26 July 1918.

MEMORANDUM

From: Chief of Artillery, A.E.F.

To: Chief of Air Service, A.E.F.

Subject: Aerial Observers for Artillery.

1. Our views in regard to this question are largely theoretical. We have had little practical experience in regard to it.

2. It is believed that the views expressed in par. 2 (a) (b) (c) and (d) of the Memorandum of G-3, are correct, but there are many difficulties to be encountered in applying these principles, particularly 2 (e). These difficulties are set forth quite fully in the Memos. of G-5 and of Lt. Col. Kilner.

3. Considering all the arguments, pro and con, advanced in these papers, it believed that the best solution must be based upon par. 3 (a) and (b) of Memo. G-5, and that of Lt. Col. Kilner containing in Pars. 2 (d) and that part of 14 reading as follows:

> "the creating of conditions which will give to officers volunterring for it such privileges or advancement as will make it attractive to them."

4. It is therefore recommended:

(a) That the aerial observers be commissioned in the Air Service and that they be placed on a footing of absolute equality with other officers of that service as regards command, promotion and pay.

(b) That special schools be established for the exclusive purpose of training observers in aerial observation of Artillery fire.

(c) That the Air Service be then held rigidly responsible for furnishing satisfactory aerial observation for the artillery.

ERNEST HINDS
Major General, N.A.
Chief of Artillery, A.E.F.

GENERAL HEADQUARTERS
AMERICAN EXPEDITIONARY FORCES
Air Service.

1st Ind.

Chief of Air Service, August 5, 1918. - To Chief of Staff, CHQ, AEF.

1. The general principles regarding the selection and status of aerial observers set forth in paragraphs above memorandum are concerned with.

2. Specifically it is recommended:

(a) Aerial observers shall be selected from officers volunteers, from any branch of the service and in such numbers as may be indicated by G-5.

(b) Air Service shall examine these canidates as to their qualifications and reject such as are considered deficient.

(c) The Artillery shall train those canidates who have had insufficient artillery experience in general principles artillery organization, practice and methods, knowledge of which all observers must possess.

(d) Upon the successful completion of their training in the Air Service Schools, these officers shall receive official rating as observers and be re-commissioned in the Air Service in the same grade that they hold in their own branch.

3. The fact that officers volunteering for observation duty will be commissioned in the Air Service carries with it the eligibility to command. Opportunity to receive flying instruction with a vew to obtaining pilot's rating will be granted observers in special instances in the discrection of the Chief of Air Service.
Under the present law observers are on the same basis as pilots in regard to pay. As soon as commissioned in the Air Service they will be on a footing of equality with all other Air Service Officers as regards promotion.

4. To meet the immediate needs for trained personnel and until such time as the proposed system shall produce the required numbers, the artillery and infantry in the A.E.F. shall continue to supply the personnel called for as aerial observers in their tables of organization. The personnel given the opportunity to transfer to the Air Service. In case any elect to remain in their orginial arms, these officers shall continue to serve with personnel, and none of them shall be returned to their army except on application approved by C.A.S.

5. In the case of officers who are promoted to a grade in their own arms above that of Captain, the C.A.S. will approve their withdrawl from squadrons and their returns to their orginial organization unless they are given a position of responsibility in the Air Service suitable to their grade.

6. As it is considered essential that the future supply of trained observers personnel be received almost entirely from the U.S.A., it is recommended that the above policy regarding the selection and status of observers if approved by at once communicated to the U.S. with the request that the same policy be established in America.

MASON M. PATRICK
Major-General, U.S.A.
Chief of Air Service, A.E.F.

EXTRACT FROM CABLE SENT

No. 1573-S.
August 8th.

X X X X

Paragraph 1. Subparagraph J.

The necessity for a large increase of trained observer personnel requires immediate standardization of methods of selection and status observers personnel in Untied States and A.E.F. Following policy adopted here. Aerial observers shall be selected from officers volunteers from any branch of the Service and in such numbers as may be indicated. Air Service cadets shall be eligible to volunteer as observers and upon completion of training in U.S.A. should be commissioned before being sent over-seas but not rated as observers until after final training AEF. Air Service to examine canidates as to qualifications with power to reject those considered deficient. Artillery to train canidates who have had insufficient artillery experience in general principles of artillery organization practice and methods. Upon receiving official rating as observers A.E.F. these officers shall be recommissioned in the Air Service in same grade as held in their own grade (?). Observers will thus be placed on footing of entire equality with other air service officers as regards command promotion and pay. To meet immediate needs and until proposed system shall produce required number or observers, artillery and infantry units shall contunue to supply the personnel for aerial observation required by their tables of organization. Personnel now attached to Air Service as observers of various grades shall be given opportunity to be recommissioned in Air Service. In case any elect to remain in their orginial arms they shall continue training or service with Air Service until they can be replaced by air service personnel and none shall be returned to their arms except on application approved by Chief Air Service. Consider it imperative that future supply trained observer personnel be received from United States. Accordingly request that above policy be approved and placed in effect. Pershing.

X X X X

EXTRACT OF CABLES RECEIVED.

No. 1905-R
Sept. 3, 1918.

X X X X

Paragraph 3??

Reference P 1375 paragraph 1 J, policy of standardization os method?? selection and status of officer personnel adopted here same as American Expeditionary Forces, except that upon completion of training as observers here they will be rated as such period? Change your policy accordingly.

X X X X

For Chief of Artillery.

GENERAL HEADQUARTERS
AMERICAN EXPEDITIONARY FORCERS
Office of the Chief of Staff.
France, August 8th, 1918.

From: Chief of Staff:

To : Commanding General,_____

Subject:Aerial Observers for Artillery.

1. Upon recommendation of the C.A.S. and Cheif of Artillery, the following policy has been approved at these Headquarters and approval requested from the United States by cable:

(a) That the aerial observers be commissioned in the Air Service and that they be placed on footing of absolute equality with other officers of that service as regards command, promotion and pay.

(b) That special schools be established for the exclusive purpose of training observers in aerial observation of Artillery fire.

(c) That Air Service be then held rigidly responsible for furnishing satisfactory aerial observation for the artillery.

(d) Aerial observers shall be selected from officers volunteers from any branch of the service and in such numbers as may be indicated by G-5.

(e) The Air Service shall examine these candidates as to their qualifications and reject such as care considered deficient.

(f) The Artillery shall train those candidates who have had insufficient artillery experience in the general principles of artillery organization, practice and mehtods, knowledge of which all observers must possess.

(g) Upon the successful completion of their training in the Air Service Schools, these officers shall receive official rating as observers and be re-commissioned in the Air Service in the same grade that they hold in their own branch.

2. The fact that officers volunteering for observation duty will be commissioned in the Air Service carries with it the eligibility to command. Opportunity to receive flying instruction with a view to obtaining pilot's rating will be granted observers in special instances in the discretion of the Chief of Air Service.

3. The personnel now attached to the Air Service as observers of various classes shall be given the opportunity to transfer to the Air Service. In case any elect to remain in thier orginial arms, these officers shall continue to serve with Air Service personnel, and none of them shall be returned to their arms except on application approved by C.A.S.

4. In the case of officers who are promoted to a grade in their own arm above that of Captain, the C.A.S. will approve their withdrawl from squadrons and their return to their original organization unless they are given a position of responsibility in the Air Service suitable to their grade.

5. To carry out the policy outlined above it is desired that these facts be made known to officers of your command with the information that officers volunteers are desired and that candidates may submit their applications through proper channels and that the commanding officers indorse there on fully their opinion regarding the officer's qualifications for the important and specialized duties involved.

LeROY ELTINGE
Deputy Chief of Staff

C of A 2642 H A
LCC

GENERAL HEADQUARTERS

AMERICAN EXPEDITIONARY FORCES.

July 24, 1918.

MEMORANDUM: For the Chief of Artillery, A.E.F.

Subject: Detail of Aerial Observers.

1. I believe that steps should be taken at once to correct the existing situation as regards artillery airplane observers.

2. A memorandum dated July 1st and signed by Lieut. Colonel Kilner of the Air Service recited in detail the unsatisfactory condition now existing; and as this paper is now before you, repetition of its unnecessary here.

3. I am of the opinion that the best results will be obtained by adhering to the present Tables of Organization and requiring each regiment to furnish it's quota of observers.

4. These observers should remain a part of the regiment and return to it when their training is completed and have been given some experience at the front. After that time, they should remain with their organization and be avaliable for observation of its firing.

5. I believe that the present unsatisfactory condition is due to failure to carry out this policy. This method is funfamentally sound in that it places in the hands of the aritllery commander, the control of all the agents which affect the accuracy of his fire. Moreover, the questions of a supply of satisfactory officers and the promotion of these officers and will be settled.

6. I believe that the question of supplying and maintaining heavy artillery observers should be considered seperately and should not be affected by any decision as to the most practicable method for furnishing and maintaining observers for light artillery and for other branches of the service.

(Sgd) H.J. HATCH
gjm Brig. Gen., N.A.

AMERICAN EXPEDITIONARY FORCES
Office Chief of Artillery

26 July 1918.

MEMORANDUM

From: Chief of Artillery, A.E.F.

To: Chief of Air Service, A.E.F.

Subject: Aerial Observers for Artillery.

1. Our views in regard to this question are largely theoretical. We have had little practical experience in regard to it.

2. It is believed that the views expressed in par. 2 (a) (b) (c) and (d) of the Memorandum of G-3, are correct, but there are many difficulties to be encountered in applying these principles, particularly 2 (e). These difficulties are set forth quite fully in the Memos. of G-5 and of Lt. Col. Kilner.

3. Considering all the arguments, pro and con, advanced in these papers, it believed that the best solution must be based upon par. 3 (a) and (b) of Memo. G-5, and that of Lt. Col. Kilner containing in Pars. 2 (d) and that part of 14 reading as follows:

> "the creating of conditions which will give to officers volunterring for it such privileges or advancement as will make it attractive to them."

4. It is therefore recommended:

(a) That the aerial observers be commissioned in the Air Service and that they be placed on a footing of absolute equality with other officers of that service as regards command, promotion and pay.

(b) That special schools be established for the exclusive purpose of training observers in aerial observation of Artillery fire.

(c) That the Air Service be then held rigidly responsible for furnishing satisfactory aerial observation for the artillery.

ERNEST HINDS
Major General, N.A.
Chief of Artillery, A.E.F.

GENERAL HEADQUARTERS
AMERICAN EXPEDITIONARY FORCES
Air Service.

1st Ind.

Chief of Air Service, August 5, 1918. - To Chief of Staff, CHQ, AEF.

1. The general principles regarding the selection and status of aerial observers set forth in paragraphs above memorandum are concerned with.

2. Specifically it is recommended:

(a) Aerial observers shall be selected from officers volunteers, from any branch of the service and in such numbers as may be indicated by G-5.

(b) Air Service shall examine these canidates as to their qualifications and reject such as are considered deficient.

(c) The Artillery shall train those canidates who have had insufficient artillery experience in general principles artillery organization, practice and methods, knowledge of which all observers must possess.

(d) Upon the successful completion of their training in the Air Service Schools, these officers shall receive official rating as observers and be re-commissioned in the Air Service in the same grade that they hold in their own branch.

3. The fact that officers volunteering for observation duty will be commissioned in the Air Service carries with it the eligibility to command. Opportunity to receive flying instruction with a vew to obtaining pilot's rating will be granted observers in special instances in the discrection of the Chief of Air Service.

Under the present law observers are on the same basis as pilots in regard to pay. As soon as commissioned in the Air Service they will be on a footing of equality with all other Air Service Officers as regards promotion.

4. To meet the immediate needs for trained personnel and until such time as the proposed system shall produce the required numbers, the artillery and infantry in the A.E.F. shall continue to supply the personnel called for as aerial observers in their tables of organization. The personnel given the opportunity to transfer to the Air Servicee. In case any elect to remain in their orginial arms, these officers shall continue to serve with personnel, and none of them shall be returned to their army except on application approved by C.A.S.

5. In the case of officers who are promoted to a grade in their own arms above that of Captain, the C.A.S. will approve their withdrawl from squadrons and their returns to their orginial organization unless they are given a position of responsibility in the Air Service suitable to their grade.

6. As it is considered essential that the future supply of trained observers personnel be received almost entirely from the U.S.A., it is recommended that the above policy regarding the selection and status of observers if approved by at once communicated to the U.S. with the request that the same policy be established in America.

MASON M. PATRICK
Major-General, U.A.
Chief of Air Service, A.E.F.

EXTRACT FROM CABLE SENT

No. 1573-S.
August 8th.

X X X X

Paragraph 1. Subparagraph J.

The necessity for a large increase of trained observer personnel requires immediate standardization of methods of selection and status observers personnel in Untied States and A.E.F. Following policy adopted here. Aerial observers shall be selected from officers volunteers from any branch of the Service and in such numbers as may be indicated. Air Service cadets shall be eligible to volunteer as observers and upon completion of training in U.S.A. should be commissioned before being sent over-seas but not rated as observers until after final training AEF. Air Service to examine canidates as to qualifications with power to reject those considered deficient. Artillery to train canidates who have had insufficient artillery experience in general principles of artillery organization practice and methods. Upon receiving official rating as observers A.E.F. these officers shall be recommissioned in the Air Service in same grade as held in their own grade (?). Observers will thus be placed on footing of entire equality with other air service officers as regards command promotion and pay. To meet immediate needs and until proposed system shall produce required number or observers, artillery and infantry units shall contunue to supply the personnel for aerial observation required by their tables of organization. Personnel now attached to Air Service as observers of various grades shall be given opportunity to be recommissioned in Air Service. In case any elect to remain in their orginial arms they shall continue training or service with Air Service until they can be replaced by air service personnel and none shall be returned to their arms except on application approved by Chief Air Service. Consider it imperative that future supply trained observer personnel be received from United States. Accordingly request that above policy be approved and placed in effect. Pershing.

X X X X

EXTRACT OF CABLES RECEIVED.

No. 1905-R
Sept. 3, 1918.
X X X X

Paragraph 3??

Reference P 1375 paragraph 1 J, policy of standardization os method?? selection and status of officer personnel adopted here same as American Expeditionary Forces, except that upon completion of training as observers here they will be rated as such period? Change your policy accordingly.

X X X X

GENERAL HEADQUARTERS
AMERICAN EXPEDITIONARY FORCERS
Office of the Chief of Staff.

France, August 8th, 1918.

From: Chief of Staff:

To : Commanding General,_____

Subject:Aerial Observers for Artillery.

1. Upon recommendation of the C.A.S. and Cheif of Artillery, the following policy has been approved at these Headquarters and approval requested from the United States by cable:

(a) That the aerial observers be commissioned in the Air Service and that they be placed on footing of absolute equality with other officers of that service as regards command, promotion and pay.

(b) That special schools be established for the exclusive purpose of training observers in aerial observation of Artillery fire.

(c) That Air Service be then held rigidly responsible for furnishing satisfactory aerial observation for the artillery.

(d) Aerial observers shall be selected from officers volunteers from any branch of the service and in such numbers as may be indicated by G-5.

(e) The Air Service shall examine these candidates as to their qualifications and reject such as care considered deficient.

(f) The Artillery shall train those candidates who have had insufficient artillery experience in the general principles of artillery organization, practice and mehtods, knowledge of which all observers must possess.

(g) Upon the successful completion of their training in the Air Service Schools, these officers shall receive official rating as observers and be re-commissioned in the Air Service in the same grade that they hold in their own branch.

2. The fact that officers volunteering for observation duty will be commissioned in the Air Service carries with it the eligibility to command. Opportunity to receive flying instruction with a view to obtaining pilot's rating will be granted observers in special instances in the discretion of the Chief of Air Service.

3. The personnel now attached to the Air Service as observers of various classes shall be given the opportunity to transfer to the Air Service. In case any elect to remain in thier orginial arms, these officers shall continue to serve with Air Service personnel, and none of them shall be returned to their arms except on application approved by C.A.S.

4. In the case of officers who are promoted to a grade in their own arm above that of Captain, the C.A.S. will approve their withdrawl from squadrons and their return to their original organization unless they are given a position of responsibility in the Air Service suitable to their grade.

5. To carry out the policy outlined above it is desired that these facts be made known to officers of your command with the information that officers volunteers are desired and that candidates may submit their applications through proper channels and that the commanding officers indorse there on fully their opinion regarding the officer's qualifications for the important and specialized duties involved.

LeROY ELTINGE
Deputy Chief of Staff