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ARMY WAR COLLEGE.
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MEMORANDUM FOR THE ASSISTANT COMMANDANT:
THE ARMY WAR COLLEGE.

SUBJECT:

THE PROBABLE CHARACTERISTICS OF THE NEXT WAR AND THE ORGANIZATION, TACTICS, AND EQUIPMENT NECESSARY TO MEET THEM.

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The Army War College,
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MEMORANDUM FOR THE ASSISTANT COMMANDANT:

Subject: The Probable Characteristics of the Next War and the Organization, Tactics, and Equipment necessary to meet them.

I. The study presented.

The method adopted in making this study is as follows:

a. To make a critical examination of those conditions which have throughout history caused a continuous oscillation between armies based on quantity and those based on quality.

b. To investigate the trend of current military opinion as expressed by the writings of eminent soldiers and by tactical doctrines.

c. To make a study of the conditions and factors which today would influence military operations.

d. As a result of the foregoing to determine an ideal type of organization, tactics, and equipment for an American Army under existing conditions.

II. Facts bearing on the study.

1. Historical tendencies:

Since 2500 B. C. the types of armies used have continually oscillated between two extremes.

a. A Mass Army composed of hastily raised and incompletely trained individuals who, in the main, looked on the business of war as a secondary avocation. The dominant characteristic of such a force is QUANTITY rather than QUALITY.

b. A Professional Army, highly trained, and composed of individuals who looked on the business of war as their vocation. The dominant characteristics of such a force is QUALITY rather than QUANTITY.

For evidence substantiating the above, see Inclosure No. 1. (Pages 2 to 16.)

2. The present trend of military thought:

a. Since 1919 numerous military authorities have voiced the belief that for the immediate future the solution to the problem of obtaining short, decisive wars was to be found in the employment of smaller, more mobile and better trained armies. That is, by the use of armies organized along professional lines.

b. The interest in mechanization and the present organization and tactical doctrines of the British, German and, to a lesser degree, the French Armies are perceptibly influenced by this idea.

For a fuller discussion, see Inclosure No. 1. (Pages 17 to 19.)

3. The effect of Mass Armies on the World War:

a. The outstanding characteristic of the World War was its bloody and costly indecisiveness.

b. This result was due to the fact that on account of the quality and size of the forces involved, maneuver was at first slow and then absent.

c. The reasons responsible for this condition are:

(1) In order to utilize the vast numbers available, extremely wide fronts were initially required.

(2) On account of the inertia incident to the size of the units and to "Liner Strategy," it soon became necessary to rest both flanks on unturnable obstacles.

(3) Without flanks, maneuver and, to a degree, surprise are impossible.

(4) Without maneuver and surprise, decisive victories are unattainable.

4. General characteristics of mass armies.

a. Mass Armies are built up by conscription, either before or subsequent to a declaration of war. In the latter case training is hurried and inadequate -- in the former it must be abbreviated to avoid crushing the nation with taxes, while at the same time depriving it of its workers.

b. Strength and size are not synonymous. The practice of making strength depend wholly on size is extravagant and bloody. It is the idea on which "Nations in Arms" are based.

c. Large size and limited training make it immobile and, hence, not apt at maneuver.

d. Time is necessary in order to mobilize and deploy masses of men.

e. Movement and supply depend almost entirely on the character and adequacy of the road net.

For further discussion, see Inclosure No. 1. (Pages 20 to 28.)

5. General characteristics of professional armies.

a. Professional Armies are built up prior to a war. Their training is complete and thorough.

b. Due to long association a feeling of solidarity and mutual confidence pervades the ranks.

c. Limited size and long training make it mobile and, hence, apt at maneuver.

d. It is less liable to demoralization in adversity. Note the disorder in the British ranks after TALAVERA and in the retreat from BURGOS to CIUDAD RODRIGO when it was composed of poorly trained mercenaries, as compared with the splendid discipline in the retreat to the MARNE. Also compare the conduct of the regulars and militia after the first battle of BULL RUN.

e. Professional Armies, maintained at war strength, are immediately ready.

f. Movement and supply are little affected by the character or adequacy of the road net.

For further discussion, see Inclosure No. 1. (Pages 28 to 33.)

6. Effect of geographical means of communication.

a. The density of improved roads and railroads is much greater in western Europe than in any other portion of the earth. As compared with our highly developed northeastern area the ratio stands as three to one in favor of Europe.

b. To maintain the forces employed in western Europe the roads in the zone of the armies were used to their maximum. A considerable amount of supplies were moved by day. Had air attack precluded this daylight traffic the roads would probably have proven inadequate. In the next war the air forces will be more effective.

c. Since then Europe saw the maximum density of forces capable of being supplied it is evident that since in all other parts of the world conditions are worse, smaller forces will have to be used.

d. Our General Mobilization Plan contemplates forces of a size only usable in Europe.

For tables, see Inclosures Nos. 2 and 3.

7. Effect of the size of the theater of operations.

a. In order to occupy and man effectively continuous lines with flanks secured by obstacles, two conditions are necessary. First, the road net must be adequate. Second, the distance between the obstacles must be commensurate with the numbers capable of being raised and maintained. The Polish attempt, in 1920, to occupy the entire Russian frontier with inadequate forces ended in a fiasco.

b. Theaters of war possessing two impassable obstacles so adjacent that the numbers necessary to occupy the position effectively can be maintained by the roads available are practically nonexistent save in western Europe.

8. Equipment and training.

a. Complicated equipment demands high training for its effective use.

b. Equipment is becoming more and more complex and costly.

c. To continually re-equip masses of men with the latest weapons is financially impossible. Small armies can be kept up to date.

d. Throughout history the necessity for using costly and complicated equipment has resulted in a swing towards smaller professional armies.

e. Prior to the advent of gunpowder the supply problem, even for mass armies, was not difficult. Moreover, in former times the masses, while relatively large, were not so huge in the absolute sense. The men composing them were inured to hardship and scanty rations.

f. Civilization and the complexity of supplies and equipment incident to gunpowder have limited the use of LARGE Mass Armies to western Europe.

9. Mass and professional armies compared.

a. The opening phases of all wars permit maneuver; while, as has been shown, terrain and roads make it mandatory throughout the duration of most.

b. In wars of maneuver Professional Armies have almost invariably proven their superiority to Masses. This is due to the fact that owing to their superior mobility, they can attack the enemy in detail since the inherent inertia of masses, coupled with the retardation incident to logistics and lower training, prevents the mass from developing its full numerical superiority at the point of contact. Against a reasonable superiority in numbers the superior training and technical ability of the regulars insures victory. The only exceptions to this rule have occurred when for a period the mass army was so constituted as to possess more mobility. Examples of this situation are provided by the Sythians, Magyars, Goths, Mongols, and Boers.

c. Identical tactics and organization have always produced long indecisive wars. The nation first re-adopting a small modernly equipped, professional army will have a marked advantage.

d. The peace-time maintenance cost of a Professional Army is man for man much higher than is the case with a conscript army. If, however, we consider the smaller number of professionals required to furnish equal efficiency, the difference in cost is not so great. However, in any case the cost of maintenance dwindles into insignificance when compared to the terrific cost of a war. The larger the numbers employed the less well will they be trained and the longer and more costly will be the war. Large numbers are even more costly after the war due to the item of pensions.

For a fuller discussion, see Inclosure No. 1. (Pages 33 to 45.) Also, Inclosure No. 4 - Costs.

10. Summary.

In view of the facts stated there is a strong probability that the next war will be based on maneuver. Consequently the force best suited to its successful prosecution will be of the professional type.

11. Organization, tactics, and equipment.

a. The organization, tactics, and equipment thought suitable for a small professional army are discussed in detail in Inclosure No. 1. (Pages 46 to 55.)

b. Tables of organization, illustrative of the general makeup of the units, are shown in Inclosures Nos. 6, 7, 8, 12, 13, 14, and 15.

c. Inclosures Nos. 5, 9, 10, and 11 show pictures of some elements of equipment.

III. Action recommended.

1. That, during the next school year, a committee of the Army War College be given the subject of this memorandum for a thorough investigation.

2. That the report of the above committee and this memorandum be sent to the War Department.

3. That the War Department then investigate thoroughly the proposition of concentrating on the development of a highly trained mobile force of limited numbers, rather than on the creation of an immense untrained and immobile army.

IV. Concurrences.

None.

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15 Inclosures:

No. 1. - Discussion.
No. 2. - Roads and Railroads in Possible Theaters of War.
No. 3. - Road and Railroad Density in Critical Areas of the United States.
No. 4. - Method of Figuring Expense of Professional Army of 315,000.
No. 5. - The Light Machine Gun. (Picture)
No. 6. - Tables of Organization: "The Rifle Company"
No. 7. - "The Infantry Battalion"
No. 8. - "Composite Infantry Brigade"
No. 9. - The Heavy Machine Gun. (Picture)
No. 10.- The Heavy Machine Gun. (Picture)
No. 11.- 75-mm Pack Howitzer. (Picture)
No. 12.- Tables of Organization: "The Infantry Division"
No. 13.- "The Cavalry Troop and Squadron"
No. 14.- "The Cavalry Brigade"
No. 15.- "The Cavalry Division"

LIST OF INCLOSURES

1. Discussion.

2. Roads and Railroads in Possible Theaters of War.

3. Road and Railroad Density in Critical Areas of the United States.

4. Method of Figuring Expense of Professional Army of 315,000.

5. The Light Machine Gun. (Picture)

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11. 75 mm Pack Howitzer (Picture)

12. Tables of Organization, "The Infantry Division"

13. "The Cavalry Troop and Squadron"

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15. "The Cavalry Division".

INCLOSURE NO. 1

DISCUSSION

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DISCUSSION

I. INTRODUCTION.

".....All experience hath shewn, that mankind are more disposed to suffer, while evils are sufferable, than to right themselves by abolishing the forms to which they are accustomed."

In these flowing words the brilliant author of the Declaration of Independence gave expression to the fact that the human mind prefers to remember rather than to think: to endure rather than to adventure.

Due to this habit we tend to an excessive admiration for the past, and frequently carry our veneration to the point of believing that it also depicts the future.

The widespread opinion that the World War - waged, as it was, in complete accord with the principle of "The Nation in Arms" - is a new development and the sealed pattern for future wars, is a case in point. As a matter of fact, the principle of "The Nation in Arms," the Mass Army, is older than history.

During the forty-four hundred years which separate the Syrian invasion of Egypt from the German invasion of France there have been countless wars waged on the mass system; and a practically equal number conducted, on the diametrically opposed principle, inherent in the use of professional armies.

Now, while there is a strong school of military thought which holds that all historical study prior to 1870 is futile, the apparently inexorable recurrence of the cycles of history is so impressive as to merit investigation. Without perspective a painting is valueless; so it is with things military.

Unquestionably it is footless to copy ancient tactics, but we should familiarize ourselves with the causes which impelled their adoption, because in the four thousand odd years of recorded history man has changed but little. Save for appearances the hoplite and the rifleman are one, and the emotions and consequent reactions which affected one affect the other.

This being so it behooves us to pause for a moment and classify old wars according to the means used in their waging.

II. TYPES OF ARMIES USED IN FORMER WARS.

General.

In order to simplify this investigation, nomenclature has been standardized as follows:

Armies composed of men maintained, equipped, and trained over a period of years, for the sole purpose of war, are called "PROFESSIONALS."

Armies composed of men, however maintained, equipped, and trained, who make war a secondary consideration, are called "MASS ARMIES."

In applying these general terms it must be remembered that they are relative and should be interpreted in consonance with the cultural period in which the forces operated.

Clearly the amount of time, training, and money necessary to produce an Egyptian Bowman of 1500 B. C., a Roman Legionary of 45 B. C., a French Grenadier of 1796, or a British Regular of 1914, varied in an ascending scale. Yet they are one in that a group of any of them was superior to an equally numerous group of contemporaneous amateurs.

The basic difference between professional and mass armies is the difference between quality and quantity -- these attributes can not be combined.

Old wars classified as to types of army used.

2500 B. C.

Mass Army

One of the earliest wars of which there is authentic record occurred between Egypt and Syria during the Sixth Dynasty. A force of unknown character from Syria attacked Egypt. To meet this the Egyptians raised a levee in mass, calling on each province "Nome" to furnish its quota. (ERMAN)

Lesson.--A short campaign of home defense can be conducted with a mass army. At this period tools and weapons were simple and often identical.

2000 B. C.

Professional Army

Under the Middle Empire, Egypt sought to maintain peace by isolation. To attain this end, fortification was invented and highly perfected. Two great forts, one at Assuan and the other at Pelusium, were built and manned by professional soldiers. (BREASTEAD)

Lesson.--Complicated equipment demanded professionals.

1500 B. C.

Mass Army

At this time Assyria came to the front. All males of military age were liable to serve in the army. (SPAULDING)

Lesson.--Wars were local; weapons simple.

1400 B. C.

Professional Army

Thothmes III invaded Syria with an army of 15,000 men. This force marched from the present site of the Suez Canal to Mount Carmel, 250 miles in twenty-two days. From this fact and from the account of the battle fought at Armageddon, it is believed that the force was composed of professionals. (PETRIE)

Lesson.--Distant wars and hard campaigning need quality rather than quantity.

1000 B. C.

Mass Army

At this time the Greek States had wholly mass armies, all males being required to serve. The chiefs, and some of the lesser chiefs, being better armed and more practiced in war, were much more susceptible of being classed as "Professionals."

Lesson.--Good weapons were costly and, hence, limited to the small professional class.

722 B. C.

Professional Army

As we have seen, Assyria started with a mass army. Under Sargon II, her army consisted of 50,000 professionals. In peace time this force was used to garrison provinces and protect the border. For wars it was augmented by an additional mass army of 150,000 men. (BREASTEAD)

Lesson.--Distant operations need professionals.

650 B. C.

Professional Army

Greek mercenaries were used in Egypt. (HERODOTUS)

Lesson.--The Egyptians had money, but had no military ability--so they hired it.

600 B. C.

Mass Army

By this time all the Greek States had a well-defined method of universal service, citizens and non-citizens being subject to call.

NOTE.--Non-citizens were not allowed heavy armor. (WESTERMANN)

Lesson.--Wars were local and of short duration. The wealthy Greek citizens owned their equipment.

546 B. C.

Professional Army

Under Cyrus and Cambyses, the Persian Army was professional. In very large wars, either of conquest or of defense, its numbers were greatly augmented by local militia. (HERODOTUS)

Lesson.--Distant operations and continuous wars demand professionals.

460 B. C.

Professional Army

Due to the constant wars, all the Greek States began to employ mercenaries. (SPAULDING)

Lesson.--Civilians could not attend to business and at the same time remain constantly in the army. At this time arms and equipment became the property of the State. In order to keep the mercenaries from wasting them, the rules for discipline became much more rigid.

480 B. C.

Professional and Mass Armies

At Thermopylae the Greek Army of 7,000 consisted of a trained national levee. However, the Spartan contingent of less than a thousand probably should be called "Professional," due to the fact that their whole useful military life was spent in the practice of arms. In the Persian Army of 100,000 the Guard Corps of 10,000, called the "Immortals" because they were always kept up to strength, were the only professionals. (CRESSY)

370 B. C.

Professional Army

Philip of Macedon hired Greek mercenaries, not only to form part of his army but also to act as models for the rest which was composed of his subjects. Alexander the Great used this army, which was purely professional. With it he conquered the known world and in every battle defeated forces composed of mass armies which greatly outnumbered him. (HERODOTUS)

Lesson.--For wars of conquest and distant campaigns professional armies are necessary.

280 B. C.

Professional and Mass Armies

The Romans, with a good mass army, were defeated by Pyrrhus with a professional army. (SPAULDING)

Lesson.--Quality superior to quantity.

218 B. C.

Professional and Mass Armies

Hannibal, with a mercenary army composed of hired men from many nations, repeatedly beat Roman mass armies largely superior to him in numbers. After Cannae (216 B. C.--~~Mass-Army~~), Scipio organized a new mass army. He placed so much emphasis on drill, organization, and equipment that, at Zama, he defeated Hannibal's professional army.

NOTE.--The bad behavior of the Carthaginian Cavalry, which, in this case, was not professional, was in large measure responsible for the Carthaginian defeat. (POLYBIUS)

Lesson.--Quality triumphed over quantity. For an overseas operation the semi-professional army was needed. This Scipio produced. Due to the fact that it was homogeneous and national, it proved superior to the veteran mercenaries of Hannibal.

105 B. C.

Professional Army

The Cimbric and Teutones, a perfect exemplification of the "Nation in Arms," destroyed two Roman armies at Arausio (Orange) on the Rhone, 105 B. C. Marius then organized a new Roman army, enlisted for sixteen years, and with it, in 102 B. C., annihilated the Teutones, near Aix. (OMAN)

Lesson.--Emotional enthusiasm can, on occasion, defeat discipline. Since the Romans could not match the Teuton masses, and since their militia army could not stand the Teutones' ardor, it was necessary for them to find a new means. This they attained in the rigid discipline of the sixteen-year enlistment. Another cause leading them to this was that the constant disbanding of armies at the end of each war failed to utilize the military training of the veterans.

NOTE.--The system of numbered legions in the Roman armies started at this time. (OMAN)

59 to 44 B. C.

Professional and Mass Armies

Caesar, utilizing the rapid marching and high battle mobility of his professional armies, defeated many mass armies, all of which invariably outnumbered him. In the civil wars his victories were much less striking, since here both sides used professionals. (CAESAR'S COMMENTARIES)

Lesson.--Quality superior to quantity. Similarity of type of army or of tactics has always produced indecisive results.

29 B. C. to 380 A. D.

Professional Army

The professional armies of Rome engaged in constant wars -- during the whole of this period with vastly superior mass armies. They were almost invariably successful. However, in 251 A. D., the Goths defeated a Roman army, under Decius, at Trebonii. (OMAN)

Lesson.--The Roman infantry armies were more mobile than most of their foes. The mounted Goths were more mobile than the Romans. In this latter case their mobility and enthusiasm more than made up for their lack of training.

378 A. D.

Professional and Mass Armies.

At the battle of Adrianople the last Roman army of the old type was utterly defeated by the Gothic mass army. From this date onward, for 1,000 years, Cavalry replaced Infantry as the dominant arm of battle. (OMAN)

Lesson.--Again mobility and enthusiasm more than compensated for lack of training. Also, the Roman army was decadent.

530 A. D.

Professional Army

By this time the Army of the Eastern Empire was wholly professional and consisted of mounted bowmen, using both fire and shock. Infantry elements, when needed for defensive operations or sieges, were raised on the mass system. With such a professional army Belisarius defeated, at Daras, a mass Persian army double his number, and five years later with an army of 15,000 professionals conquered all northern Africa. His opponents were mass armies. (OMAN)

Lesson.--Superior mobility and discipline.

EUROPE
500 to 800 A. D.

Mass Armies

In Europe during this period the art of war sunk to a very low ebb. All fights were local and were conducted by small levees. Some few of the counts and their clients may claim professionalism due to their frequent practice in wars. (OMAN)

756 to 850 A. D.

Semi-Professional Army

CHARLEMAGNE

"Charles the Great undertook offensive wars on a much larger scale than Pepin and Charles Martel. His armies went far afield and the regions he subdued were so broad, that the old Frankish levee in mass would have been far too slow and clumsy a weapon for him.....To keep this mighty empire in obedience a more quickly moving force was required. Hence Charles did his best to increase the number of his horse soldiers." (OMAN)

To insure this result he proceeded as follows: In 779 he passed a law prohibiting the exportation of armor. In 803 he reduced the size of his army by arranging all citizens into groups according to wealth, varying from five to three men each, and requiring that each group supply one man armed, mounted, and equipped. By the laws of 805 and 807 he still further stressed quality over quantity by increasing the size of the groups and demanding battle equipment from the man sent. In 811 he

promulgated a code of military punishments. In 813 he passed a law specif[illegible] and equipment of the soldiers, but also the kind of transportation, engineer stores, quartermaster and ordnance property that should accompany each unit. To hold the ground that he had conquered he created a system of fortified camps connected by roads -- they were called "Burgs." He garrisoned these burgs with military settlers, whom he provided with farms and wives. (CHARLEMAGNE-FIRST OF THE MODERNS -- RUSSELL)

Lesson.--This attempt at professionalism was highly successful.

659 to 1071 A. D.

EASTERN EMPIRE

At the close of the Saracen war in 659, Constantine the Great organized his empire into Corps Areas, maps of which are still available. These Corps Areas were called "Themes." Each "Theme" was garrisoned by a corps of from eight to twelve thousand professionals. After deducting fortress troops and border guards each "Theme" could produce a field force of 6,000 mounted men. These forces were organized into the most minute detail - from the squad of ten men up, including the division. They had medical and supply units and arsenals. The Emperor Maurice, while still a general under Constantine, wrote a manual for general officers called "Strategicon." Not only are all forms of tactics covered in this manual, but different types of strategy applicable against the several enemies of the empire are specified in great detail.

NOTE.--The chapter in this book with reference to the examination of prisoners of war is almost identical in words with the regulations used by us in France, in 1917.

This manual was re-written and brought up to date in 900 by Leo the Wise. Professional armies, organized in accordance with these regulations, maintained the integrity of the empire until 1071, at which date the army was badly beaten by a vastly superior mass army of Turks at Manzikert. After this defeat the "Theme" system fell into disuse and the army degenerated into a mass of mercenary bands, using their own tactics and equipment. (OMAN AND "THE STRATEGICON")

Lesson.--There is nothing new.

EUROPE
800 to 1000 A. D.

Mass Armies

After this defeat the Charlemagne empire fell to pieces.

800 to 850 A. D.

Mass and Professional Armies

VIKINGS

The Vikings, who initially were volunteer robbers, became professionals through experience. They stole horses and so gained such mobility as to be perfectly immune from the mass levees sent against them. About 900, feudalism began to evolve as an antidote to the Vikings. At first some leader would guarantee the protection of a part of the country provided the inhabitants would pay him. With this money he hired, armed, and equipped a small body of professionals. Such forces defeated the Vikings because they not only marched but also fought on horseback, whereas the Vikings dismounted to fight and had no missile weapons. By 1000 A. D., these feudal lords had developed to such a state of military efficiency that they could defeat any number of peasants. Froissart states that sixteen of them defeated 2,000 peasants in one afternoon.

Lesson.--Superior mobility of professionals.

1097 to 1271 A. D.
EUROPE
Mass Armies

During this period feudalism was triumphant. Most of the wars were local. The armies were of the mass type, stiffened by the professional followers of the feudal lords. The Crusaders were purely mass armies. However, the troops who fought under Baldwin of Jerusalem were professionals who elected to stay. The striking success which Baldwin had with his tiny forces against 's of Saracens and Egyptians is eloquent of the value of professionals. (CHRONICLES OF THE CRUSADES)

In 1173, Henry II of England, then engaged in war with France, found that feudal levees were expensive and inefficient. He therefore desired to hire mercenaries. The feudal levee was obliged, by law, to serve forty days. Neither

the peasants nor the noblemen were particularly anxious to cross the seas to France. Henry utilized this fact by calling out the National Levee and then exempting all men, who did not care to serve, at the rate of 2 shillings and 8 pence apiece. With this money, which was called "Scutage" (shield money), he hired his mercenaries. In addition to such mercenaries, every castle had a very small professional garrison.

NOTE.--The great castle of Chateau Gaillard was defended for many months by a garrison of 300 English professionals against an army of 10,000 Frenchmen.

It is probable that the success gained by the English at the beginning of the Hundred Years' War arose largely from the fact that since they were on an overseas expedition their troops were largely professionals, whereas the French being at home used mass armies. Towards the end both sides used professional armies and the results became very indecisive.

The English defeated the French at Crecy in 1346 A. D. They accomplished this by dismounting their knights and occupying a defensive position with them and with archers. The French charged into this and were shot down without being able to close. This put an end for a time to the dominance of Cavalry.

Lesson.--Overseas operations demand professionals.

1315 to 1515 A. D.

Professional Army

Swiss mercenary infantry, using halberds and pikes, became the main reliance of all armies. Their eventual disappearance was due to lack of discipline and to firearms.

1230 to 1350 A. D.
EASTERN EUROPE
Mobile Mass Army

Genghis Khan. By the use of higher mobility the Mongols overran many weak nations. However, the strong Sultans of Egypt, defeated them, and they were finally turned back by the

walled towns and forts along the Oder and Drave. Their constant experience in war probably justified their being classed as "Semi-Professionals." (LAMB)

Lesson.--Mobility and enthusiasm are a powerful combination.

1350 A. D.

Professional Army

The Turks started the use of Janissaries. This was a form of professional guard corps which never exceeded 10,000 men. (OMAN)

1446 A. D.

Professional Army

First Standing Army. Charles VII of France raised twenty Compaignes d'Ordonnance. These were mounted units, each consisting of 200 armored lancers, 200 armored and mounted archers or crossbowmen, 200 unarmored archers and horse-holders. To provide an infantry to back this force Louis XI organized a so-called "Francais Archers." This force was a paid, but not drilled militia.

Lesson.--Complicated weapons and tactics made the use of professionals necessary.

1469 A. D.

Mass Army

During the wars of Roses, the English were at home and, despite their century of experience with professionals, they immediately reverted to the use of levees.

1494 A. D.

Professional Army

The French Army which invaded Italy consisted of 25,000 professional cavalry, 12,000 Swiss infantry, and 30,000 militia infantry. They were opposed by mercenaries.

1496 A. D.

Spain organized a standing army.

1566 A. D.

Professionals and Masses

Wars in the Netherlands. The Spanish professional army was opposed by a national militia and mercenaries.

In 1585, Maurice of Nassau tried with success to raise the tone of his militia army by reducing the size of the units and making much more rigid the discipline and drill. (RISE AND FALL OF THE DUTCH REPUBLIC.)

1618 to 1648 A. D.

Professionals

The Thirty Years' War was fought with relatively small armies of mercenaries on both sides.

Lesson.--Similarity of organization, tactics, and equipment produced a long indecisive war.

1642 A. D.

Professionals and Masses

The Civil War in England began with the royal forces consisting of untrained volunteers and a few mercenaries, and a parliamentary force of organized but untrained militia.

1645 A. D.

In 1645, Cromwell commenced the organization of the New Model Army -- a Professional Force.

Lesson.--Triumph of professionals.

1700 A. D.

Professional Army

In the wars of the Spanish and Austrian Secessions, both sides used professional armies. However, the ravages due to disease and the practice of partly demobilizing every winter prevented these forces from arriving at any high state of drill or efficiency.

Lesson.--Similarity of organization, tactics, and equipment produced long and indecisive wars.

1740 A. D.

Professional Army

Frederick the Great had a highly trained army of 80,000 men, enlisted for life. His wars were fought with such a force against other professional armies whose training, however, was far less effective than his own. (CARLYLE)

Lesson.--High efficiency, coupled with superlative leadership, equalized numerical inferiority.

1792 to 1815 A. D.

Mass and Professional Armies

Marshal Foch states that VALMY is the first battle in which a "Nation in Arms"-as now understood-appears.

The wars of the French Revolution and First Empire were fought by this type of army against the professional armies than in vogue. It is noteworthy that, due to long war experience and the enthusiasm of reformers, the French Armies attained very high ability which, when coupled with the genius of Napoleon, made them long invincible. It is further important to note that, while he had these efficient troops, he relied on mobility rather than numbers, particularly in his tactics. When they became extinct he had to resort to MASS tactics. Of his troops of 1813 he said: "With recruits it is possible to win battles but not campaigns."

Lesson.--Mass armies imbued with enthusiasm, using new tactical methods and superlatively led, can defeat professionals. Genius without proper tools must eventually fail.

1861 - 1865 A. D.

Mass Armies

In the Civil War both sides used identical organizations and tactics.

Lesson.--Identical methods produce long wars.

Up until the Summer of 1863 a regular force on either side would have had decisive results. After that date both sides were professional in everything but discipline. NOTE.--In 1864, Lee wrote a long order on the necessity for securing discipline. (HENDERSON)

The initial successes of the South were largely due to the fact that superior enthusiasm--emotional urge--replaced discipline. In the North this enthusiasm was less marked, especially in the eastern armies.

1870 to 1871 A. D.

Mass and Professional Armies

In this war a very efficient, numerous, and enthusiastic Mass Army, excellently led, easily defeated a numerically very inferior Professional Army, badly organized and led with most remarkable inefficiency.

In 1871, the surprising results gained by the new French Mass Army are noteworthy. (MOLTKE)

Lesson.--Novelty of organization, combined with usable numerical superiority and good leadership, defeated a poor professional army. NOTE.--If the commanders had been swapped a year before the war started, the results would possibly have been reversed.

1899 A. D.

Mass and Professional Armies

The war in the Transvaal hardly fits the headings used due to the fact that in this case the mass army was numerically much inferior. Its chief value comes from the lesson it gives in the lag between new weapons and new tactics. (GERMAN OFFICIAL HISTORY)

Lesson.--Great mobility in a large theater of war, combined with new weapons and methods and opposed to stupid leadership and obsolete tactics, is bound to secure results out of all proportion to the means used.

Summary of lessons as to types.

The conclusions deducible from the above summary may be tabulated as follows:

Conditions tending to the use of PROFESSIONAL ARMIES	Conditions tending to the use of MASS ARMIES
1. Complicated equipment.	1. Simple equipment.
2. Costly equipment.	2. Cheap equipment.
3. Intricate and precise tactical formations.	3. Simple tactical formations.
4. Necessity for mobility. (NOTE.--With the exceptions noted opposite, professional armies have always had higher mobility than masses.	4. Mobility not needed. (NOTE.--In case of Mongols, Arabs, Magyars, Sythians, Boores, etc., this was not true.
5. Distant operations.	5. Local wars. (NOTE.--Now out of use.)
6. Necessity for rapid decision.	6. Necessity for rapid decision absent.
7. Protracted operations inevitable.	7. Short seasonal wars. (NOTE.--Now out of use.)
8. Campaigns where supply is difficult.	8. Campaigns where supply was easy.
9. Where discipline is more important than emotional inspiration.	9. When emotional inspiration replaced the cohesive power of discipline.

NOTE.--With reference to Items 1, 2, and 3, Column 1 above, the complexity and cost of equipment are now far higher, both relatively and absolutely, than at any time in history. To meet modern conditions tactical formations are more intricate and make higher demands on the individual than ever before.

III. RECENT EVENTS AND OPINIONS AS TO TYPES.

General.

So much for history. Let us now examine more current events and the opinions of contemporaneous soldiers.

Treaty of Versailles.

In the first place, we have the striking coincidence offered by the diametrically opposed effects induced by the treaties of TILSIT and VERSAILLES.

By the former a defeated Prussia was stripped of her professional army; she answered by the re-creation of a national one.

By the latter a greater Prussia was deprived of universal service. Is it not probable that the energy which made her conscripts formidable will do the same for her professionals?

The following statements would seem to substantiate such a possibility:

On March 3, 1919, the military advisors to the peace conference headed by Marshal Foch submitted a recommendation that, for the future, Germany be limited to an army of 200,000 men, recruited, either by voluntary enlistment or by conscription, for a period of one year and not susceptible of being subsequently called to the colors for reservist training.

On March 7, Mr. Lloyd-George submitted an amendment to the above prescribing that the enlistments be voluntary and for a period of twelve years, without the right to discharge except for disability.

On March 10, the matter came up for discussion.

Mr. Lloyd-George, in defending it, argued that with a one-year period of service Germany could create an army of 2,000,000 men in ten years. He further stated that Great Britain would never sign a treaty fraught with such awful dangers to her security.

In rebuttal Marshal Foch said that: "While it is true training for one year would produce soldiers of sorts, two hundred thousand of them would be far less dangerous than one hundred thousand professionals of the type proposed by Lloyd-George."

In sustaining the Marshal, General Degoutte said: "Such a force will make Germany much more formidable than will any number of one-year conscripts."

Generals Degoutte, Weygand, and Cavallero then entered a formal protest against allowing the 200,000 twelve-year professionals.

The compromise resulting from this argument produced the clause in the treaty fixing the German Army at 100,000 men.

NOTE.--The above facts were secured from the stenographic reports taken at the time, and were made available through the courtesy of the State Department.

Peculiar significance attaches to this fear of professionals when it is remembered that the men voicing it were all leaders of conscript armies in a successful war.

Opinions of leaders.

Von Seeckt.

Ten years later, Von Seeckt in his "Armies of Today" says: "When recourse must be had to arms, is it necessary that whole peoples hurl themselves at each other's throats? Can masses be handled with decisive strategy? Will not future wars of masses again end in stalemate?"

"Perhaps the principle of the levee in masses is out of date? It becomes immobile; cannot maneuver. Therefore it cannot conquer; it can only stifle."

And again: "The levee in masses failed to annihilate decisively the enemy on the battle-field. It degenerated into the attrition of trench warfare. Germany was beaten down; not conquered. The results of the war were not proportionate to the sacrifices."

Of course, it may be urged that Von Seeckt is simply making the best of a bad bargain; but, is he?

Debeney.

At least his former enemies take him seriously, as witness the following:

"Germany has in effect 250,000 regulars of long service. We are prone to believe that this is the best modern form. This is human nature, for in general the conceptions of armies oscillate between two poles: the Nation in Arms and the Professional Army." ("THE MILITARY SECURITY OF FRANCE" - GENERAL DEBENEY, 1930.)

To meet this menace he is inclined to think that France should have an equal number of professionals immediately ready on the eastern border as the covering army. By giving the men homes in the garrison towns they would be content. Note the similarity with the BURGES of Charlemagne.

Terge.

General TERGE in "The Protection of our Frontiers" (also published in 1930) says: "The professional army has these advantages: quality over quantity; instant readiness for war; ideal for offensive."

He notes that the Act of 1928 which reduced the term of service to one year, may eventuate either in a return to a longer period of service or in a professional army.

He says that in 1914 France and Germany had nearly similar armies; since then they have followed opposite roads -- France towards Militia, Germany towards Professionals. Exactly the opposite to the situation in 1870.

As a solution to this menace he suggests the placing on the eastern frontier of a covering army of regulars equal to the German Army, backed with prepared works and machines. Behind this concentrate the militia army.

IV. CHARACTERISTICS OF MASS ARMIES.

General.

Admitting the cogency of the historical examples quoted as showing the human tendency to oscillate between extremes, it is still desirable to try to find out what are those characteristics of mass armies which cause some of their recent and most illustrious commanders to view them askance.

In seeking the answer this question the writer has asked many officers, including students and instructors at the Army War College, what in their opinion made mass armies desirable?

The majority had never considered the case. Such armies existed and, hence, were to be used. "They were the rule" so to speak.

Others based their advocacy on one of two reasons:

First: The enemy would have them.
Second: That, due to political expediency, they were the only type we could get.

Neither reply is convincing. Later, we shall point out the advantage of being different from the enemy. As to expediency, victory is also expedient, and the type of army most likely to secure it will be used.

Advantages.

In general, it seems that the advantages pertaining to the use of large conscript armies are as follows:

First: The sense of power and consequent security aroused in the popular mind by an armed force numbered in millions.

Second: The opportunity to arouse popular enthusiasm and, hence, popular support by placing the burden of war on all alike.

Third: The opportunity of producing homogeneity by a maximum use of local recruitment.

Fourth: The safeguard afforded to political leaders in that if things go wrong they can say that everything possible to secure success had been done.

Fifth: The belief that a national army is the cheapest form of national security.

Sixth: The fact that in a non-likely situation, so far as the United States is concerned, of fighting several major enemies at one time, an army of millions would be demanded to furnish defenders for the several battle fronts.

Seventh: Finally, the belief that the expressions "BIG BATTALIONS" and "STRONG BATTALIONS" are synonymous.

Limitations.

Means of communication, geographical.

The adequacy and number of roads, railroads, and navigable rivers put a definite limit on the size of armies.

Where the means necessary to move the supplies to feed and maintain masses do not exist, masses can not be used.

This being so, the suitability, or rather usability of masses in different theaters can largely be determined in advance.

Discussion of roads and railroads in possible theaters of war.

In this connection a brief scrutiny of Inclosure No. 2 - Roads and Railroads in Possible Theaters of War, prepared from data secured in the Department of Commerce and corrected to include June 1931, is of interest.

In Column 7, we find that in the theaters of the World War where really large forces were employed, 100% of the roads were improved.

Now it is a fact that, in order to maintain the armies occupying these theaters, the roads were used to their maximum capacity - while the splendid network of strategic railroads and the small size of the theaters of operations made the hauls comparatively short.

Further, it seems certain that had the Air Forces been sufficiently powerful to prevent any considerable amount of the daylight movements indulged in, even these roads would have been inadequate.

Unless all signs fail the air forces of the next war will be able to prevent all movement of supplies by day from taking place in the zone of the armies.

Again, it is noteworthy that while Column 7 shows that in this country there are 26% of improved roads, the parenthetical figure 6%, showing the per cent. of surfaced roads, is more important because, for military supply in all weathers, only the surfaced roads are useful since shallow ditches and inferior surfaces used in America let unsurfaced roads become waterlogged.

In Europe, on the other hand, this is not the case because, due to ages of tamping and deep drainage ditches, the improved but unsurfaced roads have all-weather usability.

Column 9 is an even better index to the supply capacity of different countries since it shows the area in square miles served by each mile of improved roads. Here again we find that in the United States the elimination of unsurfaced roads makes the area jump from 4.5 square miles to 16.7 square miles, whereas in western Europe there is one mile of improved road to each 0.6 square mile.

Finally, Column 11, showing the number of square miles served by one mile of railroad is striking since here again the great superiority of western Europe is demonstrated.

Discussion of road and railroad density in critical areas of the United States.

An examination of the above-mentioned table may give rise to the thought that the comparisons obtained are unfair due to the many sparsely inhabited areas in all parts of the world save western Europe.

A glance at Inclosure No. 3 - Road and Railroad Density in Critical Areas of the United States, disproves such an assumption.

The average road density in our northeastern area is ONE MILE OF SURFACED (i.e., improved) ROAD TO EACH ONE AND EIGHT-TENTHS SQUARE MILES. In western Europe, as has been stated, the density is ONE MILE OF IMPROVED ROAD TO EACH SIX-TENTHS OF A SQUARE MILE. On the west coast the comparison is even less favorable.

From the foregoing it is evident that the size of armies and the density of the road and railroad nets must vary in an exact ratio in so far as large forces are concerned.

Applying this fact to our own case we find that there is only one place in the world - western Europe - where we can possibly use armies of the size and organization contemplated in our General Mobilization Plan. In all other theaters such masses will either starve or be reduced to impotency.

This fact, taken in conjunction with the admittedly greater mobility and fighting value of small, highly-trained and LIGHTLY equipped armies, is a weighty argument for our giving serious consideration to the organizing of our forces along lines of more general usability.

Before leaving this subject it is well to ponder the statement made by General Ragueneau, Q. M. G. of the French Armies. In speaking of the possibility of pursuing the Germans to the Rhine, he says in effect -- that if all the motor transport of the French Army, including the vast pool usually reserved for troop movements, had been used wholly for supply (the railroads being out) it would have been impossible to maintain more than half of the army and that only up to a distance of fifty miles from railhead. Remember he had three times as many roads as exist elsewhere in the most favored sectors.

Expense.

While the staggering expense of one hundred and eighty-six billion dollars chargeable to the World War is only partly attributable to the numbers engaged, the vast post-war costs under which this country is now laboring are the direct result of the size of the forces involved.

Pensions and bonuses are fixed institutions with us. To include June 30, 1931, our veterans have cost us fourteen billion five hundred and twenty-nine million dollars. (Veterans Bureau) This staggering cost is due not only to the huge numbers involved, but also to the voting power which large organized minorities possess and use in securing legislation favorable to themselves. With smaller forces both the actual cost and the political power would be much less.

Complexity of equipment and lack of training.

The more complex the weapons of war become the less efficiently are they used by partially trained troops. Too often wars are discussed from the standpoint of materiel, rather than from the standpoint of men. Perfect men are assumed. As a matter of fact, only prolonged habit can induce nervous and exhausted men to perform automatically under fire the simplest tasks. When confronted with the manipulation of complex weapons and the use of intricate tactics, the efficiency of both the men and the weapons dwindles towards zero.

While national pride makes us reluctant to admit defects, common sense forces concurrence with du PICQ when he says:

"Troops will rarely fight unless forced to do so by discipline. Two hundred thousand men, only half of whom fight, are not nearly so effective as one hundred thousand, all of whom do. Those who don't fight still get hurt and all must be fed." ..... "It is time we understood the lack of power in mob armies." "Time is necessary to give the officers the habit of command, the men the habit of obedience." ..... "Victory is to the strong not to the big battalions. Sixty men who can beat a thousand are the stronger. Such men are not numerous. Gideon got only three hundred out of thirty thousand."

Indecisiveness.

The indecisiveness of the World War was not directly due to the numbers involved, but to the form of combat evolved to use those numbers.

"The advent of huge masses incapable of rapid maneuver made it necessary to rest the flanks on natural obstacles. Also, long fronts were necessary in order to employ the strength of the masses ....." (BERNHARDI'S "WAR OF THE FUTURE") This, of course, is due to the fact that beyond certain limits depth of formation does not permit rear elements to be usefully employed.

This evolution of the so-called "Linear Strategy" was a completely new departure. Prior to 1914 the chief aim of every commander had been to defeat his enemy by maneuver, but when flanks disappeared so did maneuver; and war had to be carried on solely through the medium of frontal attacks which had for their object either the tactical discomfiture of the enemy by attrition, or else the creating of a set of false flanks by penetration.

But masses have other drawbacks besides their inability to maneuver. The areas they occupy are so large that all strategic movements must be made either by train or by truck. Due to this fact the probability of detection from the air is increased and the direction of movement limited to that permitted by the existing motor roads and railways.

Overhead is excessive. On account of the quantities of supplies consumed, large armies can only exist in areas having, as has already been pointed out, adequate roads and railroads. To operate these means of supply quantities of laborers are necessary. Not only are the supplies large in themselves, but the less well trained are the troops the more technical and fire assistance do they need, and consequently the number of guns and the amount of ammunition increases out of all proportion to that needful for the support of trained troops. (Von Seeckt)

Professor R. M. Johnston puts this very aptly when he says in his "Reflections on the Campaign of 1918" -- "Low training and high-powered equipment tend to produce long (indecisive) wars."

Since mass armies depend on inertia for defense and attrition for attack their use of military stratagems is limited to one field -- namely, that of rapid concealed concentrations.

Further, the volume of men and materiel to be moved is such that this operation can only be achieved in industrial areas.

"In other less populous places small numbers and high quality are needful, for if millions can be handled in northern France tens of thousands may well be excessive in the valley of the DVINA" - or of the SAINT LAURENCE. (R. M. JOHNSTON)

Mobility.

Mobility, as General W. D. Connor has said: "is the most abused word in the military lexicon."

Mass armies are inherently the negation of mobility. Compared to small professional armies their speed and ability to move are almost zero. Yet, while the static effect of mass on the last war is well known, we still hear it repeated with parrot-like unction that "modern war is a question of machines." As a matter of fact, "Science, which devises the machines, works both ways; hence it is wrong to speak of the triumph of the machine over man. The machine has defeated masses of men, not man himself. It never will, as it only comes to life in the hands of man.

"The mistake comes from exposing immobile, nearly defenseless masses of humanity to machines. The greater the masses the surer the victory of the machines." (Because not only is the mass hopeless, but the larger it is the less well is it armed and the less well can it be trained.)

"As science places more inventions at the disposal of the army, the greater are the demands on the soldiers who use these inventions." (VON SEECKT)

The last paragraph of this interesting quotation is of particular interest in the argument it presents in support of the proposition that a recurrence of small professional armies is imminent. combat results could be attained by the use of specialized machines and weapons, manned by men trained and habituated in their use.

solete equipment.

Invention and improvements are a continuing process, while the manufacture of numerous new arms is a costly one. Hence it is apparent that continually to re-arm mass armies with the latest weapons is financially impossible. Therefore, tomorrow, as yesterday, nations trusting to masses are bound to send their young manhood to battle with obsolete or obsolescent weapons, whose effectiveness is still further reduced by inadequate training.

Now, so long as masses fought against masses this condition equalized itself; but when professionals were encountered, even when not armed with superior weapons, the results were disastrous. As illustrative, the following quotations from "Liaison," by General Spears, are interesting:

"The 5th Division, engaged on a front of 6 miles, had together with the 19th Brigade and the Cavalry Division, completely held up von Kluck's attack..... Two battalions and a battery in flank guard, had with the help of the cavalry held up a whole German Corps." (August 24, 1914)

"On August 26, General Smith-Dorrien with the Second Corps and the Cavalry Division checked a vastly superior enemy and then withdrew in good order in broad daylight.

"This well-nigh miraculous result was in great part due to the fact that the British (Regulars) had established themselves as such formidable fighters that the enemy simply did not dare to tackle them save with the utmost precaution."

On the other hand, it is economically and physically possible to keep constantly re-equipping a relativel small force of professionals and at the same time thoroughly train them in the tactics and technique of their weapons. Such a force - well led - could defeat a vastly superior national levee.

Apropos of this is a statement by Professor R. M. Johnston:

"It is not sufficient realized that th armies that fought on the Western Front were all armies of low training..... The armies though they differed much in training qualities were made up of conscripts and not professional soldiers."

(In 1918) "A force of 100,000 trained professional troops could have marched through any place on the Western Front and in either direction..... With such (trained) soldiers formations could be made almost indefinitely thin and flexible."

General Lanrezac, commanding the Fifth French Army in 1914, makes the same complaint about his men as compared with the better trained Germans.

In commenting on this General Spears says:

"The errors and mistakes of the French in 1914, when in spite of great gallantry and fearful losses they were so often unsuccessful, were attributed largely to faulty training of the troops and a complete misconception of the conditions of modern war on the part of the officers. A conscript army will invariably be inferior in this respect to a professional one."

The effect of aviation and chemicals.

Finally, it is desirable to consider the effect which aviation using bombs and chemicals may have on a war of masses. Giving full credit to the great strides made in anti-aircraft defense and to the inevitable interference which one air force will cause the other, it is still almost certain that the great troop concentrations, dumps and base installations of the World War are impossible of future duplication. They are too vulnerable to air attack. Where masses are concerned this fact will lead to such dispersion that many of the troops will be unavailable or unsupplied at the moment of need.

It is believed that the foregoing is an unbiased, though necessarily cursory evaluation, of the general characteristics of large conscript armies.

V. CHARACTERISTICS OF PROFESSIONAL ARMIES.

General.

In making such an investigation it is inevitable that certain comparisons had to be drawn between such forces and professionals. Now, in order to give a balanced picture, we shall subject the regulars to more specific comment.

Mobility, supply, and usability.

From the standpoint of mobility, supply, and universal adaptability to all theaters of war, the scales are clearly weighted in favor of the professionals.

Expense.

While from the aspect of peace-time maintenance the cost of a professional army is high, it sinks into insignificance when compared to the appalling expense due to wars waged by methods of improvisation; for as Marshal Haig said in his final report: "Great Britain was victorious due to her ability to improvise; improvisation is always expensive."

Our present Regular Army of 130,000 officers and men costs annually in the neighborhood of $261,503,000.00.

An analagous army of 15,000 officers and 300,000 men, armed and equipped in the latest manner, would cost $500,179,000.00. (For figures used in calculation, see Inclosure No. 4.)

The United States was in the World War for nineteen months. The direct cost of this operation amounted to TWENTY TWO BILLION DOLLARS, about one billion one hundred and fifty-eight million a month. (AYRES)

In other words, the direct cost of the World War would maintain an army of 315,000 for forty-two years. Moreover, it is better finance to raise money over a term of years than all at once.

But aside from the considerations above and the possibility that such a force would avert a war, there must be counted the secondary bonus expenses, which have already been mentioned as amounting to date to fourteen billion odd dollars, with no end in sight.

Since then the use of national armies tends to produce long costly wars and longer and more costly expense accounts later, it is clear that any other sort of army capable of correcting these faults is desirable.

Strategic and tactical considerations, general.

"New weapons are usually the starting point for new tactics. Hence in order to avoid unpleasant surprises, it is desirable to envision the future." (BERNHARDI)

The World War produced, or saw used for the first time, many new arms; while the methods of using certain already known weapons changed so radically that they too may be classed as new. This last statement applies in particular to the massed use of guns and machine guns.

Since, however, military men are essentially conservative there is an inevitable lag phase between the advent of new arms and the appearance of new tactics.

This seemingly is what happened in France and what, in large measure, is still going on.

Present army corps, strategic aspect.

Let us take an army corps, as now prescribed, for an example, and see how it conforms to the strategic and tactical conditions it is destined to meet.

Here is a force of some 80,000 odd men which in one column covers at least a hundred and fifty miles of road.

Obviously it should not be on one road, but as pointed out in the discussion on roads, it may have no choice.

The rations alone for this force amount to seventeen hundred and eighty tons daily.

Even if three roads are available, at least one day is required to deploy for battle. Due to interference by an active enemy on the ground and in the air, the time may conceivably be much longer. Just how great this delay will be depends on the difference in mobility between ourselves and the enemy.

In static warfare this element of time is not so vital. The corps in such a case is simply a sector command composed of shifting divisions which join and leave singly. Moreover, all movement is carried on behind a continuous line which, even in the emergency of a violent attack, has a battle life measurable in days.

But in theaters where the terrain is too extensive, or the communication net too meager to admit of or supply a continuous line with the flanks secured by obstacles, maneuver will return. Under such conditions, has a force of eighty thousand men the ability to maneuver while keeping its elements within supporting distance? If we are operating against an enemy equally ponderous the answer seems to be "Yes." But in what will such a maneuver result? Due to slowness, the enemy can always meet us. The "Race to the Sea" - without the sea - will be repeated.

Like a race between street-cars such operations lack conclusiveness, because there is no difference in rate.

General Fuller, writing on Cavalry, states: "The student of history will consequently find that only when ORGANIZATION, tactics, and leadership were such as to allow of the mobility of cavalry being rapidly developed from the stability of infantry has war flourished as an art, and when this has not been possible it has degenerated into a dog fight."

His remarks, while true, are not sufficiently inclusive in that they are applied only to tactics. The same thing holds in the field of strategy, but with this difference: Neither cavalry nor mechanized troops have sufficient combat ability to secure a major victory unaided. Infantry is needed and to be effective it too must have a faster rate than its opponent. Our present organization, due to its size and the amount of its equipment, does not possess this capacity.

Tactical considerations, present forces.

Turning now to the realm of tactics, are the formations which limited training imposes on mass armies any more suitable? If so eminent a writer as General Bernhardi can say that: "It is improbable whether infantry can ever again make a successful attack without a predominant artillery." What does he mean? The answer is clear -- a tremendous artillery superiority is the only means of getting an indifferent infantry forward.

To insure such a predominance of artillery fire much time is needed, not only for the making of arrangements but also for the accumulation of the guns and ammunition. In the semi-stabilized situations with which we are familiar and on which our own and foreign tactical doctrines are still based, time was available. Equally important were the roads and railways, dumps and installations by and from which those supplies - millions of shells - could be moved and obtained.

Under circumstances where either terrain, roads, or enemy aviation preclude the assemblage of the guns and munitions an impasse is reached and our heavy divisions become impotent.

Reasons for using mass system.

Why then do we cling to them and to the tactics which they necessitate? Probably for two reasons:

First: Conservatism.
Second: Herd instinct.

"Mankind admires force, mass, size, winds, mountains, seas. The warrior typifies force and is admired. The adoration of masses in war arises from the same emotion." (du PICQ)

The column is a form of mass and contains all the disadvantages inherent to it. The basic idea seems to be that the physical impulsion which will push it on will produce shock. But, "There never is any shock."

"The heavy Boeotians, under Epaminondas, tried to break the Spartan lines at LEUCTRA and MANTINEA with a deep column "as with the ram of a ship'; but the front rank stopped dead on coming into contact with the enemy; the rest of the column communicated to it no impulsion whatever because an impulse never comes from the rear....." (COMMANDANT COLIN - TRANSFORMATION OF WAR)

Two thousand years later the same thing occurred to McDonald's column at WAGRAM. Out of 22,000 men two thousand reached the position; as there were 7,000 casualties, thirteen thousand must have skulked. Finally, the graveyards of France bare tragic testimony to still other attempts at shock tactics. Progress and firearms had effected only this: at LEUCTRA the rear ranks stopped; at WAGRAM they ran, having first added materially to the "Butcher's Bill;" on the MARNE they could not even run.

The sole useful purpose of depth is to replace losses in the front line, not to push it on. It was so the Romans used their tri-fold maniples. "Greek tactics, the tactics of columns, sprung from mathematics. The Roman from a knowledge of man." (du PICQ)

Is there not a striking resemblance between the phalanx and the square formation for infantry used during the World War and still practiced? The answer is "Yes."

Even if it is admitted that for headon assaults such tactics were necessary, are they in war of movement? Only a tiny per cent. of the men engaged and endangered can use their weapons. Man can stand only a certain amount of terror, after that his nerves give out and he is temporarily useless. The deep columns suffer from this. The rear units get some casualties and constantly see, without being able to help, the ghastly ravages of war which cumber the line of advance. Terror mounts on terror and there is not the stimulation of action to hold it back. The history of a LEUCTRA, a WAGRAM, or a NEUVE CHAPELLE, is bound to be repeated, little as we like to admit the fact.

Once again the phalanx is defeated. How shall we constitute our legion to meet the conditions so aptly expressed in a recent letter to the writer from General Fox Conner:

"One of the outstanding impressions made on participants by the battle-fields of the World War was their apparent vacancy. What this actually meant was that men can no longer show themselves in any considerable bodies on the battle-field. In the next war it will be impossible for large bodies to move without enormous intervals and distance. This will be true even at night. It, therefore, follows that all units must be smaller in order that command may be retained, and in order that the larger units may be assembled on the battle-field within the limits imposed by the time element."

Evaluation of arguments so far presented.

It is believed that the evidence and arguments thus far presented are sufficient to warrant us in saying that there is a reasonable probability that the next war will be characterized by the use of smaller and better trained armies. If this be so it behooves all soldiers, who, in the words of General W. D. Connor: "Are desirous of being prepared to fight the next war instead of the last" to consider the organization and tactics of such armies.

In the following an attempt will be made to initiate such an investigation.

VI. CONSIDERATIONS AFFECTING THE ORGANIZATION OF SMALL UNITS.

General.

In order that such units may move and fight: "With enormous intervals and distances," they must be self-supporting -- that is, they must organically contain all the elements necessary to wholly independent action. Since, however, the separation of artillery into units of less size than a brigade detracts in some measure from its effect, the infantry of these units must either be so mobile that they can avoid superior enemy artillery or else must be so efficient that they can attack successfully "Without a predominant artillery support."

It is believed that highly trained professionals armed with the latest types of rifles, light and heavy machine guns, and utilizing to the full the power to fight at intervals up to the effective range of their small arms while being supported by a limited amount of organic artillery, can very easily cope with much superior numbers of conscripts inevitably less well armed and less apt at the use of weapons and ground. Moreover, it has already been shown that communications prohibit the universal or even frequent employment of huge armies. Also, since terrain is seldom so complacent as to provide natural obstacles on which to rest the flanks of a continuous line, small armies will not have to contend with greatly superior numbers nor will they have to assault prepared positions.

Xenophon says: "Be it agreeable or terrible the less anything is foreseen the more does it cause either pleasure or dismay." This is still true.

The phenomenon of both sides using identical tactics and methods of war is not new and usually has had the effect of causing indecisive battles. The Greek and Roman civil wars; the three "Battle" parallel order of the middle ages; the rigid deployments and endless sieges in the days of Gustavus, Turenne, and William of Nassau; Napoleon's remarks that he was always successful until the enemy learned to copy his methods; and, finally, the World War, are illustrative.

Hence it seems reasonable to say that any nation developing a different type of army possessed of high mobility and superior individual ability, combined with a new method of tactics, will have a marked advantage until the enemy copies.

Surprise.

Surprise is one of the prime requisites to victory.

Broadly speaking, surprise may be utilized in respect to: TIME, PLACE, and METHOD.

One of the principal reasons for the bloody indecisiveness of the World War once stabilization had set in, is that surprise was rendered almost impossible.

Due to similarity of tactical doctrines, surprise as to METHOD was not practiced for almost three years. The startling successes attending the three departures from this rule -- namely, the first gas attack, Cambrai, and the German offensive of March 1918 but serve to prove it.

Surprise as to PLACE was restricted in western Europe by the absence of flanks and by the rabid adherence to artillery preparations; though when the vogue for blasting tactics ran out, some scope for ingenuity was restored in the way of secrecy in concentrations.

Surprise as to TIME was ruled out by the necessity of using darkness to cover the grouping of the assault masses in the departure trenches. The invariable: "Stand to" at dawn shows to what a low ebb surprise as to TIME had sunk.

While an examination of major strategy is beyond the scope of this paper, it is of interest to note that so far as nations using universal service are concerned, the only opportunity for strategic surprise lies in speeding up mobilization and concentration beyond the point the enemy conceives possible.

A return to small armies capable of, and adept at, maneuver will restore the art of surprise; though the increased speed of observation planes may, in a measure, remove the power of effecting complete surprise as to place. Even if both armies are professional, maneuver warfare still permits surprise; but in this case it will result more from daring leadership than from simple logistics.

Training, general.

High quality needed.

Obviously the quality of a small army must be high in order to cope successfully with a larger one. The whole argument in favor of professional armies rests on the fact that they can be better trained.

Situation in 1917-18.

We know that in our armies of 1917-18 discipline in rest areas was good and maneuvers fairly well executed. In battle, on the other hand, discipline, tactics, and the use of weapons were far from perfect. These defects arose from hasty and incomplete instruction and resulted in a plague of specialists trained by one set of officers and led in combat by another. The men of a company did not know each other or their officers. Community of interest and mutual confidence bred of long association were absent. The "Buddy" idea was a literary fiction.

Average length of training in World War.

The average American soldier who fought in France had training as follows:

6 months in the United States.
2 months in France, behind the line.
1 month in a quiet sector.

Total - 9 months. (AYRES)

Considering the enthusiasm of war and the one month in a quiet sector, it is safe to say that these nine months were equivalent to fifteen months in peace.

Training in conscript armies today.

Reports filed with the League of Nations show that at the present there are thirty-six nations using conscript armies. The length of service of the principal ones is as follows:

France	12	months
Italy	18	"
Japan	24	"
Russia (average)	36	"
Poland	24	"
Belgium (average)	11	"
Czecho-Slovakia	14	"
Jugoslavia	18	"
Average	19	months

Hence these armies are little better trained and no better equipped than were ours in France. Further, their size makes it certain that they will start the next war with the weapons with which they finished the last. Whereas a small army can be re-armed.

With such limited training, reliance will have to be placed on heavy formations, predominant artillery support and movement inspired by voluminous orders.

A professional army could easily defeat such forces, despite a considerable difference in numbers.

Importance of training.

The question of the training necessary to give it this advantage is of interest.

Caesar says that in winter he so trained his men that when the campaign opened he had only to show them the enemy in order to conquer.

Of these same troops Gibbon wrote: "A Roman field of maneuver only differed from a Roman battle-field in that on the former there was no bloodshed."

The purpose of discipline and training.

The purpose of discipline and training is:

First: To insure obedience and orderly movement.

Second: To produce synthetic courage.

Third: To provide methods of combat.

Fourth: To prevent or delay the breakdown of the first three due to the excitement of battle.

In every human being there is a natural reluctance to obey another. The purpose of our so-called disciplinary drills is to break down this reluctance and make obedience automatic. For this purpose we employ drills and manuals of arms similar to those used in 1750, with this difference: in the days of Frederick they were battle formations.

The Romans were noted for their discipline, yet a careful examination of contemporaneous bas-reliefs fails to show any regularity in the angle at which their arms were carried, even in a triumph. By analogy, had present methods been in vogue the Romans would have sought disciplinary drills by aping Alexander, and Frederick by copying Gustavus.

The question of attaining discipline by the use of combat exercises only is vital - and can be achieved, though parades will suffer. Battle is an orgy of organized disorder. The worst possible preparation for such a situation is one of meticulous order.

No formations or directly applicable to route marches and to combat should be taught.

Courage.

There is a natural reluctance to admit that all men are not brave. The more distant a war becomes the braver in retrospect do its soldiers seem; yet the very regard we pay to valor shows that it is rare. If all Greeks or all Americans had been heroes, would Achilles and Sergeant York be so famous? If all armies fought to a finish, would THERMOPYLAE be of deathless memory?

To produce synthetic courage, discipline and training must be carried to the point where they become automatic-habitual. To these ends fear of punishment and certainty of reward must be utilized. The solidarity arising from mutual confidence bred of long and intimate association must be exploited. So, too, must unit and professional pride. To attain these ends proper methods, and years in which to digest the ideas taught and develop automatic habit, are vital.

It is possible to teach a man to sit on a horse and learn the aids in a few days. In a few months he can get on well if nothing happens, but to control a horse in the excitement of a polo game and subconsciously use the aids takes years.

Methods of command.

Present method.

The present method of controlling units in action depends on detailed voluminous orders and constant communication, and traces its origin to the need of employing large numbers of ill-trained men and inexperienced officers in the intricate and methodical operations resulting from trench warfare. For such a situation it was admirable; probably the only solution.

To attempt to continue such a system in a war of movement, even if fought with armies as now organized, is doomed to failure.

Reports from the front are inaccurate when sent, and old when received. During the interval - often a matter of hours - conditions have changed. The leading troops will already be engaged. When this happens the commander in rear cannot influence the movements of these troops, because units under fire move only in two directions -- forward or backward.

If it is a case calling for the launching of the reserve in units the size of a present division or corps, the lag in time caused by the writing and receiving of the report, the writing and distribution of the order, and the time needed for the reserve to develop and begin the attack is so great that the chances of its being useful are negligible - the situation will have changed.

In the case of forces composed of small, mobile, self-contained units the method is still less applicable.

The successful use of such units will depend on giving great initiative to all leaders in actual command of men.

Proposed method.

Under such circumstances the solution of the command problem would seem to rest in using the system called by the British: "The Nelsonian Method," or by our Navy, the method of "Indoctrinated initiative."

This system is based on the belief that the: "Best is the enemy of the Good." That a simple mediocre solution instantly applied is better than a perfect one which is late or complicated.

Among leaders of whatever rank there are three types: 10% Genius; 80% Average; and 10% Fools. The average group is the critical element in battle. It is better to give such men several simple alternative solutions which, by repeated practice, they can independently apply than it is to attempt to think for them via the ever fallible means of signal communications.

To put such a system into practice requires frequent conferences between the leader and his subordinates in which he indoctrinates them with his method of meeting a few general situations. This teaching should then be further emphasized by map maneuvers and, finally, by actual maneuvers until the idea of a simple spontaneous system of team-play is developed.

Under this method orders will be brief, simply stating the result desired, the time and the place.

At first glance such ideas appall those of us who are accustomed to existing methods. Reflection, aided either by participation in combat or else by reading the accounts by JUNIOR officers of recent wars of movement, shows that the only revolutionary thing about it consists in substituting fact for fiction. After the deployment, battles are fought on initiative of juniors who carry on without orders.

In making these statements we in no way disagree with Grant when he says: "In every battle there comes a time when both sides are ready to quit. Then victory comes to the leader who has the nerve to make one more push."

The initial impulse comes from the leader and is based on his CHARACTER imparted by telepathic emanations, though he can personally influence one or two units. The actual work, however, is done by the subordinate commanders who, due to the small size of their forces, can exercise the personal influence of example. Large units, be they platoons, brigades or armies, can not be so reached.

The men who man tanks and machine guns are no different from those who wield pikes and muskets.

"The human heart is the starting point of all matters pertaining to war." (MARSHAL de SAXE)

Inspiration does not come via coded messages, but by visible personality.

The history of war is the history of warriors, -- few in number, mighty in personality.

In small professional armies a method of selection can and must be used which will insure such leaders. It is true that they will frequently be killed, but the death of a high-ranking officer has great inspirational effects. Their business is to win, not simply to survive.

Defect in small professional armies.

Before admitting the unalloyed advantages of professional armies, it is necessary to point out one very vital defect which has been brought into being by the use of gunpowder.

In the days of hand arms man fought man, and his life depended on his equipment and his skill with weapons. Until one side broke there was relatively little loss. But when the pursuit started so did the slaughter, because the opponents were so close together that the vanquished had no start in the race and hand weapons were not adapted to delaying action. Hence good professional armies suffered few losses; as long as they won they kept on improving.

The following illustrations are of interest. In each case the victor is placed first.

Pharsalus	Caesar	25,000	losses	200	
	Pompey	60,000	"	15,000	
Cannae	Carthaginians	50,000	losses	6,000	
	Romans	90,000	"	80,000	
Agincourt	British	15,000	losses	1,600	
	French	50,000	"	25,000	
Leipsic	Gustavus	40,000	losses	3,400	(Some fire-arms used)
	Tilly	44,000	"	13,000	

Gunpowder changed all this, for against bullets man enters not a duel with his fellows but a lottery with fate. The larger casualties come before the break and defeat is less deadly because the further the opponents are apart at the decision, the better start the vanquished have, and firearms are better adapted to delays.

Due to these facts victorious armies now often lose more than the vanquished, and when this is not the case the losses are at least more on a parity. The result is that armies run down with the influx of less well trained men.

The following examples are illustrative. (NOTE.--These and the preceding figures comes from: "THE *DICTIONARY OF BATTLES*" - HARBOTTLE.)

Kolin	Austrians	54,000	losses	9,000
	Frederick	34,000	"	14,000
Kurnersdorf	Austrians & Russians	90,000	losses	24,000
	Frederick	40,000	"	20,000
Wagram	Napoleon	150,000	losses	18,000
	Austrians	140,000	"	33,000
St. Privat	Germans	232,000	losses	20,000
	French	133,000	"	18,000
1st Bull Run	Confederates	26,000	losses	1,752
	Federals	30,000	"	1,492
World War	Allies		losses	4,689,200
	Central Powers		"	2,750,000

This fact is very important to the present discussion -- a professional army must either be so good that it is immediately victorious or *else like PYRRHUS suffer defeat* through victory.

A solution.

In order to supply battle losses in a professional army, an enlisted reserve of regulars who have served one enlistment must be formed and its members given enough pay to insure their addresses being known.

Since no nation is justified in hazarding its existence on the chance of defeating the enemy before its own original force is exterminated, it will be necessary to back up a professional army with a limited number of reserve forces.

The function of these reserves will be to occupy defensive fronts if such exist, man lines of supply and, finally, after they have gained experience in the school of actual war, to provide either additional replacements for the professionals.

The National Guard is adequate in numbers and training to fulfil this mission.

Nothing new in method proposed.

As always, there is nothing new in the idea of a two-type army. In the discussion of old armies (Section II) frequent cases of identical procedure were pointed out.

Not same as present system.

At first glance it may seem that the idea of a twofold army herein advanced is identical with the time-honored practice of the United States.

Such a notion is an error.

The plan proposed contemplates a regular army, with units on a war footing, backed by a trained group of replacements, and of such a strength that in the critical initial phases of the war it will either be wholly successful or else so damage the enemy that his final discomfiture can be effected at a minimum cost in men and money.

The plan changes the regular army from a school to a weapon.

VII. DISCUSSION OF TYPE OF PROFESSIONAL ARMY TO BE DEVELOPED.

Desirable qualities.

In seeking the mold in which to form a professional force for the performance of this mission we shoul seek to accentuate the qualities of immediate readiness -- fast inconspicuous and invulnerable movement off the battle-field, combined with relatively rapid mobility and high-fighting capac on it.

Wholly mechanized army.

General.

In thinking of suitable forms our attention is at first naturally directed to a wholly mechanized army. There are, however, certain drawbacks, among which must be mentioned the following:

Cost.

High cost and rapid obsolescence of equipment. These factors will force us to begin the war with wholly inadequate numbers and will result in our finding ourselves faced with an hiatus when the initial stock is exhausted and the new vehicles laid down at the initiation of the war have not materialized.

Not always suitable.

The next factor to consider is that there do not now exist either in fact or in imagination machines capable of fulfilling all or even a measurable proportion of the functions demanded of armies.

Always a counter.

Finally, we know from historical analogy that all new weapons have like new diseases developed a curative vaccine. In other words, that new weapons have invariably been most effective tactically, though often most ineffective mechanically, during the brief period between their appearance and the arrival of counter measures.

Anti-tank weapons, etc.

At the present time large caliber machine guns, small automatic cannon, the 5,000 F. S. bullet said to be in existence, and, finally, but most important of all, the disappearance of their novelty, have rendered armored fighting vehicles less potent than in 1918.

Some mechanized units needed.

We should have mechanized units of several types so grouped that they can effectively cooperate with existing arms in carrying out the several military functions which long experience has assigned to infantry, cavalry, and artillery.

Due to the steady progress of invention, it is undesirable to build large numbers of any one type of machine. Better results will accrue if small but complete units of each new type devised are built and put in service successively; as experience and ingenuity point the desirability of changes. When war starts manufacture should be concentrated on the latest approved model in each type.

Majority of army not mechanized.

The great majority of the professional army should consist of the types approved by the test of time and whose functions, despite changes in equipment, have remained constant since the beginning.

Equipment.

The equipment of this "Muscle Army" should be of the latest and LIGHTEST varieties and limited to those types adapted to general as opposed to special operations.

Motorization.

Since this country contains 74.4% of all the motor vehicles in the world; possesses four companies operating truck fleets of over 10,000 machines apiece; twenty-three companies with fleets ranging from 9,427 to 1,037; and nineteen companies operating from 957 to 186 trucks (National Automobile Chamber of Commerce, 1931), it is clear that ample mechanical transport is available which, if JUDICIOUSLY used, can materially lighten the amount of battle equipment carried by men and animals -- if and only if we limit ourselves to small forces grouped in small units. To apply this system to masses would simply cumber the roads to no purpose.

Even if the exigencies of a campaign force the eventual abandonment of mechanical transport, every pound mile saved will have paid for itself in the heightened condition in which the troops enter such a phase.

It is neither necessary nor expedient to possess or maintain such transport in peace. Maneuvers and combat exercises are confined almost entirely to the battle part of war. So far as transport is concerned, all that is necessary is that from time to time a survey be made showing the . . and suitability of existing types of commercial vehicles so that when war comes they and their drivers can be acquired. Small armies do not need much transport; so industry would not be paralyzed.

New weapons.

Since one of the principal virtues claimed for a professional army is that due to its limited size, it may be continually re-armed with the newest types of weapons, it is evident that initially the auxiliary army should use present equipment, otherwise expenses would prevent development.

Organization of auxiliary army.

So far as organization is concerned, the auxiliary army, depending, as it must, more on quantity than on quality, should be organized along present lines with units at half present authorized strength, because any attempt to utilize the elastic formations adaptable to professionals is doomed to failure due to lack of training.

Tables, illustrative only.

The construction of tables setting out in detail the organization recommended for a professional army is not only beyond the scope of this study, but also beyond the capacity of any one individual. The numbers and armament herein shown are simply illustrative of the principles believed essential.

VIII. ORGANIZATION OF PROFESSIONAL ARMY.

General.

The guiding principle of organization should be the endeavor to devise means of killing without getting killed.

The best way to accomplish this is to reduce the number of human targets while at the same time increasing their killing power. If these individuals can be widely separated, a further saving in losses is assured.

The drawback to wide deployment comes from the fact that usually the several steps in the echelons of command are charged with supervising so many men or groups that they either reduce the interval to increase control, or else abandon control to maintain the interval.

Now, since "Man engages in combat for the purpose of gaining the victory and not for the purpose of fighting," (du PICQ) and since it is impossible to gain victory without fighting, control is necessary. The obvious solution is to reduce the size of the groups forming each echelon. Everything is simple until the question of supporting arms versus mobility obtrudes itself.

Infantry units.

General.

Groups composed of two machine guns and one cannon probably represent the best means of attaining the maximum fire with the minimum men. Unfortunately, such a group is impossible because it is immobile and has so few men that it cannot exercise that threat to close which wins battles.

This being so we must seek a solution which, while retaining the firepower of the cannon and machine guns, also possesses adequate personnel, is mobile, easily commanded, and still admits of such wide deployments as will reduce its losses in battle and avoid interruptions on the march.

As has been already indicated, infinite deployment is easy if we can disregard human nature. Since this is impossible we must utilize it.

Man is a gregarious, vain, and at the moment, mechanical-minded animal. These traits should be exploited by grouping him around a machine where the vanity of his self-esteem will make him fight.

The light machine gun

The light machine gun (See Inclosure No. 5) provides an ideal nucleus for such a mechanical-minded group. Moreover, being a machine it is less susceptible to the palpitations of fatigue or emotion than is the rifle. To insure the homogenious mobility of the group, horses or tractors as a means of transportation are not included; the weapon must be manhandled. Four men, relieved of the weight of their rifles and bayonets and working in pairs, are adequate, and at the same time they can carry 150 r on the march and 250 rounds in battle -- total, 1,000 rounds. Twenty-five hundred rounds will be more than sufficient for such a gun. To get this extra 1,500 rounds, riflemen must be used. If we ask each man to carry into action only an added 100 rounds, we get nineteen men, or twenty with a sergeant, as a complement for each gun.

From the viewpoint of target range accuracy the light machine gun is slightly less efficient than is the heavy water-cooled variety, but it goes with the assault echelon where its presence is visible and audible. This the heavy gun cannot do. Moreover, the heavy gun is not wholly abandoned.

The platoon and company.

Returning to our group or section and building from it as a basis, we get a platoon of two sections and a company of three platoons. (For details, see Inclosure No. 6 - Infantry Company.)

The battalion.

A battalion of three such companies totals 466, and will have at its disposal eighteen machine guns and 359 rifles. This gives considerable combat value without violating the principle of keeping the echelons of command small. Further, it is not cumbered with either animals or tractors. On the other hand, it is not wholly self-supporting in that it does not contain artillery; but were artillery attached it would not only reduce the march but it would also fail to utilize the range of that arm. This question will be examined later when we consider frontages. (For details, see Inclosure No. 7 - Infantry Battalion.)

The brigade.

Combining three such battalions with a company of heavy machine guns (animal-drawn) and a battalion of field artillery (motorized), we get a composite brigade, which forms the next echelon of command. (For details, see Inclosure No. 8 - Composite Infantry Brigade.)

The choice of the name "Brigade" is open to criticism. It was adopted in recognition of the fact that while separate arms are reluctant to serve under a colonel of any one of them, they are perfectly content if his name is changed to that of "General." In order to avoid overhead and delay in the transmission of orders, either the brigade or the regiment had to go.

In considering this composite brigade it will be noted that the machine-gun company consists of four platoons. Three platoons are the .30-caliber gun and mount; the fourth is a platoon of .50-caliber, air-cooled, machine guns. (See Inclosure Nos. 9 and 10 - .50-caliber Machine Gun.)

The purpose of this company is twofold: first, it can give the usual supporting fire of machine guns; second, in circumstances where enemy tanks are expected, two battalions can be provided with a platoon of excellent anti-tank weapons. Unquestionably, it would be nice to have more anti-tank weapons available, but they cost men and road space; so they have been eliminated. The outstanding defect of our present organization arises from the fact that we have yielded too often to this tendency to be prepared for everything, with the result that we cannot move.

Animals have been retained for draft on the ground that at the speed required they give more fluid mobility than do machines. Moreover, they can be replaced by requisition in any theater of war.

An examination of the formation of the field artillery battalion reveals the fact that it is composed of two batteries of 75-mm. guns and one battery of 75-mm. howitzers. (This gun is the present pack artillery weapon mounted on wheels. See Inclosure No. 11.)

Again, this battalion serves two purposes: it gives to the brigade the normal supporting fire of artillery, but being in the brigade makes that small unit self-contained. The battery of howitzers is also available to supply a platoon of accompanying guns or, if on the defensive, anti-tank guns to two battalions. The range of these weapons is 9,200 yards, which for the supporting purposes in maneuver war is enough.

The division.

Combining three such brigades with other units shown in Inclosure No. 12 - The Infantry Division, we produce the division.

Little argument is needed to defend the incorporation of a squadron of seven observation airplanes. The number is only half of those now used, on of the reduced size of the division.

The tank battalion of thirty-nine machines of the Vickers-Armstrong or the modified Christie type is added -- first to permit a means of further exploiting the mobility of the division on the offensive; and, second, when on the defensive, to provide a means for local counter-attacks.

The organization proposed for this battalion is as follows: The platoon consists of three tanks and one self-propelled small cannon (about six pounder) mounted on an identical chassis. While admitting the expensive nature of self-propelled guns, they none the less are believed necessary because, in open warfare, the platoons will operate on broad fronts and will often meet situations demanding IMMEDIATE supporting fire -- they, too, must be self-contained.

The company consists of three platoons and the captain's tank. The battalion of three companies.

Post-war reflections on the circumstances attending war of movement have already caused several countries, including England, to incorporate cavalry in their divisions.

The platoon of armored cars with the squadron is for the purpose of bridging the gap between air reconnaissance and the relatively close work performed by the horsemen. In addition to reconnaissance, in general the squadron will also be useful in covering night movements of tanks, in acting as a mobile reserve, and for general security.

Cavalry units.

General.

In preparing an organization for Cavalry the principles adduced for Infantry are equally applicable. The organization herein presented is practically identical with that at present in effect, except that the numbers have been reduced.

Cavalry platoon and troop.

In the troop there are three rifle platoons and one light machine-gun platoon (Inclosure No. 13 - The Squadron and Troop). Aggregate force: 116 men, 6 light machine guns, 84 rifles.

In a purely dismounted fight the three squads of the machine-gun platoon are incorporated one to each rifle platoon, and an organization similar to the infantry, but with less ammunition, is provided.

should be two to each rifle platoon

When cover permits the use of the mobility of the rifle platoons for mounted envelopment, regardless of whether the fighting conducted is mounted or dismounted the light machine-gun platoon forms the pivot about which the rifle platoons maneuver.

Cavalry squadron.

The squadron consists of only two troops. (Aggregate: 241 men, 12 light machine guns, 173 rifles.) To give it three would make it too bulky for command.

Cavalry brigade.

Again and for the same reason, the regiment is eliminated and the brigade formed from three squadrons, with the addition of a three platoon machine-gun troop, combining the .30-caliber and .50-caliber guns, a troop of armored cars and a battery of horse artillery using 75-mm. howitzers. (For details, see Inclosure No. 14 - The Cavalry Brigade.)

A study of successful cavalry operations in both the Civil War and in Palestine, and of the German Cavalry in Russia and Rumania, clearly demonstrates the advantage of having batteries attached to small mounted units.

The troop of thirteen armored cars is necessary, as in the case with the divisional cavalry, to bridge the gap between the airplanes and the horse patrols for reconnaissance. When roads do not permit the use of these vehicles, they will be held in reserve with the division. Aggregate for brigade: 1,145 men, 36 light machine guns, 8 heavy machine guns, .30-caliber, 4 heavy machine guns, .50-caliber, 562 rifles, 13 armored cars.

Cavalry division.

The division consists of three brigades with some trains, signal troops, medical units, and a mechanized cavalry regiment. (For details, see Inclosure No. 15 - The Cavalry Division.)

It will be noted that the cavalry tank squadron of the mechanized regiment is arranged with three tanks and one accompanying gun in the same manner and for the same reaon as in the infantry tanks.

should match the Tanks and armed a battalion of F.A.

Further, it should be noted that the type of machines used for a mechanized regiment should be constructed to carry out the minor combat functions of cavalry, whereas tanks with the infantry division should be constructed for major combat operations.

Summary.

It is desirable to repeat here that the organizations specified above are only illustrative. More critical study will probably point to the need of certain changes in the ratios of the several arms. In making such a study the tendency to provide for everything should be discouraged -- that way lies immobility.

Corps and armies.

It is believed that since the organization of corps and larger units depends wholly on the theater of war, it is foolish to specify them in advance. All that is necessary is to provide the suitable special arms, such as the air forces, medium artillery, engineers, etc., which they will have to use. However, in view of the probable difficulties of moving large units, as brought out by General Fox Conner, these corps troops will usually be attached to divisions; the corps commander acting in fact as the commander of the theater of operations.

IX. TACTICS OF PROFESSIONAL ARMY.

General.

The chief defects in the present methods of attack result from the fact that the masses used are clumsy and intricate; hence hard to deploy and impossible to control. The columnar formations of attack emphasize these defects, while at the same time they subject a great many men to danger while producing an assault echelon lacking in fighting power. Under this system the only means of victory seems to be to collect quantities of guns and mountains of ammunition and then, by having masses of infantry, to hope that some will survive to reap the victory blasted for them by the guns. An enemy capable of more rapid movement will either not select ground suitable for such tactics or else will not wait calmly while the preparations, days in the making, are perfected.

Infantry tactics, offensive.

General.

If, then, we hope to conquer by other means than having his infantry scavenge in the wake of the shells, we must get some power into our firing line. If we adopt the present methods of a deployed line of skirmishers, we get little power at the start and none at the finish. The obedience secured from short service men is mental, not automatic. When such men are deployed their mental reactions are dimmed by excitement and a sense of isolation: many do not press on when ordered, because being isolated and invisible fear of being thought afraid does not affect them. This hesitation occurs more at the long and medium ranges than at the short range. There things are so tense that men must move; it is safer to go on than to lie still. "A retreat forward" takes place.

The platoon.

The infantry platoon of forty-three men suggested differs little in size from the present one of some fifty odd. Hence, if we string it out in a skirmish line the only advantage it would have would result from longer training and its light machine guns -- this is not enough.

To overcome the straggling incident to skirmish lines it is proposed to deploy the platoon in line of section columns of files or twos, with the light machine guns leading. The interval between columns will be from fifteen to thirty yards.

The platoon commander will be in the interval and abreast of the guns; he can, therefore, insure progression. Moreover, the crowd spirit and the lure of the machine will be helpful.

To advance, the corporal of one gun squad moves out and finds a new location to which the gun is moved under protection of the other. The second gun moves up. Then the platoon commander. Finally, the platoon sergeant and the two section sergeants see that the columns advance. (Ammunition is handed to the guns starting with the men farthest away. Gun crews reserve theirs to the last.)

When decisive range is reached the riflemen will be deployed.

It is believed that up to close range two machine guns so used will produce much more fire effect than is possible with rifles and auto-rifles, many of which are absent. The rifle grenadiers will be used when necessary to prepare the assault.

While for brevity the case has been described with the guns and riflemen staying together, there is no reason why the sections may not be split, or why the gun squads may not stay together and the riflemen be used separately as in the cavalry. Such variations will be made at the shorter ranges.

The company.

The second platoon of the company, similarly arranged, will be deployed to a flank with an interval up to a maximum of 200 yards.

The third platoon, frequently in support, will be in the interval. Its guns should be used whenever cover permits.

The battalion.

The interval between companies can be as great as 300 yards.

With two companies in the firing line and one in reserve a battalion will cover a front of possibly 1,000 yards.

The brigade.

A brigade with two battalions in action, with a maximum frontage of 2,000 yards, can still support its whole line with the heavy machine guns and artillery when the latter are held centrally.

It would seem that within limits there will be almost no restrictions to the deployment interval between brigades. Each is self-contained and each with one battalion in reserve has a means at hand of checking counter attacks.

This elasticity should be used to cause the enemy either to over-extend his inelastic front or else, if he cannot or will not move, to go around him.

The division.

For turning movements or flank attacks advantage should be taken, whenever the nature of the ground and the presence of cover permits, of using the tank battalion as a means of still further increasing the encirclment.

This is the operation which mechanization enthusiasts dilate on, but they, in imagination, start the move too far from the objective, and then to insure surprise have to assume impossible speeds.

Here we simply move the tanks up cover behind the most extended flank element of the infantry. No speed is necessary and the ground over which the tanks march is protected. Further, the cavalry will cover the approach of the tanks when they pass beyond the infantry and will reconnoiter roads for them up to the take-off line. To use tanks for assault over open country is suicide.

In view of the great intervals between all units the need for "indoctrinated initiative and simple short orders" is highly emphasized.

Defensive.

The teaching as to very wide intervals will still hold. The firepower and mobility of the reserve units will be exploited and, finally, the tanks afford a fine weapon for limited counter attacks. In fact, due to the time and opportunity for careful reconnaissance, they are better for this than for any other operation. But this type of army can be pounded to pieces if it sits down in a narrow country with its flanks on natural obstacles and waits for a blasting attack.

Its mobility should enable it to avert such a fate by maneuver. In the cases where special circumstances prevent maneuver the reserve army, as has already been pointed out, should be used to hold the defensive line. While this is going on, the professional army should be employed for flank attacks, breakthroughs or, if the enemy penetrates, for counter attacks.

This does not mean that even in western Europe a mobile army would be impotent. At the start of a war it is impossible to deploy an adequate force behind the whole length of a frontier and then start it rolling in one long, flankless, resistless, wave.

In the first place, the supply difficulties would not permit it; but disregarding this fact, the numbers necessary for such an operation demand a national levee. During the time needed for this and for its deployment a professional army could do a great deal of harm. It might be decisive; if not, it would cause its opponent to occupy very unfavorable insure ample time for the raising of an opposing national levee to meet him.

Cavalry tactics.

The higher mobility given to cavalry by the presence of its horses simply accentuates the capacity for wide deployment as outlined for infantry.

This fact, coupled with the high firepower with which the proposed organization endows it and the advantage which it will frequently derive from the assistance of its mechanized elements, makes it, for maneuver warfare, more effective than it has been for a thousand years.

Nothing in the organization proposed affects the well-understood roles of the two arms. But the means of accomplishing these tasks have been made more effective.

X. POINTS TO BE EMPHASIZED.

In conclusion, the following points should be emphasized:

1. In the World War the use of mass armies produced by nations in arms failed to attain decisive results.

2. Many nations concur in this belief and are seeking a remedy.

3. Historical analogy and enlightened opinion both point to the probability that this remedy will take the form of a war of movement conducted with small mobile armies.

4. Due to lack of training and natural inertia large national armies are incapable of mobility.

5. Modern war conditions prohibit the movement or control of masses on the march or in battle.

6. Small professional armies composed of smaller self-contained units offer a solution for the restoring of mobility and, hence, for shorter and more decisive wars.

G. S. Patton, Jr.
Major, Cavalry.

ROADS AND RAILROADS IN POSSIBLE THEATERS OF WAR

1	2	3	4	5	6	7	8	9	10	11
PLACE	Unim-proved	Non - s'fcd but Graded	Mac-adam	Other sur-faces	Total	% im-proved	Area in Sq. Mi.	Area in Sq. Mi. to each Mi. im- road	R.R. Mile-age	Area in Sq. Mi. to each Mi. R.R.
AMERICA										
Argentina	95000	44580	None	2597	142177	33%	1153417	proved 24.3 Sq. Mi.	24533	43.0 SqMi
Brazil	57142	12662	500	64	70371	19%	3276358	252.0 " "	19603	172.4 ""
Canada	179391	201944	4349	4376	390060	54%	3684732	17.0 " "	42000	87.0 ""
Chile	20654	1252	137	50	22094	7%	290160	201.0 " "	5553	53.0 ""
Mexico	60809	9590	None	378	62137	5%	767258	530.0 " "	14600	52.5 ""
Peru	2607	3146	6244	59	12056	79%	566912	60.0 " "	2810	202.0 ""
United States	2361798	481290	99426	81719	3024233	(6%) 26%	3026780	" "	249309	12.0 SqMi
*		*		*			*	4.5 *		*
All Africa	107294	118252	21724	10417	258287	59%	11721799	77.0 Sq. Mi.	43265	272.0 SqMi
*		*		*			*	*		*
ASIA										
Brit. India	160243	None	64007	1030	225280	29%	1094300	16.5 Sq. Mi.	41724	26.5 SqMi
China	No data	No data	No data	34810	No data	No data	4282000	123.0 " "	12335	357.0 ""
Japan	None	None	None	659216	659216	100%	172024	"	13420	13.0 ""
Turkey	16884	2296	320	None	19500	14%	494538	0.3 " 19.0 " "	3547	156.0 ""
*		*		*			*	*		*
EUROPE										
France	None	380173	22369	2486	405028	100%	212736	0.5 Sq. Mi.	26876	8.0 SqMi
Germany	None	130363	74564	12552	217479	100%	1882252	0.8 Sq. Mi.	33347	5.5 ""
Gt. Britain	None	None	None	179286	179286	100%	89041	0.5 Sq. Mi.	20389	4.4 ""
Italy	None	None	14430	99699	114129	100%	191733	1.1 Sq. Mi.	10358	12.0 ""
All Russia	No data	415160	15105	346447	776712	No data	8241921	10.6 Sq. Mi.	47051	175.0 ""
Spain	No data	No data	None	54114	54114	No data	191993	3.5 Sq. Mi.	9859	20.0 ""

TABLE OF ORGANIZATION)
No. 421)

WAR DEPARTMENT,
Washington,

CAVALRY BRIGADE

1	Units	Brigade Headquarters	Machine Gun Troop	Armored Car Troop	3 Squadrons (T/O 426)	Battery, 75 mm Howitzers	Total	Attached Medical	Attached Chaplain	Aggregate
2	Brigadier General	1					1			1
3	Lieutenant Colonel	1a					1			1
4	Majors				3		3	2		5
5	Captains	3b	1	1	9	1	15	2d2v	2	21
6	Lieutenants	1	2	3	18	3	27	6		33
7	Total commissioned	6	3	4	30	4	47	12	2	61
8	Master sergeant	1					1			1
9	First sergeants		1	1	6	1	9			9
10	Staff sergeants, including			1	3	1	5	2		7
11	Mechanic			(1)						
12	Packmaster					(1)				
13	Sergeants major				(3)					
14	Sergeants, including	6	13	11	42	9	89	4		93
15	Basic c.	(4)	(9)	(9)	(24)	(4)				
16	Mess		(1)	(1)	(6)	(1)				
17	Observer, intelligence	(1)								
18	Instrument		(1)			(1)				
19	Stable		(1)		(6)	(1)				
20	Signal					(1)				
21	Supply	(1)	(1)	(1)	(6)	(1)				
22	Corporals, including	4	18	6	75	10	108			108
23	Basic e.		(12)	(6)	(72)	(4)				
24	Buglers				(3)					
25	Ammunition		(1)							
26	Miscellaneous	(4)				(6)				
27	Privates and Privates first class	27	64	56	267	108	822	32		854
28	Armorer		(1)	(1)						
29	Buglers		(2)	(2)	(12)	(2)				
30	Cooks		(2)	(2)	(12)	(2)				
31	Chauffeurs	(6)		(13)	(3)					
32	Clerks	(6)			(6)					
33	Drivers, pack		(24)			(43)				
34	Horseshoers		(3)		(12)	(2)				
35	Gunners, Asst.		(12)	(13)		(4)				
36	Linemen	(1)				(2)				
37	Mechanics			(3)		(1)				
38	Operators, radio	(8)			(6)	(4)				
39	Operators, telephone	(2)				(2)				
40	Basic and Miscellaneous	(4)	(20)	(22)	(416)	46				
41	Total enlisted	38f	91	85	693	129	1036	38		1084
42	Aggregate	44	94	89	723	133	1083	50	2	1145
43	Horses, riding	44	197		741	28	910			910
45	Horses, pack	4	40		81		125			125
46	Mules, pack					55				55
47	Mules, riding or draft		8		48	21	77			77
48	Cars, armored, command			1			1			1
49	Cars, armored, fighting			12			12			12
50	Cars, five passenger, light	3		1	3		7			7
51	Trucks, 1½-ton	3		4			7			7
52	Wagons, combat		4		12		16			16
53	Carts, wire g.	1					1			1
54	Trucks, kitchen			1						1
55	Trucks, water			1						1
56	Trucks, radio	1								1
57	Guns, machine, caliber .30		8	13	36		57			57
58	Guns, machine, caliber .50		4							4
59	Guns, submachine			13						13
60	Howitzers, 75 mm pack					4				4
61	Pistols	44	94	89	723	132	1083			1145
62	Rifles	22		13	519		562			562

Remarks

a. Executive officer.
b. 1 adjutant, 1 intelligence and plans and training offi 1 supply officer.
c. Basic includes, chiefs of section, platoon leaders, e
d. Dental.
e. Basic corporals include, squad leaders, gunners FA section heads, etc.
f. Messed with AC Troop.
g. Wire section pack in FA.
i. Light machine guns.

Incl. XX 14.

TABLES OF ORGANIZATION)
No. 426 Experimental)

WAR DEPARTMENT,
Washington,

T/O 420Ex

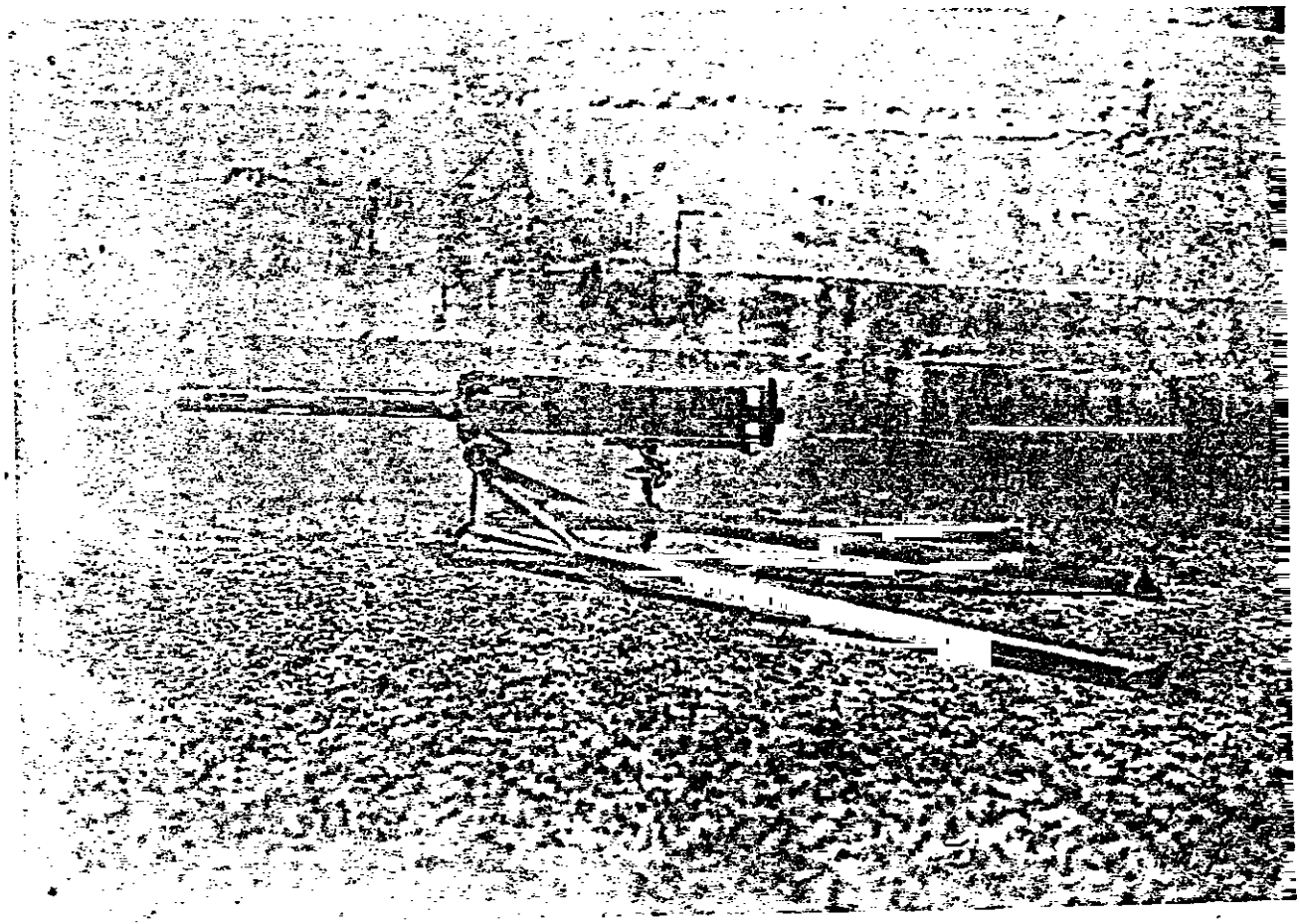
Squadron and Troop, Cavalry Brigade
Experimental

1.	2	3	4	5	6	7	8	9	10
		Rifle Troop							
1. Units	Squadron Headquarters	Troop Headquarters	1 Rifle Platoon	1 Machine Gun Platoon	Total 3 Rifle Platoons and 1 Machine Gun Platoon	Total Troop	Total 2 Troops	Total Squadron	Remarks
2. Major	1							1	a. Commands machine gun platoon
3. Captains	1	1				1	2	3	b. Also runners.
4. First lieutenants		1a				1	2	2	c. Driven by clerk in squadron headquarters.
5. [illegible]			1		2	2	4	4	
6. [illegible]	2	2	1		2	4	8	10	
7. [illegible]		1				1	2	2	
8.	1							1	
9.	(1)							(1)	
10.		3	1	1	4	7	14	14	
11.		(1)				(1)	(2)	(2)	
12.			(1)	(1)	(4)	(4)	(8)	(8)	
13.		(1)				(1)	(2)	(2)	
14.		(1)				(1)	(2)	(2)	
15.	1		3	3	12	12	24	25	
16.	(1)							(1)	
17.			(3)	(3)b	(12)	(12)	(24)	(24)	
18.						31	62	66	
19.	5	10	22	16	82	61	122	123	
20.		(1)				(1)	(2)	(2)	
21.	(2)							(2)	
22.		(2)				(2)	(4)	(4)	
23.				(3)	(3)	(3)	(6)	(6)	
24.		(2)				(2)	(4)	(4)	
25.	(1)	(2)	(1)	(1)	(4)	(6)	(12)	(13)	
26.	(2)							(2)	
27.		(1)				(1)	(2)	(2)	
28.		(2)				(2)	(4)	(4)	
29.			(21)	(12)	(75)	(75)	(150)	(150)	
30.	7	14	26	20	98	112	224	231	
31.	9	16	27	20a	100	116	232	241	
32. [illegible]	11	16	28	20	102	118	236	247	
33. O-Horses, [illegible]	3	3				3	6	9	
34. O-Mules		8				8	16	16	
35. O-Car, 5 passenger, light c.	1							1	
36. O-Wagon, Combat		2				2	4	4	
37. O-Pistols		[illegible]	[illegible]	[illegible]	100	116	232	241	
38. O-Rifles									
39. O-Sabers									
40. O-Guns, machine, caliber .30 (AC)									

.50 Caliber Machine Gun,

low firing position

Note: The gun sh wn below is the one developed for the Cavalry using a modified air craft gun. The Ordnance Department is also working on a new model gun of similar caliber being manufactured by the Colt Company.



Incl. 9.

TABLES OF ORGANIZATION)
:
No. 26)

WAR DEPARTMENT,
Washington,

Infantry Battalion

1	Units	2 Battalion Headquarters	3 3 Companies	4 Total Battalion	5 Attached Medical	6 Aggregate	7 Remarks
2	Major	1		1		1	
3	Captains	1	3	4	1	5	p. armed with the pistol.
4	Lieutenants	2	12	14	1	15	r. armed with the rifle.
5	Total commissioned	4p	15	19	2	21	
6	Technical or 1st sergeant	1p	3	4		4	
7	Staff sergeants	2p		2	1	3	
8	Sergeants	2p	33	35	1	36	
9	Corporals	3p	39	42	2	44	
10	Privates and privates first class	16	348	364	10	374	
11	Gunners		(18)	(18)		(18)	
12	Assistant gunners		(54)	(54)		(54)	
13	Chauffeurs	(2)r	(6)	(8)	(2)	(10)	
14	Cooks	(2)p	(6)	(8)		(8)	
15	Messengers		(6)	(6)		(6)	
16	Basic	(12)r	(258)	(270)	(8)	(278)	
17	Total enlisted	24	423	447	14	461	
18	Aggregate	28	438	466	16	482	
19	Ambulances, motor, field				1	1	
20	Trucks, 1¼-ton	2	6	8	1	9	
21	Guns, machine, light		18	18		18	
22	Projectors, grenade		36	36		36	
23	Pistols	14	93	107		107	

TABLES OF ORGANIZATION)
No. 21)

WAR DEPARTMENT,
Washington,

COMPOSITE INFANTRY BRIGADE

1	Units	2 Brigade Headquarters and Headquarters Company	3 3 Infantry Battalions	4 Machine Gun Company	5 Field Artillery Battalion	6 Total Brigade	7 Medical	8 Chaplain	9	10 Remarks
2	Brigadier General	1				1			1	
3	Lieutenant Colonel	1				1			1	
4	Majors	1	3		1	5	1		6	p. Armed with the pistol
5	Captains	2	12	1	5	20	4	1	25	
6	Lieutenants	2	42	5	15	64	3		67	
7	Total commissioned	7p	57	6	21	91	8	1	100	
8	Master sergeants	2p				2			2	
9	Technical or 1st Sergeants	1p	12	1	4	18			18	
10	Staff sergeants	2p	6		1	9	4		13	
11	Sergeants	5p	105	14	35	159	4		163	
12	Corporals	6p	126	20	41	193	7		200	
13	Privates first class and privates	30p	1092	157	316	1595	37	1	1633	
14	Total enlisted	46	1341	192	397	1976	52	1	2029	
15	Aggregate	53	1398	198	418	2067	60	2	2129	
16	Cars, 5 passenger, light	1							1	
17	Ambulances, motor, field		3		1	4	2		6	
18	Trucks, cargo, 1½-ton		27		7	34			34	
19	Guns, machine, caliber .30			12		12			12	
20	Guns, machine, caliber .50			4		4			4	
21	Guns, machine, light		54			54			54	
22	Guns, 75 mm				8	8			8	
23	Howitzers, 75 mm				4	4			4	
24	Pistols	53	321	142		509			509	
25	Rifles		1068	50		1118			1118	

WAR DEPARTMENT,
Washington,

TABLES OF ORGANIZATION)
:
No. 28)

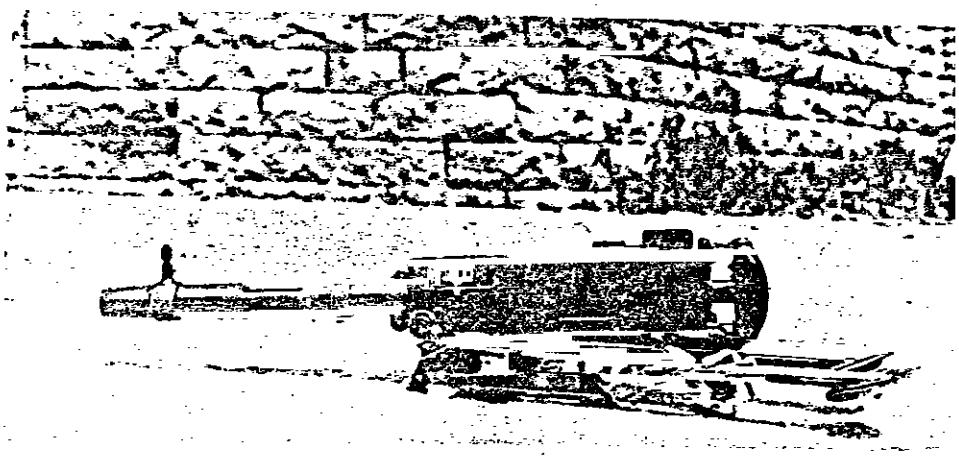
RIFLE COMPANY

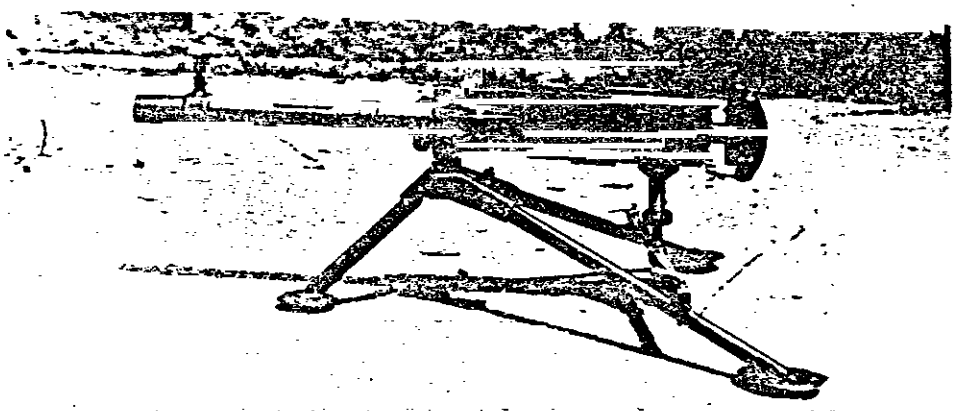
1	Units	2 Company Headquarters	3 Platoon Headquarters	4 Light Machine Gun Squad	5 Rifle Squad	6 Section (1 Rifle Squad, 1 Lt. MG Squad)	7 Total Platoon (Plat. Hq. and 2 sections)	8 Total Company (Headquarters & 3 Platoons)	9 Remarks
2	Captain	1						1	g. Equipped w/grenade discharger
3	Lieutenants	1	1				1	4	p. armed with the pistol.
4	Total commissioned	2p	1p				1p	5p	r. Armed with the rifle.
5	First sergeant	1r						1r	
6	Sergeants	2r	1r			1r	3r	11r	
7	Corporals	1r		1r	1r	2r	4r	13r	
8	Privates first class and privates	8	2	8	9r	17	36	116	
9	Gunners			(1)p		(1)p	(2)p	(6)p	
10	Assistant gunners			(3)p		(3)p	(6)p	(18)p	
11	Riflemen	(2)r	(2)r	(4)r	(9)r	(13)r	(28)r	(86)r	
12	Chauffeurs	(2)r						(2)r	
13	Messengers	(2)r						(2)r	
14	Cooks	(2)p						(2)p	
15	Total enlisted	12	3	9	10	20	43	141	
16	Aggregate	14	4	9	10	20	43	146	
Weapons									
17	Dischargers, grenade			2	2	4	8	24	
18	Guns, machine, light			1		1	2	6	
19	Rifles	10	3	5(2g)	10(2g)	16	35	115	
19	Pistols	4	1	4		4	9	31	
Vehicles									
20	Trucks, cargo, $1\frac{1}{4}$-ton	2						2	

Incl. 6

THE LIGHT MACHINE GUN

Note: The gun shown below is the present light machine gun. The total weight including mount is 40 pounds. The Ordnance Department has developed a weapon identical in appearance and ballistic qualities weighing ten pounds less. The tactics described in the text are based on the use of this improved weapon.





METHOD OF CALCULATING APPROXIMATE COST OF A REGULAR ARMY of 315,000

- Total appropriation for F. Y. 193_ in even thousands

A. $ 329,715,000.00

4. In this year, military activities, other than
   Regular Army, amounted to .....B. $ 46,937,000.00
   " Costs of special construction .....C. $ 20,695,000.00
   Requisition of land (not normal) .....D. $ 580,000.00
   TOTAL E. $ 68,212,000.00

F. $251,503,000.00*

a. Now the difference Item F. Cost of Regular Army, is divisible into two amounts—one amount, overhead is considered adjustable for any normal increases in men; the other amount varies directly with the numbers of men and officers. While not wholly accurate, the variable figures have been taken as follows:

(	$ 21,237,000.00 Subst:
(	5,403,000.00 R.S.
(	8,881,000.00 C & E
(	3,843,000.00 T. E.
(	14,472,000.00 A. T.
(	33,000.00 Animals
(	15,865,000.00 B & Q
(	580,000.00 Hosp.
(	10,369,000.00 O. D.
(	1,653,000.00 Med.
TOTAL	G. $ 62,336,000.00
b. Pay and allowances – Officers	H. 51,676,000.00
c. Pay and allowances – Enlisted Men	I. 57,671,000.00
d. A. C. construction and maintenance	J. 31,639,000.00
TOTAL	K. $223,322,000.00

5. By subtracting K. from E. we get the overhead * L. $ 38,181,000.00

6. In order to get a unit value for G. – H. – I.
   divide G. by 118,000: this equals M. $ 597.00 Average cost of man.
   " H. by 12,000: " " N. 4,306.00 Average pay of officer.
   " I. by 18,000: " " O. 488.00 Average pay and allowance of enlisted man.

7. To get the approximate cost of a Regular Army of 15,000 officers and 300,000 men.

Multiply item _	$ 697.00 by 300,000 number of men	$ 209,100,000.00
" item N.	4,309.00 by 50,000 number of officers	64,590,000.00
" item O.	488.00 by 300,000 number of men	146,400,000.00
It is assumed that the A. C. will cost 30% more than at present so add 30% of J. to J._____		41,300,700.00
TOTAL gives variable cost of army of 315,000_____		$ 461,220,700.00
Adding item L. Overhead to this gives _____		$ 38,181.000.00
TOTAL COST OF ARMY _____		$ 499,181,000.00

NOTE. Information on which calculation is based was secured through the courtesy of the Office of the Chief of Finance.

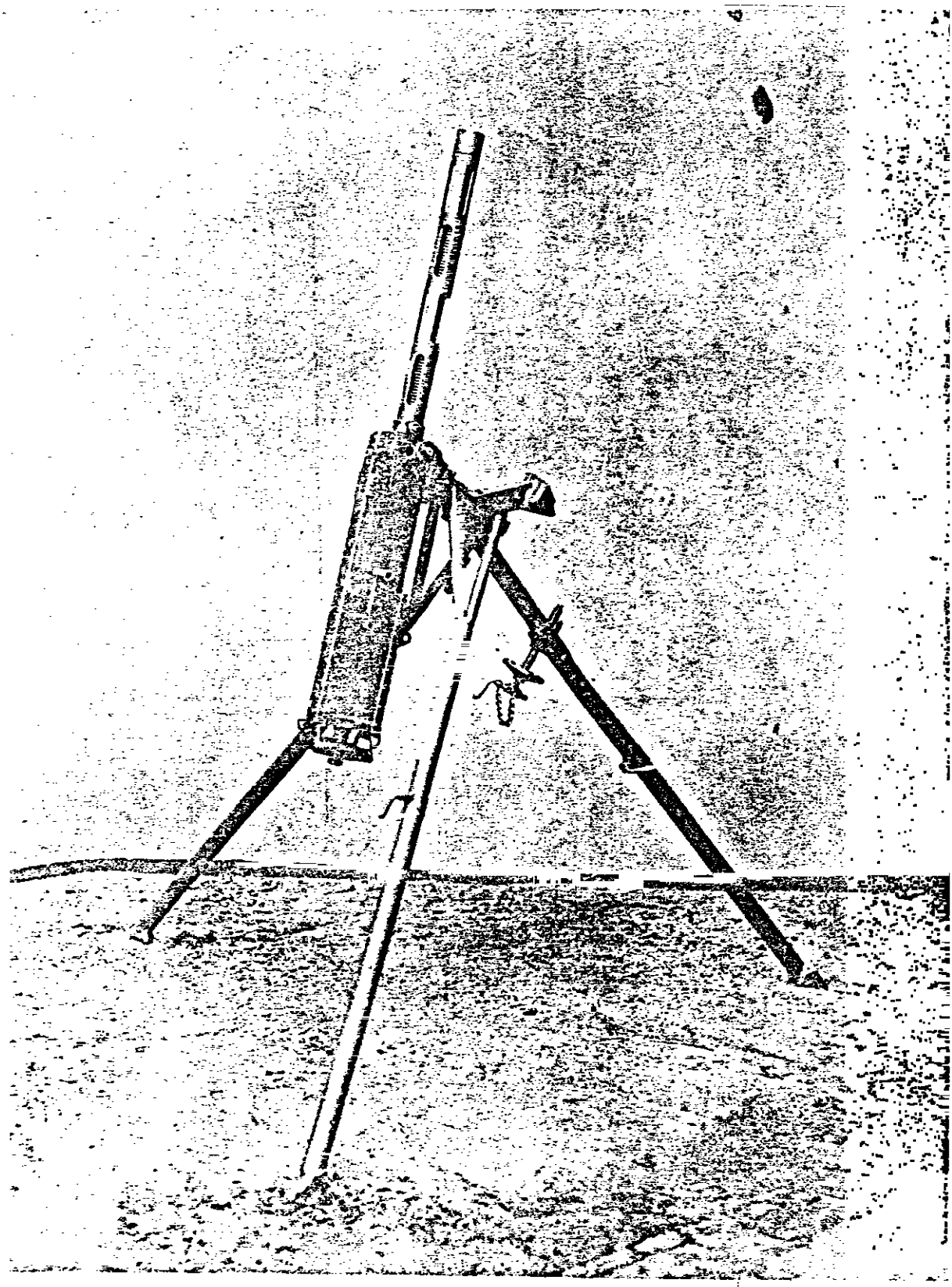
Road and Railroad Density in Critical Areas of the United States

Place	Miles surfaced Roads	Area Sq. Mi.	Area in Sq. Mi. to each mile Improved Roads	Miles, Railroads	Area in Sq Mi. to each Mi. of R.R.
Connecticut	3572	4820	1.3	968	5.0
Maine	5777	29,895	5.1	2193	13.6
Massachusetts	9324	8039	0.85	2021	4.0
New Hampshire	2784	9031	3.2	1165	7.7
New York	32,713	47,654	1.4	8311	5.7
Vermont	4983	9124	1.7	1056	8.6
Total Northeast Critical Area	59,153	108,563	Average in Northeastern United States 1.8	15,714	6.8
			Average in Western Europe .6		
West Coast:					
California	25,381	155,658	6.0	8204	18.8
Oregon	12,123	95,607	7.8	3456	27.
Washington	16,718	66,836	4.0	5541	12.
Total West Coast	54.422	318.101	Average on West Coast 5.8	17,201	18.4

Incl. 3.

.50 Caliber Machine Gun in Anti-Aircraft Firing Position

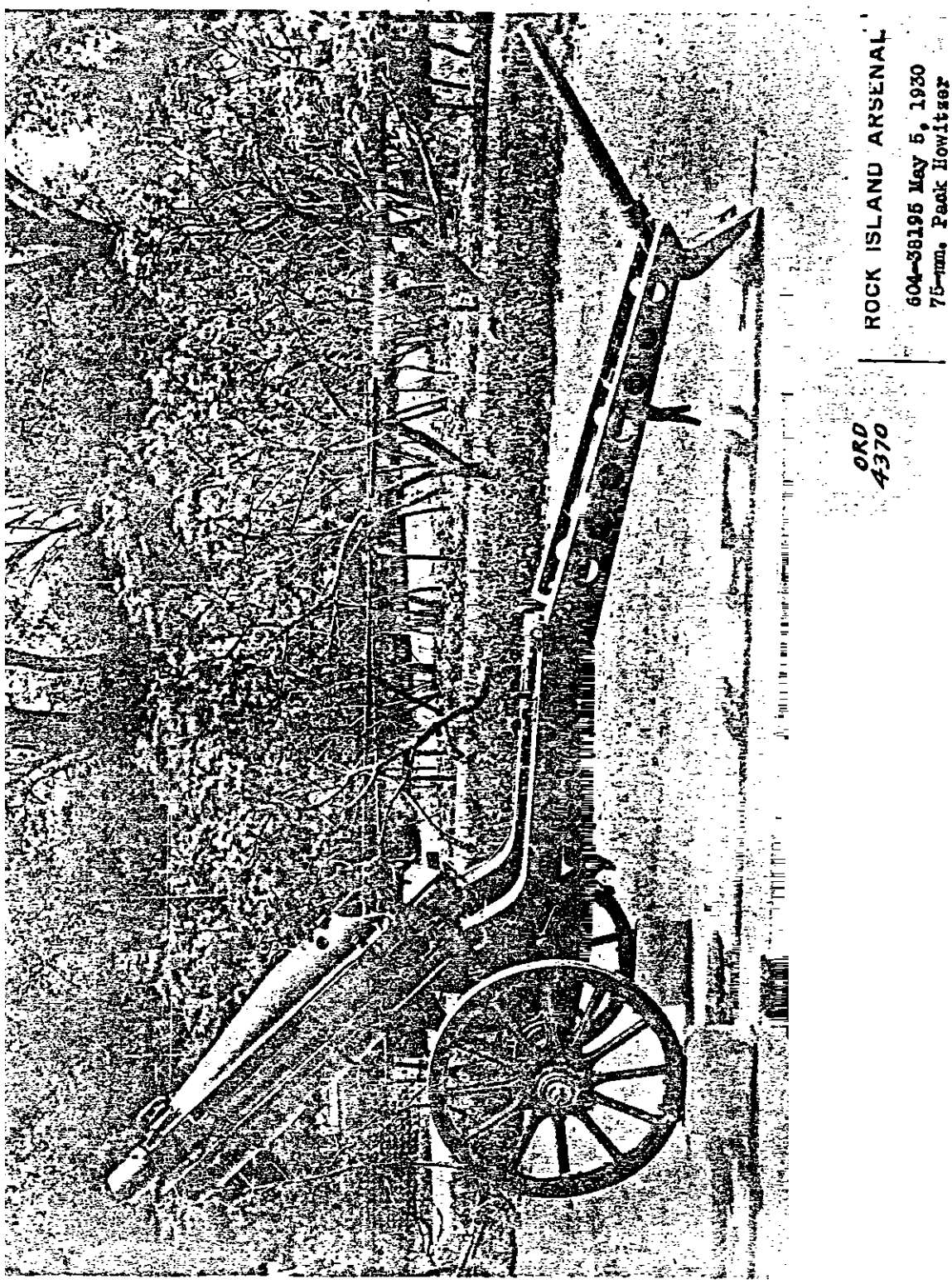
The legs of the tripod can be shortened so as to give a higher mount than that shown in inclosure No. 9, for use in ground firing.



Incl. 10.

INCLOSURE NO. 11:

The mount shown in the photograph herewith is the pack mount. In order to permit the weapon being tractor-drawn, as is intended, the tread of the wheels must be made standard and the size increased. This will cause the gun to weigh in firing position, 1400 pounds. NOTE.--The present 75mm. gun weighs in firing position, 3280 pounds.



ANIZATION)
401)

CAVALRY DIVISION

WAR DEPARTMENT,
Washington,

Units	2	3	4	5	6	7	8	9	10	11	12	13
		Special Troops										
	Division Headquarters and Headquarters Troop	Signal Troop	Ordnance Maintenance Company	3 Cavalry Brigades	1 Cavalry regiment (Mechanized)	1 Troop, Corps of Engineers (Motorized)	1 Motor Transport Company, Quartermaster	Total	Attached Medical	Attached Chaplain	Aggregate	Remarks
r General	1							1			1	
adier Generals				3				3			3	a. 4 General Staff, 1 Signal, 1 AG, 1 Inspector, 1 Quarter[illegible] 1 Ordnance, 1 JAG[illegible]
nels					1			1			1	
tenant Colonels	10a			3	1			14	1		15	
rs	5b			15	3			23	7		30	b. Assistants to G-1,-2,-3 & -4 AG, QM and JAG.
ains	6b	1	1	45	15	1	1	68	6	7	81	
tenants	6	2		99	28	3	1	139	8		147	
l commissioned	28	3	1	165	46	4	2	249	22	7	278	
er sergeants	1	1		3	1			6	1		7	
t sergeants	1	1	1	27	8	1	1	40			40	
nical sergeants	6	2	1					9	2		11	
f sergeants	6	2		15	3	3		29	7		36	
eants	7	6	5	273	32	9	6	338	15		353	
orals	4	8	5	324	62	12	4	419	12		431	
ates first class and privates	21	55	23	2466	416	81	33	3095	116		3211	
l enlisted	46	75	35	3108	522	106	44	3936	153		4089	
egate	24	78	36	3273	568	110	46	4185	177		4367	
es	56	34		3105				3195	-		3195	
s	8	8		396				412	24		436	
l[illegible]es, animal drawn									6			
[illegible]s, field, motor									6			
, [illegible]mored, command				3	4			7			7	
, armored, fighting				36	13			49			49	
, combat, command } Cavalry tanks					4			4			4	
, combat, fighting } Cavalry tanks					16			16			16	
, five passenger, light	5	1		21		4	1	32			32	
, seven passenger, medium	1							1			1	
iers, personnel					29			29			29	
s, wire		3		3				6			6	
s, combat					9			9			9	
rcycles, solo	3						1	4			4	
rcycles, with side car		5	2					7	5		12	
ks, cargo ¼-tpn		7	4				4	15			15	
ks, cargo 1½-ton	1	5		21		8	27	62	3		65	
ks, cargo, 3-ton			2					2			2	
ks, Ford					3			3			3	
ks, six-wheel					10			10			10	
ks, caterpillar					18			18			18	
ks, gas tank, 750							2	2			2	
ks, light repair			2					2			2	
ks, Small Arms repair			3					3			3	
llers, kitchen			1			1	1	3			3	
llers, water					-	1		1			1	
f-propelled mount, 75 mm How					6			6			6	
ks, kitchen	1			3	8			12	1		13	
ks, water-		1	1	3	8			13			13	
ks, radio				3	3			6			6	
ks, battery repair		1		1	1			3			3	
s, machine, caliber .30				63	117			180			180	
s, machine, caliber .50				12	40			52			52	
s, sub-machine				13				13			13	
s, machine anti-aircraft					32			32			32	
itzers, self propelled 75 mm					6			6			6	
itzers, 75 mm				12				12			12	
tols	74	78	36	3273	568	110	46	4185			4185	
les	11		33	1686		86	39	1855			1855	
ers	42			1683				1725			1725	

T/O 1

TABLES OF ORGANIZATION)
No. 1)

WAR DEPARTMENT,
Washington,

INFANTRY DIVISION

1	1	2	3	4	5	6	7	8	9	10	11	12
1	Units	Division Headquarters and Headquarters Company	Special Troops Signal, Ordnance & Service Cos.	3 Brigades	Engineers	Air Corps	Medical Regiment	Division Quartermaster Train	Cavalry Squadron and 1 Armored Car Platoon	Tank Battalion	Aggregate	Remarks
2	Major General	1									1	
3	Brigadier General			3							3	
4	Colonels	5									5	
6	Lieutenant Colonels	5		3	1		1				10	
7	Majors	3	1	18	2	1	5	1	1	1	33	
8	Captains	5	3	75	2	3	10	3	3	4	108	
9	Lieutenants	5	7	201	6	6	15	5	7	13	265	
10	Total commissioned	24	11	300	11	10	31	9	11	18	429	
11	Master Sergeants	1	2	6	2	1	1	1			14	
12	Technical and 1st Sergeants	6	5	54	7	3	6	5	2	4	92	
13	Staff sergeants	7	5	39	4	9	15	3	1	1	84	
14	Sergeants	7	11	489	14	4	32	14	15	12	598	
15	Corporals	6	15	600	14	2	20	15	29	27	728	
16	Privates and Privates first class	45	151	4899	125	62	301	226	197	150	6156	
17	Total enlisted	72	189	6087	166	81	375	264	244	194	7672	
18	Aggregate	95	200	6387	177	91	406	273	252	212	8093	
19	Machine guns, Caliber .30			126					22		148	
20	Machine guns, caliber .50			12					5		17	
21	Rifles		105	3354	102			132	173		3866	
22	Pistols	95	200	1527	75			91	252	212	2452	
23	Guns, 75 mm			24							24	
24	Howitzers, 75 mm			12								
25	Airplanes					9						
26	Cars, armored, command								1		1	
27	Cars, armored, fighting								4		4	
28	Trucks, cargo, 1½-ton			102	9	6	24	44	7	10	202	
29	Tanks, fighting, armed											
30	Ambulances, motor, field			18			12		1			
31	Car, five passenger, light								1			
32	Wagons, escort								4			
33	Horses								256			
34	Mules								16			