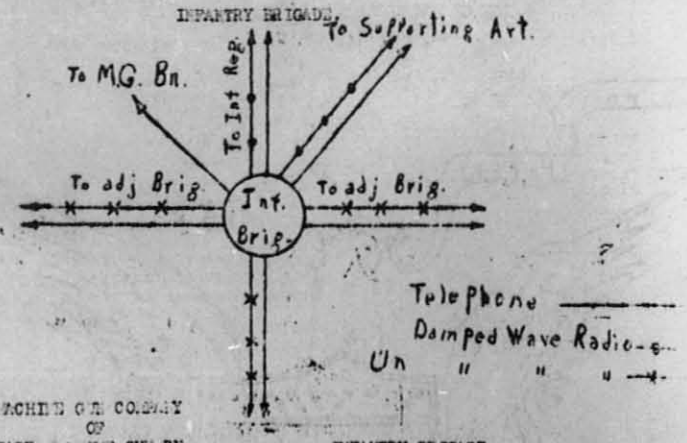
MAJOR ITEMS OF SIGNAL EQUIPMENT FOR ALL UNITS OF AN INFANTRY BRIGADE IN ACCORDANCE WITH CIRCULAR #20, W.D. 1920.



MACHINE GUN COMPANY OF BRIGADE MACHINE GUN BN.

1 Telephone Type EE-5

1 Reel, Type RL-9 (Breast) 1000 ft. Wire, Outpost, single

2 Signal Lamps Type EE-6
1 for constant use
1 for emergency use

4 Kits, flag, combination
1 per platoon
1 per bugler

MACHINE GUN BATTALION OF INFANTRY BRIGADE.

2 Switchboards Type BD-9 (Monocord, 4-drop)
1 Set, Monocord Operator, Type EE-64.

INFANTRY BRIGADE.

2 Switchboards Type BD-9, (Monocord, 4-drop)
2 Switchboards Type BD-11, (Monocord, 12-drop)
2 Sets, Monocord Operator, Type EE-64

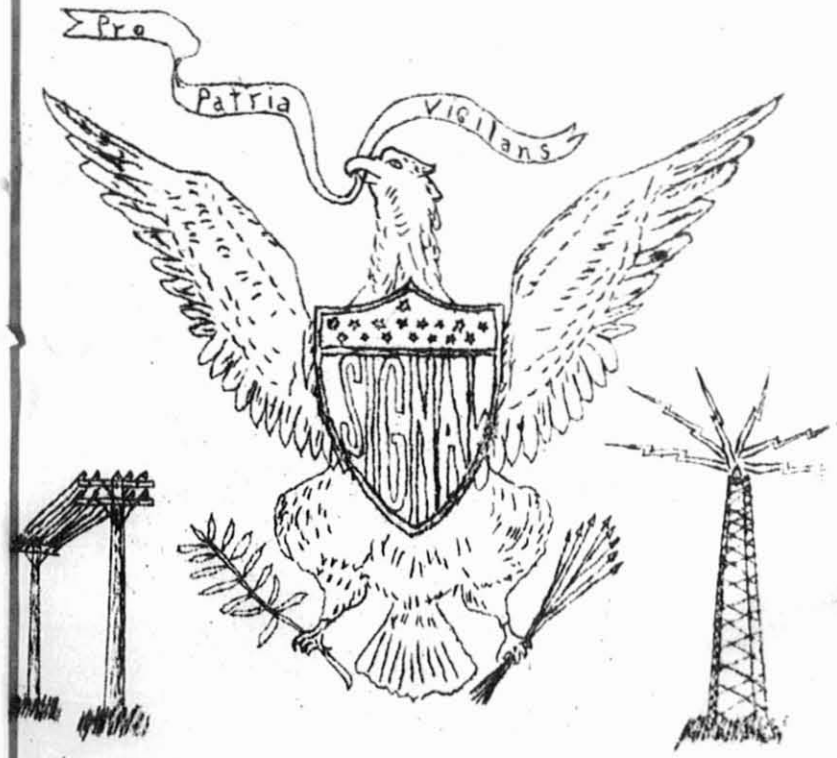
These connect to Infantry Regiments, to Divn., to Artillery, to M.G. Bn. and Battalion to other brigades.

2 Sets, test, Universal, Type EE-65
1 at brigade switchboard
1 for test point

7 Telephones Type EE-4
1 for brigade commander
1 for brigade adjutant
1 for message center
1 for public use
2 spare

4 Telephones Type EE-5, for testing purposes, carried by trouble shooters.

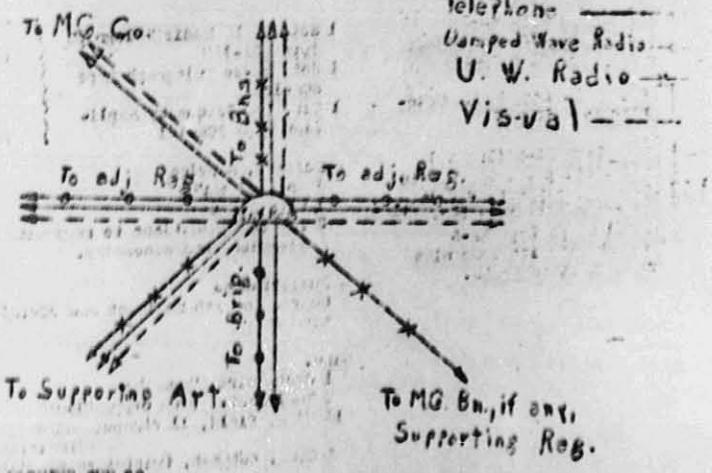
WAR DEPARTMENT
OFFICE OF THE CHIEF SIGNAL OFFICER
WASHINGTON, D. C.



INFORMATION BULLETIN NO. 2.

JUNE 1, 1920.

INFANTRY REGIMENT.



MACHINE GUN CO.
OF
INFANTRY REGIMENT.

1 Telephone Type EE-5
for stabilized warfare.

1 Reel Type RL-9 (Breast)
(1000 ft. wire, single, outpost).

2 Signal Lamps Type EE-6
1 for constant use
1 for emergency use

4 Kits, flag, combination,
1 per platoon
1 per bugler

REGIMENT.

2 Switchboards, Type BD-9 (Monocord, 4-line)
1 Switchboard, Type BD-11 (Monocord, 12-line)
2 Sets, Monocord Operators, Type EE-64

These switchboards connect to Bns. in line, to Bns. in reserve, to M. G. Bn., to Artillery, to Brigade H.Q., and latterly to other regiments.

2 Sets, Test, Universal, Type EE-65,
(1 at switchboard, 1 for trouble shooters)

8 Telephones Type EE-4
1 for Regt'l Commander
1 for Adjutant
1 for Surgeon
1 for Message Center
1 for Public Use

1 Set, U.W. Loop Radio Telegraph Type SCR-77
1 Set, Radio Telegraph Type SCR-105
1 Set, Low Frequency Amplifier Type SCR-121
1 Wavemeter Type SCR-125
} Carried in Trailer.

MACHINE GUN BATTALION
OF
INFANTRY BRIGADE.
(Cont'd)

2 Telephones Type EE-5
1 for battalion commander
1 for testing purposes

1 Set, U. W. Loop Radio Telegraph Type SCR-77

1 Reel, Type RL-9 (Breast)
1 Reel Cart, pack, Type RL-16
1000 ft. Wire, outpost, wire le...
2 wire, outpost, twi., pr., miles,

2 Signal Lamps Type EE-6
To work with its companies and unit it supports.

INFANTRY BRIGADE. (Continued)

1 Set, U. W. Radio Telegraph Type SCR-130
1 Set, Radio Telegraph Type SCR-105
1 Set, Low Frequency Amplifier Type SCR-121
} Carried in Trailer.

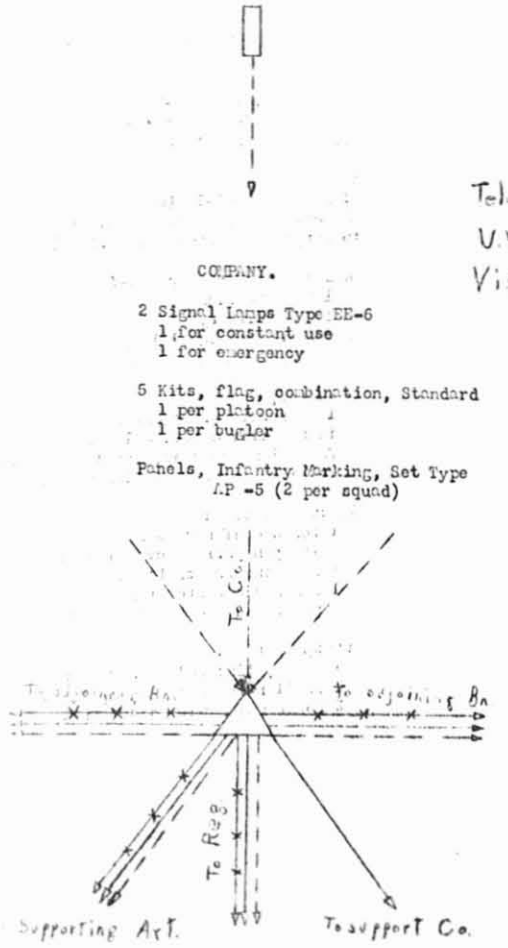
6 Buzzers, Service
3 on reel cart
1 with radio
2 for communications to regiments and division when necessary.

3 Buzzerphones
Composite with regiment and division when necessary.

Wire.
1 Cart, wire, Type N
2 Reel Carts, Pack, Type RL-16
15 Wire, field, 11 strand, miles (5 on ea. wire cart)
8 Wire, outpost, twisted pair, miles

Transportation.
1 Truck, 1½-ton
1 Trailer for radio equipment

INFANTRY COMPANY AND INFANTRY BATTALIONS.



2 Signal Lamps Type EE-6
1 for constant use
1 for emergency

5 Kits, flag, combination, Standard
1 per platoon
1 per bugler

Panels, Infantry Marking, Set Type
AP -5 (2 per squad)

INFANTRY REGIMENT. (Continued)

3 Telephones Type EE-5) For
(Western Electric 1375-B) test
Carried by men with reels) purposes.

Wire.
1 Reel Type RL-9 (Breast)
3 Reel carts, pack, Type RL-16
15 Outpost, twisted pr., miles (wire)

2 Signal Lamps Type EE-7
1 to battalions
1 to artillery
There are no signal lamps for use behind Infantry Regiment headquarters.

9 Buzzerphones.
1 composite if necessary with its brigade, in stabilised action 1 for use with each front line company, total 6; for battalions in line to work with its companies, total 2.

3 Buzzers, service
1 for use if necessary with its brigade in open warfare over long lines.
1 for linemen for testing purposes.
1 for radio system for instruction purposes and when isolated from regiment.

Transportation.
1 Wagon, limbered caisson type
1 Trailer for radio equip ment.
2 Motorcycles with side cars.

composed of seven strands of phosphor bronze, 20 ft. high, 75 ft. long on each leg. The ground connection consists of copper mesh ground mat, three feet wide by eight feet long. Power is furnished by one storage battery, Type BB-23, consisting of a battery of five cells, furnishing ten volts, 17 ampere hour capacity, the whole contained in a hard rubber jar, non-spill design. Two spare batteries for each set. Weight of one battery, approximately 25 pounds.

The receiving set is similar to the SCR-54-A. An Amplifier Type SCR-121 is furnished to increase the range.

Briefly, the SCR-105 Set is a 50 watt, five mile quenched spark transmitting and receiving set, (working range 20 miles with amplifier), designed to transmit signals of 100 to 550 meters on six fixed wave lengths as follows - 150, 180, 210, 240, 270 and 300 meters. This set is used by the regimental and brigade headquarters of infantry and artillery of an Infantry Division, and at regimental and battalion headquarters of Corps Artillery.

ADDRESSES OF SIGNAL RESERVE OFFICERS.

An effort has been made by this office to reach all officers of the Signal Reserve Corps, but, for various reasons, a few men have not been reached, due to lack of addresses or wrong addresses.

A list of those officers whose addresses are unknown is given below, and it is requested that officers of the Reserve Corps who may know the present whereabouts of these officers kindly communicate such information to the Chief Signal Officer.

Name.	Last Known Address.
Captain Harold R. Waldron	103 Whitestone Ave., Flushing, N.Y.
1st Lieut. Curtis R. Smith	None
1st Lieut. Earle R. Wall	None
1st Lieut. Robert N. Davidson	c/o Michigan Power Co., Lansing, Mich.
2nd Lieut. John J. Kilmer.	Moss, Mich.
2nd Lieut. Leonard L. McInroy	12 High St., Lyons, N. Y.
2nd Lieut. Jacob E. Edelstein	None.
2nd Lieut. Frederick G. Foley	None.
2nd Lieut. John T. Hudson	None.
2nd Lieut. George A. Irland	None.
2nd Lieut. Charles F. Feagele	None.
2nd Lieut. Richard T. Smith	None.
2nd Lieut. Henry M. Reitzel	1633 Irving St., N.W., Washington, D.C.
2nd Lieut. Myron A. Tong	148 Windsor Road, West Arlington, [illegible]

INFANTRY BATTALIONS.

2 Switchboards, Type BD-9, (Monocord, 4-drop)

1 Set, Monocord Operator's, Type EE-64

In stabilized warfare these switchboards connect to Battalion O.P., to Regimental Headquarters, to supporting artillery and latterly to adjoining battalions.

3 Telephones Type EE-4
- 1 Bn. commander) In
- 1 Message center) stabilized
- 1 Support company) warfare.

In open warfare there will be telephone communication from battalion to regiment.

1 Set, U.W. Loop Radio Telegraph Type SCR-77

1 Telephone Type EE-5, (Western Electric 1375-B) for testing purposes. Carried by men with reels.

Wire.
- 1 Reel Type RL-9 (breast)
- 1 Reel cart, pack, Type RL-16
- 3 Wire, outpost, twisted pair, miles

1 Signal Lamp Type EE-6 - to work with Companies.

1 Signal Lamp Type EE-7 - to work with regiment and supporting artillery.

SET, RADIO TELEGRAPH, TYPE SCR-106.

This damped wave radio telegraph set is composed of the following essential pieces of equipment; a special polarized, double winding transmitting buzzer, with radio frequency quenched interrupter, a quenched spark gap, and an adjustment for six fixed wave lengths; a crystal detector, mounted in a set box and arranged to be carried by a shoulder strap. The box complete less antenna weighs 25 pounds. The antenna is of the "V" type, a single wire

are given certificates of proficiency which will materially assist them in securing a good position upon discharge. This School is completely equipped with thousands of dollars worth of the latest equipment and has a staff of instructors especially selected for their expert knowledge in the different lines. Each course will run approximately six months. The courses of instruction fit men for the following vocations:

Lineman	Cable splicer
Storage battery man	Cable tester
Radio specialist	Horse operator
Radio operator	Telephone expert
Telegraph mechanic	Telephone switchboard installer
Cable operator	Telephone mechanic

Meteorological observer and computer.

Classes are conducted in the Field and Telegraph Battalions in the following subjects for which certificates of proficiency are given to those obtaining the required standard:

Radio	Telephone installation
Line work	Telephone switchboard installation
Cable splicing	Motorcyclists
Switchboard operation	Motor truck drivers
Storage batteries	Elementary electricity
Telegraphy	Gas engines

Qualified radio and telegraph operators are especially desired at this time for the Signal Corps Telegraph and Cable System in Alaska. The present pay and allowances at most stations on the System for new men is over $125.00 per month, Master Signal Electricians receive over $200.00 per month.

The Meteorological Section, Signal Corps, is open for the enlistment of a limited number of men. This section conducts a course at Camp Alfred Vail and sends men to Meteorological Stations throughout the country upon completion of instruction, which lasts about six months. Some very desirable stations are offered by this Section.

The 4th Service Company, Signal Corps, Fort Wood, New York Harbor, has vacancies for a limited number of men who wish to take up instruction in instrument making, repairing, and radio. All Signal Corps radio equipment is overhauled and repaired at the depot located at this post.

To enlist for one of the Signal Corps organizations application should be made to this office by letter in order that authority can be given to insure a man's proper assignment. Applicants must be physically fit, single, between the ages of eighteen and fifty-five years, and possess the equivalent of an eighth grade education.

FACTS ABOUT THE SIGNAL CORPS.

Location and Strength of Signal Corps Organizations, May 1, 1920:

Organization	Location	Authorized Strength	Strength May 1, 1920.
1st Field Bn.	A. F.I.G.	239	254
2nd " "	Camp Taylor	239	221
3rd " "	Hawaii	75	74
4th " "	Panama	76	65
5th " "	Camp Pike	239	165
6th " "	Camp Grant	239	191
7th " "	Camp Travis	245	209
8th " "	Camp Dodge	239	131
9th " "	Camp Gordon	239	131
10th " "	Camp Funston	239	193
51st Teleg. Bn.	Ft. Sam Houston	209	176
52nd " "	Ft. Sam Houston	209	139
53rd " "	Manila - Hawaii	100	103
54th " "	Panama	100	103
55th " "	Camp Vail	209	169
1st Svc. Co.	Alaska	)	69
2nd " "	Alaska	)	82
3rd " "	Boston	)	22
4th " "	Fort Wood	)	168
5th " "	Charleston	)	52
6th " "	Chicago	)	53
7th " "	Ft. Sam Houston	)	288
8th " "	San Francisco	) 918	239
9th " "	Hawaii	)	22
10th " "	P.I.	)	69
11th " "	Panama	)	38
15th " "	Camp Vail	)	660
17th " "	Washington, D.C.	)	80
27th " "	Seattle, Wash.	)	91
S.C. Detachment	Silesia		160
		Total	4539

The Signal Corps offers an exceptional opportunity to young men to receive educational and vocational training absolutely free at its school at Camp Alfred Vail, N. J., or in any of its organizations.

The Signal Corps School at Camp Alfred Vail, N. J. was established to give officers and enlisted men of the Signal Corps the necessary technical education to fit them to efficiently perform their duties in the Signal Corps. Those completing the courses

"THE WESTERN UNION TELEGRAPH COMPANY
195 Broadway

New York, April 8, 1920.

Colonel Edgar Russel,
Department Signal Officer,
Eastern Department,
Army Building,
New York, N.Y.

Dear Sir:

I am informed that with the view of providing enlisted men opportunity to fit themselves for worthwhile positions in civil life, the U. S. Signal Corps has established courses of training in Morse and Automatic telegraphy, and that following this preliminary training, those who have qualified and who desire to progress further are given a thorough training in the maintenance, use and principles of operation of all the electrical apparatus used in modern telegraphy.

There is an extensive need for good Morse and Automatic telegraph operators and for men able to handle Testing and Regulating equipment competently. Within the next few years hundreds of positions as operators, testboard attendants, Automatic attendants, repeater chiefs, Automatic chiefs, wire chiefs and similar well-remunerated positions will have to be filled, and those who enter this field in the near future are practically assured, not only of stable employment, but of successive opportunities for advancement.

I should be very glad to have you disseminate this information among those who enter the telegraph training schools of the Signal Corps, and to have them understand that upon the completion of their courses and re-entry into civil life this Company will accord their applications and credentials from the Signal Corps the most careful consideration.

Yours truly,

(Sgd) W. H. FASHBAUGH,
Vice President."

The Chief Signal Officer of the Army wishes to express his heartiest appreciation to the officers of the Signal Reserve Corps who have so kindly cooperated in the recruiting drive which has been conducted during the past six months. These officers can be of great value in future Signal Corps recruiting by bringing to the attention of young men whom they know and consider would be interested in the excellent educational and vocational training the Signal Corps offers. Additional information gladly furnished upon request.

THE AMERICAN TELEPHONE AND TELEGRAPH COMPANY
AND
THE WESTERN UNION TELEGRAPH COMPANY
INDORSE THE
SIGNAL CORPS SCHOOL, CAMP ALFRED VAIL, NEW JERSEY.

"AMERICAN TELEPHONE AND TELEGRAPH COMPANY
TELEPHONE AND TELEGRAPH BUILDING
195 Broadway

New York, April 9, 1920.

Colonel Edgar Russel,
Department Signal Officer,
8-10 Bridge Street,
New York City.

Dear Sir:

In response to your suggestion we have inquired into the character of the training given at the vocational school which the United States Army has established at Camp Alfred Vail, New Jersey.

We find that the courses in practical mathematics, electricity, magnetism, fundamental telephone work and telegraph operating are laid out and conducted upon such a thoroughly practical basis that they provide an excellent preliminary training for men desiring to enter the telephone business.

We are calling to the attention of the operating companies associated with this Company, the fact that men who have taken this preliminary training will from time to time be available for employment as they return to civil life and we are recommending to their favorable attention such of these men as may desire employment in their respective localities and who have terminated their service in the Signal Corps with a discharge bearing the indorsement of either "Very Good" or "Excellent" and who present a certificate showing that they have successfully completed the course.

Yours very truly,

(Sgd) E. K. HALL,
Vice President"

Extract from Bill Recently passed by Congress Increasing the Pay of the Army, Navy, Marine Corps, Coast Guard, Geodetic Survey and Public Health Service.

Be it enacted that commencing January 1st, 1920, commissioned officers of the Army ***** shall be paid in addition to all pay and allowances now allowed by law, increased at rates per annum as follows: Colonels, $600; Lieutenant Colonels $600; Majors $480; Captains $420; First Lieutenants $600; Second Lieutenants $420.

Section 2. That the rights and benefits prescribed under the act of April 15, 1918 granting commutation of quarters, heat and light during the present emergency to officers of the Army on duty in the field are hereby continued and made effective until June 30, 1922. Provided that such rights and benefits as are prescribed for officers shall apply equally for enlisted men now entitled by regulations to quarters or to commutation therefor.

Section 4. That commencing January 1st, 1920 the pay of all enlisted men of the army ***** is hereby increased 20 percentum; provided, that such increase shall not apply to enlisted men whose initial pay, if it has already been permanently increased since April 7, 1917 is now less than $33.00 per month.

Section 5. That all non-commissioned officers of the Army of the grade of color sergeant and above as fixed by existing regulations ***** shall be entitled to one ration or commutation therefor in addition to that to which they are now entitled. The commutation value shall be determined by the president on July 1st of each fiscal year, and for the current fiscal year the value shall be computed on the basis of 55 cents per ration.

Section 9. That nothing contained in this act shall be construed as granting any back pay or allowances to any officer or enlisted man whose active service shall have terminated subsequent to the approval of this act, unless such officer or enlisted man shall have been recalled to active service or shall have been reenlisted.

Section 12. That hereafter when any commissioned officer, non-commissioned officer of the grade of color sergeant ***** having a wife or dependent child or children is ordered to make a permanent change of station, the United States shall furnish transportation in kind from funds appropriated for the transportation of the Army ***** .

Section 13. That the provisions of Section 1, 3, 4, 5 and 6 of this act shall remain effective until the close of the fiscal year ending June 30, 1922, unless sooner amended or repealed***** .

The effect of this bill on the enlisted personnel of the Army is shown in the following table which gives the monthly rate of pay [illegible] in May, 1917, and the 20% increase provided for by the bill.

	Rate of pay per month for first five 1st Enlistment.	Pay per month under new act. 1st Enlistment.
* Master Signal Electrician	$81.00	$113.40
* Sergeant, first class	51.00	77.40
Sergeant	46.00	62.10
Corporal	36.00	43.20
Chauffeur, first class	51.00	61.20
Chauffeur	44.00	52.80
Horseshoer	36.00	43.80
Cook	36.00	45.00
Private, first class	33.00	39.60
Private	30.00	No increase.

* Includes ration allowance of 55 cents a day.

FOR THE FIELD ARTILLERY JOURNAL.

INFANTRY - ARTILLERY.

By Lieut. Colonel Paul B. Malone, Infantry.

(EDITOR'S NOTE:- The following article was prepared at the request of the Journal with a view to giving to our Field Artillery officers the ideas of a distinguished Infantry officer based upon experience in the World War.

The author's service in the recent war was of such a varied nature as to give him unusual opportunity to observe the needs of his own arm in cooperation with Field Artillery.

Colonel Malone was Chief of the Training Section, G.H.Q., A.E.F., from August 8, 1917, to February 18, 1918; commanded the 23rd U. S. Infantry, 2nd Division, Somme-Vieux Sector - Chateau-Thierry, Aisne Defensive, and Aisne-Marne Offensive; as Brigadier-General he commanded the 100th Infantry Brigade, 50th Division, in the St. Mihiel Offensive - Meuse-Argonne Offensive and up to the date of the Armistice.)

The war has brought the Infantry and the Field Artillery into such close cooperation that, broadly speaking, the two arms have merged into a single fighting unit, compelling the mutual acceptance of certain methods of combat, in order that the team may function on the battlefield with maximum efficiency.

All other arms being auxiliary to the Infantry, a statement of the role of the Infantry will determine the corresponding role of the other arms in cooperation therewith.

Let us, then, consider these roles from the standpoint of our latest experience in the World War. Briefly, we passed through the successive stages of stabilized warfare, the attack of strongly intrenched positions, the break-through and the initial phases of warfare in the open.

In the first phase Infantry occupied the ground already conquered, and its mission was to hold it against attack to the extent indicated by the High Command. The mission of all other arms was to support the Infantry in the execution of the role assigned it.

The methods of holding the ground during the war passed through successive phases, beginning with reliance on a dense infantry firing line charged with holding to the last extremity, and closely supported by troops of the first and second lines.

The useless loss of life resulting from this dense distribution brought about a deep extension in depth, finally developing, for each position, the system of elastic defense in three successive zones - the zone of outposts, the zone of principal resistance, and the zone of reserves. The zone of outposts was lightly occupied, and, during a general attack was usually evacuated according to fixed methods, while on the evacuated area the defensive artillery concentrated its fire with a view to breaking up the attack by the time it reached the zone of principal resistance, which was held to the last extremity. The troops in the zone of the reserves counter-attacked according to plan.

The role of the Artillery was drawn in strict accordance with the Infantry plan. It contemplated a light defensive barrage in front of the zone of outposts, a dense concentration of all the artillery fire in the zone as it was progressively evacuated, reaching the maximum intensity of concentration in front of the zone of principal resistance, where it was hoped the attack would be shattered. This was stabilized warfare in its highest development.

Based upon the infantry plan of operations, the artillery plan was drawn in every detail by the Artillery Commander to produce the desired result. During the whole period in sector the artillery was fully and exclusively under the command of artillery officers up to and including the Artillery Brigade Commander, who reported directly to the Division Commander. Infantry Commanders exercised no direct control over the Artillery Commanders who supported them in their sectors, but, as contemplated in the plan of defense, the closest liaison existed between them at all times. The correct execution of this plan contemplated that the headquarters of the Artillery Commander supporting the sub-sector be located at or near the headquarters of the corresponding Infantry Commander; that an artillery liaison officer be located at the headquarters of the Infantry Commander; that another liaison officer be located at the headquarters of the Infantry unit in the front-line position, with artillery agents of communication in the foremost Infantry echelons. Paralleling the system of infantry communication from front to rear was an independent system of artillery communication, sometimes lacking because sufficient wire could not be provided for the purpose. While infantry information ordinarily came over infantry lines, and artillery information came over artillery lines, yet either or both lines might be used for any kind of information in case of emergency. Such artillery liaison officers became, in effect, staff officers of the infantry commanders, to whom they reported, and framed into artillery terminology the requests of the infantry for artillery action, but they did not give orders. They were responsible for a complete knowledge of the infantry dispositions and for keeping their artillery commanders completely informed by maps, sketches, and reports as to every change in the dispositions of infantry troops, and for the transmission of any other information necessary for complete cooperation. Infantry commanders could ask for and secure accurate fire on any point accurately described in their fronts.

There can be no doubt that these arrangements were satisfactory; that during the period of stabilized warfare no question as to overlapping or conflict of command could occur; that the infantry was completely served by the supporting artillery when the latter carried out its duties as contemplated in the plan of defense, and responded to the calls of the infantry for appropriate artillery action. Let us, then, consider the next phase, the attack of organized positions and the breakthrough.

The St. Mihiel, Meuse-Argonne offensives serve as examples of what the relation of artillery and infantry must be on the actual field of battle during such periods. In each the attack was prosecuted according to well-matured plans. Artillery was generally, though not always, assigned as supporting units for the corresponding attacking units of infantry, and the plan of attack anticipated, in so far as possible, all possible contingencies until the attacking troops had advanced approximately to the limit of the barrage, and artillery units began to advance and take up new positions. The victorious infantry was disorganized by a long advance and the loss of a large percentage of its personnel, especially its leaders. Liaison by all means, except by runners, was lost. The artillery was struggling to push forward by man- and horse-power across a terrain churned by shell fire and covered by barbed-wire entanglements, frequently several hundred metres deep. Complete dislocation of command was generally the rule, and this at the very crisis of the action, yet in order to secure the full fruits of victory the attack must be resumed. The infantry must resume the advance, or, better still, never allow it to stop. The advance must be continued either by the infantry in the assaulting echelons, or else the supporting echelons must pass through. At this moment leadership for the first time suffers a very serious test. Up to this moment everything has proceeded, if successful, according to plans well developed in advance. Commanders were required merely to play their specified role in the general program, but now there can be no definite program other than the broad general orders that apply ordinarily to troops in open warfare. The infantry has a definite direction of advance, and an objective generally beyond human power to attain, while the artillery units "support" the corresponding infantry units in attaining the objective.

Does it not become clear that we have upon the field a team which may be designated the infantry-artillery team, whose mission, instead of being separate, distinct, and well-defined, now blends into a common mission, in the successful execution of which a multiplicity of situations will develop in rapid succession, which can be handled only by the initiative of the leader on the actual field of battle? Again, is it not equally clear that upon this field of battle responsibility for decisions must rest upon the leader of the dominant arm, and therefore upon the Infantry Commander?

To these two questions, in my opinion, and in harmony with my experience, the answer must be in the affirmative. If so, there can be but one logical procedure when this stage is reached. The supporting artillery of any infantry unit falls under the orders of the Infantry Commander whom he has been designated to support, and continues in this capacity until the mission assigned the infantry-artillery team has been accomplished, and a new set of conditions permit the orderly and methodical readjustment of the responsibilities of all concerned.

Pending such readjustment there can be no doubt in my mind as to the duty of the infantry commanders with respect to their supporting artillery -- they must positively command it, unembarrassed by the assumption that they must appeal to the Division Commander or to the commander of the artillery brigade for the fire which the fleeting opportunities of the moment demand should be delivered unhesitatingly.

It is, I think, futile to assume that the artillery brigade commander will be able to come forward at this time and personnally command his widely dispersed units. By no means of communication yet devised will he be able to receive information of the situation in time to issue orders which can be executed along the whole division front while the division is still advancing. In the usual case he will be the recipient of early information that action has been taken and results attained by his subordinates in harmony with the "requests" which in future should be considered "orders" of the Infantry Commanders.

The term "order" is used deliberately. In all or nearly all of our offensives the artillery commanders who supported us sought information as to our artillery needs and were generally not only willing but anxious to conform to our wishes, but the hypothesis that the action of the artillery commander was in response to a request, not an order, is I believe totally wrong in principle.

One great consideration must dominate all others - the infantry must roll onward to the limit of power of the attacking troops to press the attack, in harmony, of course with the mission assigned to the whole command. It would seem manifest, then, that the infantry officer on the field of battle, upon whom responsibility inevitably rests for success or failure, must, of necessity, command all of the units which contribute to success or failure on his front.

It is he who must decide to press onward against points of weakness, and then, by flanking operations, assist his comrades in overcoming strong resistance which they are unable alone to break. The means to accomplish this result must be under his control. The brigade artillery officer, during this period, located necessarily at division headquarters, will be able to control only through the use of the 155's not placed in support of infantry units, and by proper distribution of fire, when the whole division has been brought to a halt by strong resistance.

The recognition of these principles will produce a true infantry-artillery team, and a further principle necessary for the fullest development of the efficiency of the team will follow as a corrollary; the infantry officer must know how to command the team. This leads to a brief discussion of infantry needs and obligations during the period in question.

Having smashed through the enemy's position, and having cast out the mass of his divisional artillery, the infantry finds the hostile machine guns the greatest resistance to be overcome. The assaulting echelons will frequently find themselves under an annihilating machine-gun fire at close range, and will be compelled to halt and seek cover while echelons on the flanks gain ground and envelop the points of resistance. Accustomed to sending up signals for a barrage in stabilized warfare and getting an immediate response in accurately placed fire by the supporting artillery, the infantry is prone to think that artillery fire may be called for in the same way, and that the same prompt response with the same degree of accuracy should be expected. No such results are possible. The difficulty of keeping the artillery informed as to the location of the assaulting waves is very great.

The time necessary to transmit information cannot be disregarded. If the attack be allowed to halt until the artillery can suppress the machine

guns, the attack will fail completely, and the fruits of victory will be lost. Infantry must conquer this resistance by its own fire and its own power of manoeuvre. The zone in which artillery can safely place its fire is well in advance of the assaulting waves. With present methods of communication this zone is not less than 1000 meters in front of the echelons in action, though under favorable circumstances it will frequently be less, and as communication improves it will decrease correspondingly. The infantry, then, during this period of attack must unhesitatingly accept as its mission the conquest of all points within 1000 metres of its own assaulting waves by its own fire, and its own efforts, seizing, nevertheless, upon every opportunity to use artillery fire within this zone whenever it can be done successfully. In this connection it should be remembered that it is frequently as difficult to stop artillery fire upon a point as it is to start it; many golden opportunities were lost during the war because artillery fire in our close front prevented the capture of the escaping enemy, who would otherwise have been inundated by our further advance.

Infantry armament must be fashioned in har mony with the mission above assigned, and infantry tactics must meet the test. From this it follows that the infantry must have as one of its habitual weapons a gun capable of direct fire of sufficient intensity to knock out tanks and machine guns behind cover, and curved fire with a shell practically equal in explosive effect to the H. E. shell of the 75's, this shell for use against machine guns in clusters of trees or woods where their exact location is uncertain. This weapon will be known as the Infantry Howitzer. It should not be confused with the accompanying gun, which is an artillery gun, manned by artillery personnel, and commanded by an artillery commander, but operating under the direct orders of the infantry commander of the assaulting battalion. The withdrawal of the accompanying gun from the artillery command is an undesirable expedient as it reduces the strength of the artillery as such, and often does not materially assist the infantry. There will still be occasions when circumstances justify its use, and the motorization of the 75's will vastly increase the possibilities of the weapon on such occasions. The Infantry Howitzer will therefore cover with direct and curved fire the entire zone 1000 metres deep in front of the assaulting waves of infantry, and as much deeper as practicable, so as to relieve the artillery from the mission of firing, during this period of attack, in the foregoing zone, and will also materially reduce the number of occasions on which the assignment of the accompanying guns will be necessary.

It follows that the Infantry Howitzer must become a powerful weapon, possessed of great mobility, and carrying large quantities of heavy ammunition. All solutions founded on the hypothesis that it will be carried forward by man-power or horse-power will probably prove unsatisfactory. The animals will be killed. The number of men necessary to carry forward adequate supplies of ammunition will be out of proportion to the value of the unit. Results, I believe, can be hoped for only in a caterpillar of great mobility, carrying both gun and ammunition, and capable of traversing any terrain passable by infantry. This Infantry Howitzer will thus combine the functions of the one-pounder and the stokes mortar and add tremendously to the mobility of both. The special interest of the artillery in this weapon centers about the fact that its proper development will permit the assignment to the artillery of a mission in the breakthrough which it can accomplish successfully in cooperation with the Infantry Howitzer, thus relieving the artillery of a task usually impossible of satisfactory execution. The artillery will merely deepen the zone of fire of the Infantry Howitzer and when possible to do so, will reinforce the

fire of the Infantry Howitzer in the zone usually covered by the latter.

The fire power of all infantry weapons must be developed and coordinated and extreme mobility maintained in infantry manoeuvre, preserving at the same time the necessary echelonment in depth to reduce the casualties.

The means of communication employed in the war must be vastly improved to meet the needs of modern warfare. Radio telephony between all echelons in attack, and between air units and land units, promises most satisfactory results, while the development of signals by rockets to keep the artillery constantly advised of the location of assaulting waves will aid materially to the teamwork of the infantry and artillery, so necessary to success. In any attack which penetrates to great depth the team will be pulled asunder unless the artillery can develop much greater mobility than was developed during the war. In the great offensives both the Allied and the enemy infantry ran away from their supporting artillery. The enemy had practically no artillery during the early days of June, when the 2nd Division, also without its artillery, encountered the Hun on the Chateau-Thierry-Paris road. A remedy can be found only by developing in the artillery mobility equal to that of the infantry over any terrain across which the infantry can attack. The artillery of the future must be able to tear through barbed-wire entanglements and advance regardless of roads in close support of the infantry at the fastest pace the latter can attain in organized attack. Again the caterpillar provides a possible solution of the mobility problem which in all probability will be satisfactorily solved in the near future. Thus, it would seem that the horse is rapidly disappearing from the actual field of battle, and that even the combat and field trains may in the near future be completely motorized.

Great changes will thus occur in the methods of open warfare, which would seem to still further increase the importance of a closer relation between the infantry and artillery in the perfection of the fighting team.

Summarizing, then, it would seem:

(a) That in stabilized warfare no great changes are needed in the relation between infantry and field artillery as they developed in France.

(b) That during the break-through, and until conditions permit the resumption of normal relations, infantry commanders must be recognized as the actual commanders of their supporting artillery, and must know how to command such artillery.

(c) That such knowledge can be secured only by close association, the actual transfer of infantry officers to artillery units, and artillery officers to infantry units for definite periods of service, and that no infantry officer should be allowed to reach the grade of colonel, and no officer should be allowed to reach the grade of general of the line, without demonstrating that he can successfully command the infantry-artillery team. The single list will tend to accomplish this result. Combined with standardized tests results would be insured.

(d) That the mobility of the artillery is now far below attainable standards, and must be developed in the near future so as to closely support assaulting infantry at the fastest pace the latter can attain in organized attack over any terrain passable by infantry. Studies and experiments are in progress to this end.

(e) That communication takes its place among the matters of first portance in combat, and that nearly all means of communication employed during the war must be regarded as defective, capable of great and immediate improvement, and to the problem of improving them the best thought of the Army should address itself. The Signal Corps has already made material advances along these lines since the Armistice.