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INDIVIDUAL RESEARCH

THE COMMAND AND GENERAL STAFF SCHOOL

Map Problem No. 8 Series X

"Should the organization of the divisional infantry as shown in Tables of Organization dated June 30, 1930, be definitely adopted, and if not, what changes therein should be made?"

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THE COMMAND AND GENERAL STAFF SCHOOL
Fort Leavenworth, Kansas
1931-32

MEMORANDUM FOR: The Director, 2d Year Class, Command and General Staff School, Fort Leavenworth, Kansas.

SUBJECT: Should the organization of the divisional infantry as shown in Tables of Organization dated June 30, 1930, be definitely adopted, and if not, what changes therein should be made?

I. PAPERS ACCOMPANYING.

1. A bibliography for this study.

2. Inclosure 1: A file of correspondence regarding the infantry reorganization project. (For a detailed list of the papers contained therein, see the Table of Contents on pages i-iii of this inclosure).

3. Inclosure 2: Five tentative experimental tables of organization, issued by The War Department and dated July 20, 1929. (For a detailed list of these tables, see the list attached to this inclosure).

4. Inclosure 3: A series of photostatted tables and graphs of the data accumulated under the supervision of The Infantry Board in the conduct of the fire-power tests for the infantry reorganization project.

5. Inclosure 4: Appendix to Infantry Battalion Reorganization IB-320.2 (10-25-29), containing the tables and charts illustrating the initial report of The Infantry Board (pp. 88-106 of Inclosure 1).

II. THE STUDY PRESENTED. -- Do the changes in the war organization of the divisional infantry contained in Tables of Organization dated June 30, 1930, constitute improvements sufficient to warrant approval and final adoption of the resulting organization? If not, what changes in this organization should be made?

III. THE FACTS RELATING TO THE STUDY. --1.Prior to the tentative adoption and publication of the organization of the infantry division as given in Tables of Organization, 1930, published by The Command and General Staff School, Fort Leavenworth, Kansas, 1930,(1) the war organization of the infantry component of the infantry division was that shown in Tables of Organization, Infantry and Cavalry Divisions, The General Service Schools, Fort Leavenworth, Kansas, 1928, Revised July, 1928.(2) The 1930 Tables prescribed an infantry organization differing considerably from that prescribed in the 1928 Tables.(3) A condensed tabular statement of the essential differences is appended to this study, in which details of the 1928 organization are shown in violet ink in the columns headed I, and the details of the 1930 organization shown in red ink in the columns headed II.

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(1) (1: 4-5, 15-25)
(2) (2: 4-5, 16-26)
(3) (7: XXXV 314-315)

(12)

2. With a view to initiating studies leading to a change in the organization of the divisional infantry whereby primarily an increase in the infantry fire-power, and thus an improvement in the combat efficiency of the infantry division, could be secured, The Chief of Staff, General Summerall, held a meeting in his office on 20 July, 1929, which was attended by The Chief of Infantry, The Assistant Chief of Staff, G-3, The Deputy Chief of Staff, The Commandant of The Infantry School, The Commanding Officer, 29th Infantry, The Director of The Infantry Board, and several staff officers. (4). At this meeting he gave orally his directive for the initiation of the studies and experiments for determining what, if any, changes should be made in the organization of the infantry battalion. (5). He voiced certain views which he held personally regarding this matter, including an adherence to the square formation, the World War company, and the "substitution of bullets for men", but indicated that he desired the studies to be conducted in an open-minddd manner and that he would abide by whatever results these studies would develop. (6). The oral directive of The Chief of Staff was later supplemented by official instructions from The War Department. (7). The Infantry Board was designated as the agency to be directly in charge of the supervision and conduct of the tests, and was directed to submit a report thereof, with recommendations, by 1 December, 1929. (8).

3. Based upon the directive of The Chief of Staff, as amplified by the instructions issued from time to time by War Department authorities, The Infantry Board, assisted by the 29th Infantry and the Academic Department of The Infantry School, (9), devised and conducted at Fort Benning a series of tests and experiments intended to form a basis for determining what, if any, changes should be made in the organization of the infantry battalion, and for recommendations in accordance therewith. (10). As a starting point for consideration in the tests, two tentative organizations, proposed in accordance with the original directive, were suggested by The Chief of Infantry, (11), and tentative Tables of Organization were prepared in and supplied by The War Department. (12). Of the two organizations proposed, one contained two rifle and two machine gun companies, and the other four rifle and one machine gun companies. The details of these two systems are given in the accompanying papers.(13).

4. The tests and studies were to ignore problems of road space, and to be limited to a consideration of weapons already approved as standard. (14). They were to be directed primarily toward increasing the fire-power of the infantry battalion without a corresponding or porportional increase in the numerical strength in personnel.(15). Nevertheless, the caliber .50 machine gun, with an improvised motor mount was to be included, and a platoon of these weapons was placed in the battalion initially tested and recommended. (16). The combat trains were specified as animal-drawn, and the field trains as motorized. (17).

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(4) (Incl. 1: 4, 17, 19, 22)
(5) (Incl. 1: 17-25)
(6) (Incl. 1: 18, 21, 24)
(7) (Incl. 1: 26)
(8) (Incl. 1: 68. 7: XXXV 516)
(9) (Incl. 1: 4, 31, 108)
(10) (Incl.1 : 88)
(11) (Incl. 1: 1-3. 7: XXXV 315, 517)
(12) (Incl. 2: 1-5)
(13) (Incl. 1: 1-3. Incl. 3: 1-5)
(14) (Incl. 1: 20,42, 88. 7: XXXV 517, XXXVI 71, 293)
(15) (Incl. 1: 36)
(16) (Incl. 1: 88. Incl. 4: 9, 16-20. 7: XXXV 517, 637)
(17) (Incl.1 : 88)

5. During the summer and fall of 1929 The Infantry Board, in conjunction with the 29th Infantry and The Academic Department of The Infantry School, conducted a series of practical tests and theoretical studies. (18). The tests were grouped under two general heads: first, those designed to determine ratios between the rifle, Browning automatic rifle, and Browning caliber .30 machine gun, as regards comparative fire-power, and between several types of squads of arbitrarily assumed organization armed with these weapons; and second, those designed to afford a comparison of the combat power of several types of squads, platoons, companies, and battalions. (19). The first group of tests was conducted on the target range, with varying limitations as to ammunition supply, offensive and defensive assumptions, and firing times. They resulted in the conclusion that one automatic rifle was equal to two rifles in fire-power, and one machine gun equal to twenty rifles in fire-power. (20). The second group of tests, in reality a combination of practical experiments and theoretical studies, resulted in a tentative battalion organization including three rifle and two machine gun companies. (21). The details of this organization are shown in the initial report of The Infantry Board, and the essence thereof is tabulated in the condensed tabular statement of essential differences appended to this study. The report of the board contained the recommendation that the proposed organization be tested in the 29th Infantry for a year, and that further conclusions be then drawn as to the soundness of the system based on the results of the extended tests. (22).

6. The initial report of The Infantry Board, submitted on 2 November 1929, was transmitted to the War Department by The Chief Infantry with a later report covering his recommendations for changes in all infantry units. (23). Except for certain minor modifications and the changes produced by the new battalion, the Chief of Infantry advocated the retention of the organization then current for the higher infantry echelons. The War Department returned both reports to The Chief of Infantry for reconsideration, and later issued instructions for further tests and for recommendations for a divisional infantry organization based on the battalion finally selected, the final report thereon to be submitted by 31 March, 1930. (24).

7. Tests and studies to this end were devised and conducted at Fort Benning by The Infantry Board during the winter of 1929-30. (25). There was considerable dissatisfaction with the battalion organization originally recommended, and it was finally decided that this battalion was too heavy and unwieldy. Due to the limitations imposed upon the conduct of the tests by the lack of personnel, by inclement weather, and principally by the shortness of the time period allowed, a more or less hasty decision was made to withdraw from the battalion a considerable proportion of the team-served weapons and to pool these under the regimental commander. (26). The resulting organization for the entire divisional infantry was that finally published in the Tables of Organization of 1930. It was not originally contemplated that this organization, still tentative, would be taught in the Service Schools, but during the summer of 1930 instructions were issued to this effect.

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(18) (7: XXXVI 293)
(19) (Incl. 1: 88-101. Incl. 3: all charts & tables. Incl. 4: 1-6)
(20) (Incl. 1: 93, 97)
(21) (Incl. 1: 106. Incl. 4: 19-20)
(22) (Incl. 1: 106)
(23) (7: XXXVI 294. Incl. 1: 122-130)
(24) (7: XXXVI 649. Incl. 1: 128)
(25) (Incl. 1: 132)
(26) (7: XXXVI 649-50)

IV. OPINION OF THE AUTHOR:

1. Discussion. -- a. The divisional organization prescribed in the 1930 Tables was based upon the infantry organization recommended after the conclusion of the second phase of the tests and studies conducted at Fort Benning. (27) These tests and studies were not conducted to the point of exhausting all the available means and methods for accomplishing their purpose, but were limited by the too short time period within which they were to be completed. (28) The period of time was not allotted with a view to permitting the most exhaustive tests which might prove necessary, but apparently rather with a view to completing the project prior to the retirement of the then Chief of Staff. The tests were therefore hurried in some respects, and the extent and value of the results were thereby curtailed. They were not sufficiently exhaustive or conclusive.

b. The firing tests to determine the comparative fire-power of the rifle, automatic rifle, and machine gun, resulting in the ratios of 1 : 2 : 20 for these weapons, were based mainly on known distance firing on the A range, under more or less artificial conditions of target, terrain, weather, ammunition supply, and control. (29) It cannot truthfully be said that these factors affected all three weapons in the same manner and to the same degree; the ratios deduced from the tests, therefore, cannot be properly accepted as definitely characteristic of these weapons. It is true that an attempt to measure the relative fire-power of different weapons savors somewhat of the recent well-known endeavors to measure 10,000-ton cruisers in terms of submarines and battleships, and the prospects of success may seem likewise dimm and improbable. However, it is believed that any attempt, and any results attained thereby, will be more productive of data useful in the determination of a proper infantry organization than will be mere reliance upon the unsupported opinion of witnesses, especially if the latter be coupled with the former. The tests were therefore not without considerable value; their results should be weighed and tests further extended, in order that data may be obtained in which more confidence can be placed. But thus far they have not been sufficiently conclusive.

c. While it may be admitted that the rifle, automatic rifle, and machine gun are the basic infantry weapons and thus deserving of primary consideration in any tests designed to determine what the organization of the infantry should properly be, nevertheless decisions as to the appropriateness, in the infantry echelons, of other important weapons in any particular proportion, such as 37-mm guns, mortars, etc., cannot well be arbitrarily made. No attempt was made at Fort Benning, due partly to the lack of time, to assign, by test results, comparative fire-power values to other weapons. (30) The caliber .50 machine gun, included in the initial organizations to be tested, in contravention to the general policy of restricting tests to arms already adopted as standard, was, it is true, finally rejected as an organic part of the infantry battalion, but this rejection was mainly because of the clumsiness of the experimental mount improvised and the tendency of battalion commanders to neglect the weapon, largely through uncertainty as to its intended use and through inability to move the truck-mounted weapons over the particular type of restricted terrain on which many of the tests were conducted.

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(27) (1: 4-5, 15-25. 7: XXXVI 649, XXXVII 87-88)
(28) (Incl. 1: 68, 129)
(29) (Incl. 1: 89)
(30) (Incl. 1: 98. Incl. 4: 18)

d. It is unfortunate that at the time the tests were being conducted the terrain on the Fort Benning reservation, contrary to some published opinions,(31) had become rather close, through the growth and development of second-growth pine and underbrush. Moreover, important tests were conducted mainly during that period of the year in which the density of the foliage prevented observation over any considerable distances, observation which is essential to a proper use of machine guns and howitzer-company weapons. In order to supply sufficient data for the most conclusive deductions from field tests, such tests should be conducted over terrain as varied as possible and under conditions characteristic of all seasons of the year, rather than under one set of such conditions with theoretical inferences as to the others being made therefrom.

e. It will be observed that the tests and studies began with an assumption of a basic rifle unit, or squad, of eight men. (32) It does not seem that this assumption is justified. It appears that too easily do those who have grown used to the eight-man squad assume that such a strength for the basic cell is to be unquestioned. A study of infantry organization having as its purpose the improvement thereof should begin at the very bottom, with the individual, and then build up according to the principles of military organization as deduced from past experience and according to the results of exhaustive and comprehensive practical tests. Some brief attention was given, during the period of test, to rifle and automatic-rifle squads of less than eight men, but in general the tendency was to pass over the possibility of the smaller squad and to accept, because of lack of time, the eight-man squad as basic. There would seem to be some basis for suspecting that our eight-man squad is adhered to, if it was not originated, because of its suitability for our present system of close-order drill. If this is the case, the new system of drill, which is in fact independent of the standard strength of the squad, may give an opportunity for removing the cause of this suspicion. If the modern tendency toward wider dispersion of units within the zone of contact, and of the personnel of those units, which has, after all, been characteristic of the changes in deployed formations of front-line infantry throughout the development of increased fire-power, (33) if the mandate of the Chief of Staff to increase fire-power and to "substitute bullets for men,(34) and its corollary of less man-density for the same or greater fire-power density, if the limitations on the individual's capacity to control successfully a given area, a given number of men, and a given number of weapons and variety thereof, are all to be given proper consideration, it would seem that a smaller basic cell is in order. Certainly this matter should be given the most careful consideration before a decision is made as to the number of men that will be contained in the lowest echelon of organization, whether it be called the squad, half-squad, combat unit, basic cell, or what-not.

f. There was a decided lack of unanimity among the agencies concerned with recommending to the Chief of Staff the infantry organization to be tentatively adopted. This is evidenced by the opinions of the committees of the Academic Department of The Infantry School, whose comments and recommendations were solicited, by the minority report of the Infantry Board, by the lack of solidarity within the Board itself as evidenced by the consistent non-attendance of some members at the tests and the pertinent meetings thereon, and finally by the rejection by the Chief of Infantry of the higher infantry organization finally recommended by the Board. (35) This lack of unanimity in itself affords just cause for demurring over final approval of the 1930 Tables.

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(31) (7: XXXVI 70)
(32) (Incl. 1: 89-91)
(33) (See Appendix 1 of this study)
(34) (7: XXXVII 583-6)
(35) (Incl. 1: 53-67, 122-7. 7: XXXVII 133-142)

g. One of the major premises on which the tests were based was that only material approved as standard at the times of the tests would be considered in devising changes in the system of organization. The result was that practically no new material, i.e., post-war material, was considered. True, the marked development in military aviation could not but have an indirect effect. Improved ammunition for the caliber .30 weapons has also appeared since the World War. There have been, moreover, changes in the howitzer-company weapons and improvements in the machine-gun carriage and mount. But none of these, or of the other more minor developments which have also occurred, could justify a radical change from the organization recommended by the competent boards which met in the A.E.F. and in the United States shortly after the Armistice. (36) Any radical change in organization without there having been material and pertinent changes and developments in weapons could only be based upon changes in the conception of infantry tactics. Since there have been no such basic changes in the tactics of infantry units there does not seem to be justification for organizational changes unless new weapons and new means, such as transportation, either already on hand or apparently imminent, are considered as bases therefor. In fine, the need for a change in infantry organization may be admitted, but it should be a change based upon looking forward toward new weapons, new means of combat and logistics, and consequently upon new tactical methods, along the lines of greater individual fire-power, greater mobility, smaller groupings of individuals and greater dispersion thereof, and mechanization and motorization. The Fort Benning tests and the results thereof which led to the 1930 Tables were not sufficiently along these lines. (37)

h. Any series of studies purporting to lead to a determination of a proper system or scheme of military organization should take cognizance of the results of past experience, of the principles of organization as determined or evidenced thereby, and of hypotheses the worth of which would seem to justify careful study thereof. Among these should certainly be included those hereafter discussed.

i. The actual strength of units in men and material will constantly vary, prior to, during, and after combat, under the vicissitudes of mobilization and campaign. Whatever the paper strength of a given unit may be, as laid down in tables of organization, the actual strength will very seldom approach it, either from above or below. Losses from absence, casualties, and detachments will continually occur in constantly varying degree. Increments will be gained through replacements, attachments, and the natural assembly of men from that and other units during and after battle. It can thus be readily seen that table strength, at least in the field, is at best only an ideal to be striven for, a guide from which to make adaptations and compromises as the actual strength fluctuates, from unavoidable causes. The table strength should be the ideal, and not an ideal plus a factor of safety to compensate for probable, estimated losses, say up to the moment of initial combat or some equally arbitrary moment.

j. Men and materials have absolute physical limitations which can be approximated sufficiently for all practical purposes from experience and by actual test, and to which primary consideration should be given in allotting their proportions to a given unit. For example, men can march only so far and so fast in a given period of time; weapons have limitations as to range and rates of fire; roads and bridges are capable of bearing only a limited amount of traffic. But a practical test conducted only under one set of conditions or with limitations, imposed necessarily or not, which make the conditions unreal, will mislead rather

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(36) (4. 5.)
(37) (7: XXXVII 188)

than guide. This criticism is applicable to both the firing and field tests of the battalion and lower units above described.

k. The vulnerability of a given unit to hostile fire increases as the density of the individual members thereof in a given area of the combat zone increases. It is self-evident that the greater is the number of individuals crowded into a given area, the greater will be the number of casualties which will occur under given conditions of hostile fire. It is this fact which has forced the steadily increasing dispersion of individuals and groups thereof on the battlefield, and a consequent reduction in the numerical strength of the several units in various armies. An increased fire-power, through either increased accuracy or increased rate of fire, both forces (when it is the hostile fire-power that increases) and permits (when it is one's own that increases) greater dispersion of personnel on the battlefield. There results, from the need of presenting a less profitable target to the increased effectiveness of hostile fire, and from the ability to deliver fire of the same or greater effectiveness from a lesser number of sources, a decreasing density of personnel in the combat area. This phenomenon is illustrated graphically in the chart in Appendix 1 hereafter.

l. The difficulties of control increase with the increase of dispersion of individuals and units. The physical limitations imposed on direct means of communication between a commander and his subordinates make it more and more difficult for him to retain efficient control over them as the area over which they are dispersed increases. For example, in a 1911 firing line with one-yard intervals between men, or even with the current minimum interval of five yards, a corporal may control seven men. But as the five yards mentioned is a minimum (too often observed in practice as an average or maximum), and as the modern conception of group combat, with movement to close ranges covered not so much by the riflemen's fire as by the fire of supporting weapons, has supplanted the firing line idea, the members of a squad are more properly distributed over an area at least one dimension of which exceeds considerably the 35 yards commonly characteristic of an eight-man squad with five yards between men.

m. The difficulties of control are not restricted to those imposed by the area over which the control must be exercised. The average individual can effectively exercise direct control over only a specific number of immediate subordinates. This number should be susceptible of determination, if not practically, then at least theoretically from psychological experiment and data. An infantry organization in which the corporal ordinarily deals with seven subordinates, the section leader with three, the platoon leader with two, the company commander with three, the battalion commander with four or five, the regimental commander with three or four, and the brigade commander with two or three, does not seem to be in accord with this hypothesis. It is true that direct control of seven individuals representing indivisible units may not seem so complicated as control of two or three units which are divided and again subdivided; and yet the task for the leader of the seven men with their variety of weapons may be for him, with his comparatively limited capacity, far more complex than that of the brigade commander. An attempt at equalization, in accord with the capacities of the various leaders, should be made in any study of organization.

n. The mobility of a unit decreases as the weight of the equipment carried therein increases. This is true of the individual soldier or of the group of soldiers. The Benning tests were not, from the directive, to be concerned with questions of supply, column length, or other logistical considerations, although some attention had to be and was given to these subjects. The motorization of the regimental trains was largely a result of the reorganization studies. But we have long endured, and to a certain extent have ignored or winked at the paradox of requiring a 130-pound soldier carrying a dead load of more than one-third his weight to spring from the prone position and run at top speed and then throw himself again upon the ground. (38)

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(38) (10: pars. 12, 34)

It would seem that with the increase in the efficiency of transportation and supply, some material reduction, in the interests of mobility, could be made in the loads carried by the individual skirmisher and by the combat units.

o. Consistency in the number of subdivisions in each echelon of the military organization would seem to be desirable, unless sufficient cause can be shown for departing from a given number of sudivisions. The indubitable fact of the constantly changing numerical strength of a unit supports this contention. At present our regulations provide that a squad reduced below six individuals shall be broken up; a platoon reduced below four squads is employed as a unit in drill although subdivided into two groups in combat; a company is divided into three or two platoons as the number of squads varies. (39) There hardly seems to be sufficient justification for the varied provision of three squads in a section, two sections in a platoon, and three platoons in a company. In the higher units there may be more reason for departing from a standard number of subdivisions proper to all company units in common, since a new factor -- that of the team-served weapon such as the machine gun, infantry cannon, and mortar -- is introduced. But below the battalion the scheme of the tactical employment of infantry units is essentially the same for all subdivisions, the variations being only those in accord with the differences in the sizes of the units and the areas of their normal combat employment, since the armament is, at least at present, the same for all these subdivisions. In combat, where strength varies widely from day to day and even from hour to hour, and where leaders have frequent occasion through promotions and casualties to assume command of units other than those with which they entered the action, it would seem that better results could be secured by having one consistent system of organization wherein the application of tactical principles is not complicated by a varying subdivision of the several echelons. In fine, the organization should be built around the basic conception of providing a fixing force and a maneuvering force, the former being composed, especially in the higher echelons, of a source of supporting fire and a mobile element which can carry a definite forward-moving threat to prevent hostile movement from interfering with the action of the maneuvering force. Logical desire for the consistent initial provision of a suitable reserve indicates the wisdom of providing a third subdivision, and this course leads to the adoption of the so-called three-unit system of organization. The conception of the Chief of Staff as indicated in his conference on 20 July, 1929, (40) however, appears to have been based on the provision for an infantry unit divisible into two equal parts, in order that these two parts might rotate duty in the assault or front line. This is in accord with the opinions of the Superior Board on Organization and Tactics, A.E.F., which advocated four-squad platoons, four-platoon companies, and four-(rifle)-company battalions, on the hypothesis that the square organization, (that is, a unit divisible into two equal parts), is better suited for penetration as the form of attack which it postulated as commonly the lot of the infantry division and smaller units, and also of the so-called "Lewis Board". (41) These boards, however, departed from an otherwise consistent scheme by retaining the three-battalion regiment. General Pershing's indorsement on the Superior Board's report advocated the three-unit system throughout the division. (42) The lack of consistency in organization, without sufficient justification therefor, would seem to cause unnecessary difficulties in the face of the strength changes which unavoidably occur in the field.

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(39) (11: pars. 13, 23)
(40) (5: 17-25)
(41) (4: 18. 5: 21)
(42) (4: 8)

p. The integrity of units should be preserved as long as two or more subdivisions remain. This is more in accord with the British practice than with our own. The British regulations, for example, provide in the case of the squad that as long as three other ranks remain, the integrity of the squad shall be preserved. (43) In other words, as long as the leader has two men, or two parts to lead and manipulate, the grouping shall stand. This appears to be sound, and this principle should be considered in the remodeling of our own infantry organization.

q. A unit should contain organically those elements, and only those elements, which it requires for the usual or normal character of combat. This is a principle of acknowledged worth, and is voiced in the Superior Board's report in connection with the battalion, in the following words: "....there can be but one command exercised over the battalion, and this command must be exercised over all its weapons", (44) wherein the justification for including the machine gun in the battalion was sought. It may still remain a question as to whether the howitzer-company weapons should be made organic parts of the battalion, but there is no question but that it is the current policy of instruction in the service schools, as evidenced by the problems illustrative of the teachings, to attach almost invariably a pro rata share of the howitzer-company weapons to each battalion. From this alone it would seem to follow that these weapons should be included organically in the battalion.

2. Conclusions. -- a. The tests and experiments, conducted at Fort Benning in 1929 and 1930, were not sufficiently conclusive to warrant the adoption of the material changes in infantry organization based thereon, as contained in the 1930 Tables of Organization.

b. Improvement in the divisional infantry organization is both desirable and possible, and is warranted by the post-war developments in weapons, transportation, and other means of combat.

c. The organization of the divisional infantry should be modified so as to take advantage of the increase of fire-power possible from a given number of sources and so as to provide for greater mobility.

d. Consistency in the number of subdivisions should be the rule, except where due cause can be shown for a departure therefrom.

e. The integrity of units should be preserved as long as two or more subdivisions thereof exist.

f. The organization prescribed for a unit in the tables of organization should be the ideal for combat, instead of the ideal plus an arbitrary factor of safety.

g. A unit should contain organically all of those elements which it normally requires for combat, and no more.

h. The tendency should be toward smaller numerical strengths in all infantry echelons.

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(43) (8: 12)
(44) (4: 27)

V. RECOMMENDATIONS. --

1. It is recommended that the infantry organization tentatively prescribed in the 1930 Tables of Organization be disapproved.

2. It is recommended that further study and test be conducted, with a view to determining what changes and improvements shall be made in the organization of the divisional infantry.

3. It is recommended that the numerical strength of infantry units be reduced in view of the increase in fire-power; that the loads prescribed to be carried by individuals and units be decreased throughout, in view of the improvements in transportation and supply and in the interest of mobility; that a mobile reconnaissance and security force be provided within the infantry regiment; that changes contemplated in the war organization be based upon new material and upon consideration of the next war, especially the first few months thereof; and that the war organization be prescribed independently of the peacetime considerations of post accomodations, political aspects of the so-called civilian components, and the restrictions of appropriations.

4. It is recommended that consideration be given to a tentative system of infantry organization similar to that shown in the appended table (Appendix No. 2) in the columns in green, headed IV.

VI. CONCURRENCES. -- None required.

Charles L. Bolte

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Key: (1) (2: 4-5, 16-26) = Note 1: Text No. 2 (below), pages 4 to 5, both inclusive, and pages 16 to 26, both inclusive.

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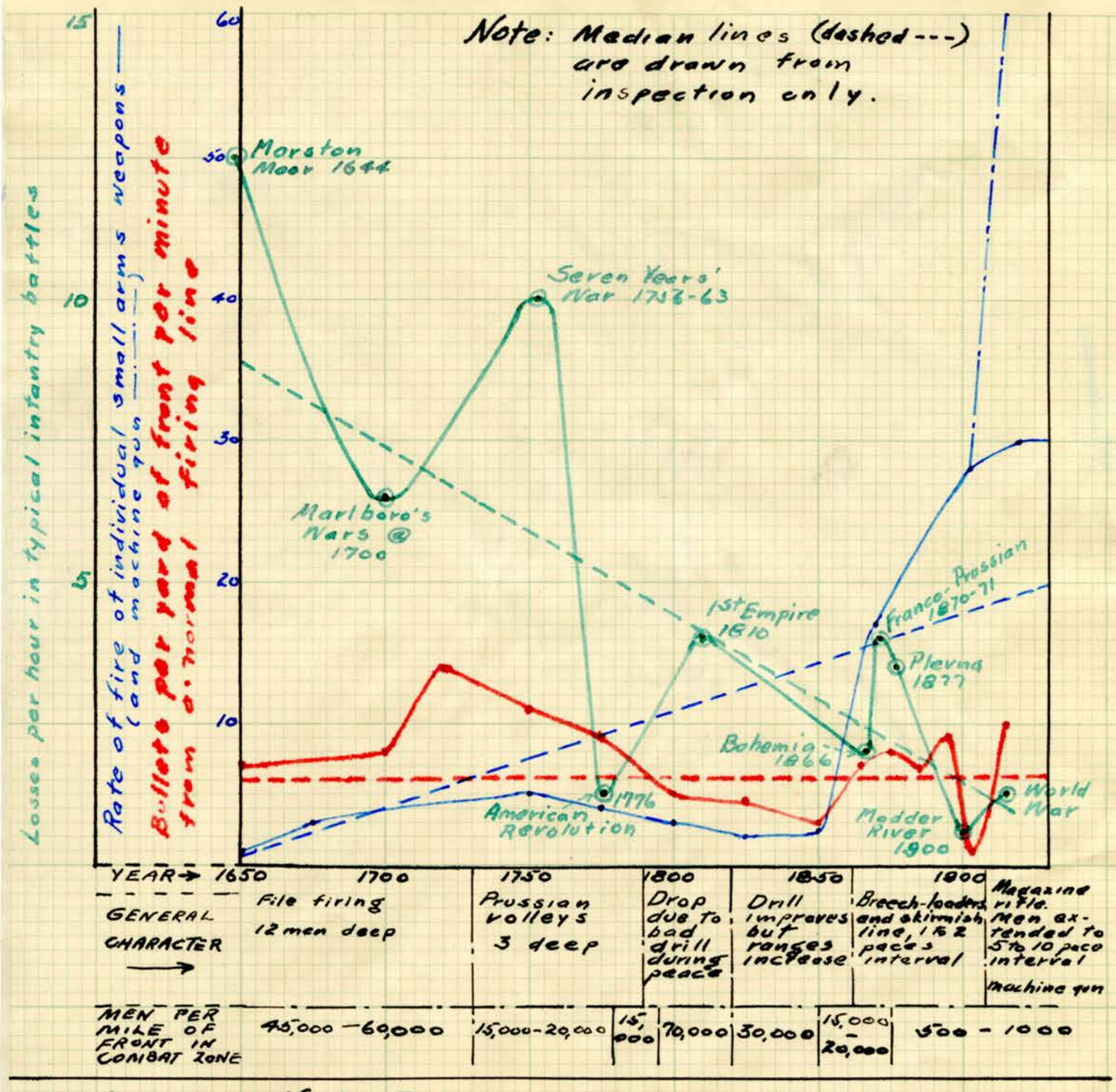
*NOTE: Statements in this study for which no reference is given are either considered to be self-evident or are based upon personal knowledge of the author, who was a member of the Infantry School Academic Department committee and participated in the tests and studies at Fort Benning in 1929 and 1930.

APPENDIX No. 1.



APPENDIX No. 1; FIRE-POWER DENSITY = MAN DENSITY CHART
Chas. L. Bolté. Capt. Inf. 1932.

NOTE: See explanation on next page (13)

EXPLANATION OF THE GRAPH IN APPENDIX No. 1.

This graph comprises three curves, together with approximate median or average lines for each curve. (45)

The green curve indicates the losses per hour in typical infantry battles at various periods in history.

The blue curve indicates the rate of fire for individual small arms weapons, with a divergent addition for the machine gun, at various periods in history.

The red curve indicates approximately the number of bullets per yard of front per minute from a normal firing line at various periods of history.

In order to show more clearly the ultimate decrease in the green curve, the ultimate increase in the blue curve, and the approximate stability of the red curve, the median lines have been drawn.

The losses are an index of the density of men in the combat area; the rate of fire an index of the fire-power of weapons; and the number of projectiles per yard of front per minute an index of the increase of dispersion of individuals as the fire-power has increased.

The purpose of this chart is to support the argument for smaller, more widely dispersed infantry groupings in combat, and hence for smaller numerical strengths in all infantry echelons.

It will be observed that the density of men in the combat area has generally decreased as the fire-power of their weapons has increased. The result has been the approximate stability of the density of fire in and from the combat area, so far as the curves are concerned. Actually, however, it is the increase in fire-power which has both forced and permitted a greater dispersion of men and a consequent decrease in the man-density.

It follows that with the even greater fire-power now possible and forecast for the future by the increase in automatic arms there must and will be an even greater dispersion of men and groups, a "substitution of bullets for men", and there should be therefore a decrease in the size of infantry units.

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(45) (12: Diagram A facing p. 160. 9: 1-16. 13: 77, 80, 90, 128, 130, 132-3, 150, 152, 153, 162, 167, 168, 172, 186-190, 240 table. 14: I 18-96, 477-663; V 227-298.)

EXPLANATION OF COMPARATIVE TABLE

This table shows, for four different schemes of infantry organization, the essential differences in personnel, weapons, and subdivisions contained in the various echelons from the squad to the divisional infantry as a whole, both inclusive. (46)

The four systems illustrated are:

I. The 1928 Tables of Organization (in violet)
II. The 1930 Tables of Organization (in red)
III. The initial report of The Infantry Board (see pp. 88-106, Incl.1) (in brown)
IV. The recommendations of this study (in green)

Listed in the left hand column are the various echelons of organization; opposite these, under the appropriate column heading and in the color indicated, are shown the number of total personnel, basic weapons, and subdivisions of the various types.

For example, the rifle squad in 1928 contained 8 men, with 7 rifles and 1 automatic rifle; in 1930, 8 men, with 6 rifles and 2 automatic rifles; in the initial report of The Infantry Board, 8 men, with 6 rifles and 2 automatic rifles; and in the recommendation of this study, 6 men with the new semi-automatic shoulder rifle.

Again, in the 1928 and 1930 organizations the divisional infantry comprised 2 brigades; in the initial report of The Infantry Board, and in the recommendations of this study, only 1 brigade of three regiments.

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(46) (1: 4-5, 15-25. 2: 4-5, 16-26. Incl. 1: 88-106. Incl. 4: 12-13, 15, 17-20)

Tables of Organization (I, II)

Weapons

UNITS	Total Personnel I	Total Personnel II	Rifles I	Rifles II	Automatic Rifles I	Automatic Rifles II	Pistols I	Pistols II	Machine Guns cal. .30 I	Machine Guns cal. .30 II	37 mm Cannon I	37 mm Cannon II	Infantry Mortars I	Infantry Mortars II
Squads, rifle	8	8	7	6	1	2	–	–	–	–	–	–	–	–
Squads, m.g. cal. 30	11	11	–	–	–	–	11	11	1	1	–	–	–	–
Squads, 37 mm gun.	8	8	–	–	–	–	8	8	–	–	1	1	–	–
Squads, mortar	7	11	–	–	–	–	7	11	–	–	–	–	1	1
Sections, rifle	26	26	23	20	3	6	–	–	–	–	–	–	–	–
Sections, m.g. cal .30	23	23	–	–	–	–	23	23	2	2	–	–	–	–
Sections, 37 mm gun.	–	17	–	–	–	–	–	17	–	–	–	2	–	–
Sections, mortar	–	23	–	–	–	–	–	23	–	–	–	–	–	2
Platoons, rifle	58	58	50	44	6	12	2	2	–	–	–	–	–	–
Platoons, m.g. cal. 30	54	54	5	5	–	–	49	49	4	4	–	–	–	–
Platoons, how. or cann.	30	57	2	3	–	–	28	54	–	–	1	2	1	2
Companies, rifle	198	198	162	144	18	36	18	18	–	–	–	–	–	–
Companies, m.g. cal. 30	188	243	26	31	–	–	162	212	12	16	–	–	–	–
Companies, how. or cann.	113	256	14	24	–	–	99	232	–	–	3	8	3	8
Battalions	852	899	546	487	54	108	252	304	12	16	–	–	–	–
Regiments	3106	3698	1860	1751	162	324	987	1502	36	64	3	8	3	8
Brigades	6310	7500	3754	3539	324	648	2033	3071	72	128	6	16	6	16
Total divisional infantry	12620	15000	7518	7078	648	1296	4066	6142	144	256	12	32	12	32

Squads

UNITS	Rifle I	Rifle II	Automatic Rifle or Light M.G.[e] I	II	Mach. Gun cal. .30 I	II	37 mm Cannon I	II	Infantry Mortar I	II
Squads, rifle	1	1	–	–	–	–	–	–	–	–
Squads, m.g. cal. 30	–	–	–	–	1	1	–	–	–	–
Squads, 37 mm gun.	–	–	–	–	–	–	1	1	–	–
Squads, mortar	–	–	–	–	–	–	–	–	1	1
Sections, rifle	3	3	–	–	–	–	–	–	–	–
Sections, m.g. cal .30	–	–	–	–	2	2	–	–	–	–
Sections, 37 mm gun.	–	–	–	–	–	–	–	2	–	–
Sections, mortar	–	–	–	–	–	–	–	–	–	2
Platoons, rifle	6	6	–	–	–	–	–	–	–	–
Platoons, m.g. cal. 30	–	–	–	–	4	4	–	–	–	–
Platoons, how. or cann.	–	–	–	–	–	–	1	2	1	2
Companies, rifle	18	18	–	–	–	–	–	–	–	–
Companies, m.g. cal. 30	–	–	–	–	12	16	–	–	–	–
Companies, how. or cann.	–	–	–	–	–	–	3	8	3	8
Battalions	54	54	–	–	12	16	–	–	–	–
Regiments	162	162	–	–	36	64	3	8	3	8
Brigades	324	324	–	–	72	128	6	16	6	16
Total divisional infantry	648	648	–	–	144	256	12	32	12	32

Sections

UNITS	Rifle I	Rifle II	Auto-rifle or Light m.g.[e] I	II	Mach. Gun Cal .30 I	II	37mm Cannon I	II	Infantry Mortar I	II
Squads, rifle										
Squads, m.g. cal. 30										
Squads, 37 mm gun.										
Squads, mortar										
Sections, rifle	1	1	–	–	–	–	–	–	–	–
Sections, m.g. cal .30	–	–	–	–	1	1	–	–	–	–
Sections, 37 mm gun.	–	–	–	–	–	–	–	1	–	–
Sections, mortar	–	–	–	–	–	–	–	–	–	1
Platoons, rifle	2	2	–	–	–	–	–	–	–	–
Platoons, m.g. cal. 30	–	–	–	–	2	2	–	–	–	–
Platoons, how. or cann.	–	–	–	–	–	–	–	1	–	1
Companies, rifle	6	6	–	–	–	–	–	–	–	–
Companies, m.g. cal. 30	–	–	–	–	6	8	–	–	–	–
Companies, how. or cann.	–	–	–	–	–	–	–	4	–	4
Battalions	18	18	–	–	6	8	–	–	–	–
Regiments	54	54	–	–	18	32	–	4	–	4
Brigades	108	108	–	–	36	64	–	8	–	8
Total divisional infantry	216	216	–	–	72	128	–	16	–	16

Platoons, Companies, Bns., Regts., Brigs.

UNITS	Platoons Rifle I	II	Platoons Mach. Gun cal. .30 I	II	Platoons Howitzer or Cannon I	II	Companies Rifle I	II	Companies Mach. Gun cal .30 I	II	Companies Howitzer or cannon I	II	Bns. I	II	Regts. I	II	Brigs I	II
Sections (all)																		
Platoons, rifle	1	1	–	–	–	–												
Platoons, m.g. cal. 30	–	–	1	1	–	–												
Platoons, how. or cann.	–	–	–	–	1	1												
Companies, rifle	3	3	–	–	–	–	1	1	–	–	–							
Companies, m.g. cal. 30	–	–	3	4	–	–	–	–	1	1	–							
Companies, how. or cann.	–	–	–	–	3	4	–	–	–	–	1	1						
Battalions	9	9	3	4	–	–	3	3	1	1	–	–	1	1				
Regiments	27	27	9	16	3	4	9	9	3	4	1	1	3	3	1	1		
Brigades	54	54	18	32	6	8	18	18	6	8	2	2	6	6	2	2	1	1
Total divisional infantry	108	108	36	64	12	16	36	36	12	16	4	4	12	12	4	4	2	2

Recommended by (III, IV)

Weapons

UNITS	Total Personnel III	Total Personnel IV	Rifles III	Rifles IV	Automatic Rifles III	Automatic Rifles IV	Pistols III	Pistols IV	Machine Guns cal. .30 III	Machine Guns cal. .30 IV	37 mm Cannon III	37 mm Cannon IV	Infantry Mortars III	Infantry Mortars IV
Squads, rifle	8	6	6	6[d]	2	–	–	–	–	–	–	–	–	–
Squads, AR. or. lt. m.g.	–	6	–	–	–	2	–	6	–	–	–	–	–	–
Squads, M.G.	11	8	–	–	–	–	11	8	1	1	–	–	–	–
Squads. 37 mm gun	8	8	–	–	–	–	8	8	–	–	1	1	–	–
Squads, mortar	11	8	–	–	–	–	11	8	–	–	–	–	1	1
Sections, rifle	26	14	20	14[d]	6	–	–	–	–	–	–	–	–	–
Sections, AR. or lt. m.g.	–	14	–	–	–	4	–	14	–	–	–	–	–	–
Sections, M.G.	23	18	–	–	–	–	23	18	2	2	–	–	–	–
Sections, 37 mm gun	20	18	–	–	–	–	20	18	–	–	2	2	–	–
Sections, mortar.	26	18	–	–	–	–	26	18	–	–	–	–	2	2
Platoons, rifle	58	48	44	32[d]	12	4	2	16	–	–	–	–	–	–
Platoons M.G.	54	48	5	5[d]	–	–	49	43	4	4	–	–	–	–
Platoons, how. or Cann.	79	48	1	3[d]	–	–	78	45	–		2	2	2	2
Companies, rifle	198	168	144	108[d]	36	12	18	60	–	–	–	–	–	–
Companies, M.G.	188	168	26	26[d]	–	–	162	142	12	12	–	–	–	–
Companies, how. or Cann.	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Battalions	1178	770	530	370[d]	108	36	540	400	12[a]	12	2	2	2	2
Regiments	4084	2710	1870	1310[d]	324	108	1890	1400	36[b]	36	6	6	6	6
Brigades	12252	9000	5660	4330[d]	972	324	5620	4570	108[c]	108	18	18	18	18
Total Divisional Infantry	12252	9000	5660	4330[d]	972	324	5620	4570	108[c]	108	18	18	18	18

Squads

UNITS	Rifle III	Rifle IV	Automatic Rifle or Light M.G.[e] III	IV	Mach. Gun cal. .30 III	IV	37 mm Cannon III	IV	Infantry Mortar III	IV
Squads, rifle	1	1	–	–	–	–	–	–	–	–
Squads, AR. or. lt. m.g.	–	–	–	1	–	–	–	–	–	–
Squads, M.G.	–	–	–	–	1	1	–	–	–	–
Squads. 37 mm gun	–	–	–	–	–	–	1	1	–	–
Squads, mortar	–	–	–	–	–	–	–	–	1	1
Sections, rifle	3	2	–	–	–	–	–	–	–	–
Sections, AR. or lt. m.g.	–	–	–	2	–	–	–	–	–	–
Sections, M.G.	–	–	–	–	2	2	–	–	–	–
Sections, 37 mm gun	–	–	–	–	–	–	2	2	–	–
Sections, mortar.	–	–	–	–	–	–	–	–	2	2
Platoons, rifle	6	4	–	2	–	–	–	–	–	–
Platoons M.G.	–	–	–	–	4	4	–	–	–	–
Platoons, how. or Cann.	–	–	–	–	–	–	2	2	2	2
Companies, rifle	18	12	–	6	–	–	–	–	–	–
Companies, M.G.	–	–	–	–	12	12	–	–	–	–
Companies, how. or Cann.	–	–	–	–	–	–	–	–	–	–
Battalions	54	36	–	18	28*	12	2	2	2	2
Regiments	162	108	–	54	84*	36	6	6	6	6
Brigades	486	324	–	162	252*	108	18	18	18	18
Total Divisional Infantry	486	324	–	162	252*	108	18	18	18	18

Sections

UNITS	Rifle III	Rifle IV	Auto-rifle or Light m.g.[e] III	IV	Mach. Gun Cal .30 III	IV	37mm Cannon III	IV	Infantry Mortar III	IV
Squads (all)										
Sections, rifle	1	1	–	–	–	–	–	–	–	–
Sections, AR. or lt. m.g.	–	–	–	1	–	–	–	–	–	–
Sections, M.G.	–	–	–	–	1	1	–	–	–	–
Sections, 37 mm gun	–	–	–	–	–	–	1	1	–	–
Sections, mortar.	–	–	–	–	–	–	–	–	1	1
Platoons, rifle	2	2	–	1	–	–	–	–	–	–
Platoons M.G.	–	–	–	–	2	2	–	–	–	–
Platoons, how. or Cann.	–	–	–	–	–	–	1	1	1	1
Companies, rifle	6	6	–	3	–	–	–	–	–	–
Companies, M.G.	–	–	–	–	6	6	–	–	–	–
Companies, how. or Cann.	–	–	–	–	–	–	–	–	–	–
Battalions	18	18	–	9	14*	6	1	1	1	1
Regiments	54	54	–	27	42*	18	3	3	3	3
Brigades	162	162	–	54	126*	54	9	9	9	9
Total Divisional Infantry	162	162	–	54	126*	54	9	9	9	9

Platoons, Companies, Bns., Regts., Brigs.

UNITS	Platoons Rifle III	IV	Platoons Mach. Gun cal. .30 III	IV	Platoons Howitzer or Cannon III	IV	Companies Rifle III	IV	Companies Mach. Gun cal .30 III	IV	Companies Howitzer or cannon III	IV	Bns. III	IV	Regts. III	IV	Brigs III	IV
Sections (all)																		
Platoons, rifle	1	1	–	–	–	–												
Platoons M.G.	–	–	1	1	–	–												
Platoons, how. or Cann.	–	–	–	–	1	1												
Companies, rifle	3	3	–	–	–	–	1	1	–	–	–	–						
Companies, M.G.	–	–	3	3	–	–	–	–	1	1	–	–						
Companies, how. or Cann.	–	–	–	–	–	–	–	–	–	–	–	–						
Battalions	9	9	7*	3	1	1	3	3	2	1	–	–	1	1				
Regiments	27	27	21*	9	3	3	9	9	6	3	–	–	3	3	1	1		
Brigades	81	81	63*	27	9	9	27	27	18	9	–	–	9	9	3	3	1	1
Total Divisional Infantry	81	81	63*	27	9	9	27	27	18	9	–	–	9	9	3	3	1	1

Notes:
- a Add 4 cal. .50 m.g.s
- b Add 12 cal. .50 m.g.s
- c Add 36 cal. .50 m.g.s.
- * 1/7 of these are cal. .50.

d Semi automatic shoulder rifle

e. Auto-rifle with bipod mount.

I: Tables of Organization, 1928.

II: Tables of Organization, 1930.

III: Initial Report of The Infantry Board (see pp 88-106, Incl. No 1)

IV: Recommended by this study.

COMPARATIVE TABLE
of Essential Differences
in various organizations of
INFANTRY UNITS

(see explanation on preceding page)

C. & G.S.S.
MP 8-X
1932
Chas. L. Bolte
Capt. Inf.

Papers Accompanying

SOLUTION

of

Charles L. Bolte
Captain, Infantry

to

MP 8 - X

Inclosure No. 2

TENTATIVE EXPERIMENTAL
TABLES OF ORGANIZATION (TE)
War Department, July 20, 1929

	Table
Headquarters and Headquarters Company Infantry Battalion	1
Infantry Battalion	2
Battalion, Infantry Regiment	3
Rifle Company, Infantry Regiment	4
Rifle Company, Infantry Regiment	5