

ARMY MENTAL TESTS

METHODS, TYPICAL RESULTS
AND
PRACTICAL APPLICATIONS

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The following is a brief account of the methods of measuring intelligence especially prepared for use in the U. S. Army, of typical results which have been secured, and of some of their immediately practical applications. This account has been prepared for the assistance of army examiners and for the information of all who are interested in the relations of scientific placement to military efficiency.

Purpose of the Intelligence Tests: Under the direction of the Division of Psychology, Medical Department, and in accordance with provisions of War Department, General Order No. 74, mental tests are given recruits during the two-week detention period. These tests provide an immediate and reasonably dependable classification of the men according to general intelligence. Their specific purposes are to aid:—

- (1) In the discovery of men whose superior intelligence suggests their consideration for advancement;
- (2) In the prompt selection and assignment to Development Battalions of men who are so inferior mentally that they are suited only for selected assignments;
- (3) In forming organizations of uniform mental strength where such uniformity is desired;
- (4) In forming organizations of superior mental strength where such superiority is demanded by the nature of the work to be performed;
- (5) In selecting suitable men for various army duties or for special training in colleges or technical schools;
- (6) In the early formation of training groups within regiment or battery in order that each man may receive instruction and drill according to his ability to profit thereby;
- (7) In the early recognition of the mentally slow as contrasted with the stubborn or disobedient;
- (8) In the discovery of men whose low grade intelligence renders them either a burden or a menace to the service.

Nature of Tests: The tests were prepared by a committee of the American Psychological Association and of the National Research Council. Before being ordered into general use they were thoroughly tried out in four National Army Cantonments. From time to time they have been revised to increase their practical usefulness. Up to November 1, 1918, approximately one million five hundred thousand men had been tested.

Three systems of test are now in use:—

(1) **Alpha.** This is a group test for men who read and write English. It requires only fifty minutes, and can be given to groups as large as 500. The test material is so arranged that each of its 212 questions may be answered without writing, merely by underlining, crossing out or checking. The papers are later scored by means of stencils, so that nothing is left to the personal judgment of those who do the scoring. The mental rating which results is therefore wholly objective.

(2) **Beta.** This is a group test for foreigners and illiterates. It may be given to groups of from 75 to 300 and requires approximately fifty minutes. Success in Beta does not depend upon knowledge of English, as the instructions are given entirely by pantomime and demonstration. Like Alpha, it measures general intelligence, but does so through the use of concrete or picture material instead of by the use of printed language. It is also scored by stencils and yields an objective rating.

(3) **Individual Tests.** Three forms of individual test are used: The Yerkes-Bridges Point Scale, the Stanford-Binet Scale, and the Performance Scale. An individual test requires from fifteen to fifty minutes. The instructions for the Performance Scale are given by means of gestures and demonstrations, and a high score may be earned in it by an intelligent recruit who does not know a word of English.

All enlisted men are given either Alpha or Beta according to their degree of literacy. Those who fail in Alpha are given Beta, and those who fail to pass in Beta are given an individual test.

As a result of the tests, each man is rated as A, B, C+, C, C—, D, D— or E. The letter ratings are reported to the Interviewing Section of the Personnel Office, and are there copied on the Qualification Cards (in the square marked Intelligence). The Psychological Report, after the grades have been copied on the Qualification Cards, is forwarded from the Interviewing Section to the Mustering Section of the Personnel Office, where each soldier's letter rating is copied on the second page of his Service Record. A copy of the Psychological Report is also sent by the Psychological Examiner to the Company Commander, who uses it in the organization of his company. In some camps the entering of Intelligence Grades on Service Records has been left to Company Commanders, but accuracy and uniformity is secured by having these grades entered in the Mustering Section of the Personnel Office when the Service Records are being started.

The psychological staff in a camp is ordinarily able to test 2,000 men per day and to report the ratings to the Personnel Office within 24 hours. Personnel Adjutants coöperate in arranging the schedule of psychological examinations so as to secure from them maximum value.

Explanation of Letter Ratings. The rating a man earns furnishes a fairly reliable index of his ability to learn, to think quickly and accurately, to analyze a situation, to maintain a state of mental alertness, and to comprehend and follow instructions. The score is little influenced by schooling. Some of the highest records have been made by men who had not completed the eighth grade. The meaning of the letter ratings is as follows:

A. Very Superior Intelligence. This grade is ordinarily earned by only four or five per cent of a draft quota. The "A" group is composed of men of marked intellectuality. "A" men are of high officer type when they are also endowed with leadership and other necessary qualities.

B. Superior Intelligence. "B" intelligence is superior, but less exceptional than that represented by "A." The rating "B" is obtained by eight to ten soldiers out of a hundred. The group contains many men of the commissioned officer type and a large amount of non-commissioned officer material.

C+. High Average Intelligence. This group includes about fifteen to eighteen per cent of all soldiers and contains a large amount of non-commissioned officer material with occasionally a man whose leadership and power to command fit him for commissioned rank.

C. Average Intelligence. Includes about twenty-five per cent of soldiers. Excellent private type with a certain amount of fair non-commissioned officer material.

C—. Low Average Intelligence. Includes about twenty per cent. While below average in intelligence, "C—" men are usually good privates and satisfactory in work of routine nature.

D. Inferior Intelligence. Includes about fifteen per cent of soldiers. "D" men are likely to be fair soldiers, but are usually slow in learning and rarely go above the rank of private. They are short on initiative and so require more than the usual amount of supervision. Many of them are illiterate or foreign.

D— and E. Very Inferior Intelligence. This group is divided into two classes (1) "D—" men, who are very inferior in intelligence but are considered fit for regular service; and (2) "E" men, those whose mental inferiority justifies their recommendation for Development Battalion, special service organization, rejection, or discharge. The majority of "D—" and "E" men are below ten years in "mental age."

The immense contrast between "A" and "D—" intelligence is shown by the fact that men of "A" intelligence have the ability to make a superior record in college or university, while "D—" men are of such inferior mentality that they are rarely able to go beyond the third or fourth grade of the elementary school, however long they attend. In fact, most "D—" and "E" men are below the "mental age" of 10 years and at best are on the border-line of mental deficiency. Many of them are of the moron grade of feeble-mindedness. "B"

intelligence is capable of making an average record in college, "C+" intelligence can not do so well, while mentality of the "C" grade is rarely capable of finishing a high school course.

Directions for the Use of Intelligence Ratings. In using the intelligence ratings the following points should be borne in mind:

1. The mental tests are not intended to replace other methods of judging a man's value to the service. It would be a mistake to assume that they tell us infallibly what kind of soldier a man will make. They merely help to do this by measuring one important element in a soldier's equipment, namely, intelligence. They do not measure loyalty, bravery, power to command, or the emotional traits that make a man "carry on." However, in the long run these qualities are far more likely to be found in men of superior intelligence than in men who are intellectually inferior. Intelligence is perhaps the most important single factor in soldier efficiency, apart from physical fitness.

2. Commissioned officer material is found chiefly in the A and B groups, although of course not all high score men have the other qualifications necessary for officers. Men below C+ should not be accepted as students in Officers' Training Schools unless they possess exceptional power of leadership and ability to command.

3. Since more than one-fourth of enlisted men rate as high as C+, there is rarely justification for going below this grade in choosing non-commissioned officers. This is especially the case in view of the likelihood of promotion from non-commissioned to commissioned rank. Even apart from considerations of promotion, it is desirable to avoid the appointment of mentally inferior men (below C) as non-commissioned officers. Several careful studies have shown that "C—" and "D" sergeants and corporals are extremely likely to be found unsatisfactory. The fact that a few make good does not justify the risk taken in their appointment.

4. Men below C+ are rarely equal to complicated paper work.

5. In selecting men for tasks of special responsibility the preference should be given to those of highest intelligence rating who also have the other necessary qualifications. If they make good they should be kept on the work or promoted; if they fail they should be replaced by men next on the list.

To aid in selecting men for occupational assignment, extensive data have been gathered on the range of intelligence scores found in various occupations. This material has been placed in the hands of the Personnel Officers for use in making assignments. It is suggested that those men who have an intelligence rating above the average in an occupation should be the first to be assigned to meet requirements in that occupation. After that, men with lower ratings should be considered.

6. In making assignments from the Depot Brigade to permanent organizations it is important to give each unit its proportion of su-

perior, average and inferior men. If this matter is left to chance there will inevitably be "weak links" in the army chain.

Exception to this rule should be made in favor of certain arms of the service which require more than the ordinary number of mentally superior men; e. g., Signal Corps, Machine Gun, Field Artillery and Engineers. These organizations ordinarily have about twice the usual proportion of "A" and "B" men and very much less than the usual proportion of "D" and "D—" men.

The first two columns in the following table illustrate the distribution of intelligence ratings typical of infantry regiments and also the extreme differences in the mental strength of organizations which are built up without regard to intelligence ratings. The last column to the right shows a balanced distribution of intellectual strength which might have been made to each of these two regiments.

Intelligence Rating	Interpretation	Two Actual Distributions		Balanced Distribution
		1st Regt.	2d Regt.	
A	Very Superior	1.0%	6.0%	3.5%
B	Superior	3.0	12.0	7.5
C+	High Average	7.0	20.0	13.5
C	Average	15.0	28.0	21.5
C—	Low Average	25.0	19.0	22.0
D	Inferior	31.0	13.0	22.0
D—	Very Inferior	18.0	2.0	10.0

Unless intelligence is wisely distributed certain regiments and companies will take training much more slowly than others and thus delay the program of the whole organization.

7. "D" and "D—" men are rarely suited for tasks which require special skill, resourcefulness or sustained alertness. It is also unsafe to expect "D," "D—" or "E" men to read or understand written directions.

8. Only high-score men should be selected for tasks which require quick learning or rapid adjustments.

9. It should not be supposed that men who receive the same mental rating are necessarily of equal military worth. **A man's value to the service should not be judged by his intelligence alone.**

10. The intelligence rating is one of the most important aids in the rapid sorting of the masses of men in the Depot Brigade. In no previous war has so much depended on the prompt and complete utilization of the mental ability of the individual soldier. It is important, therefore, that the psychological ratings be regularly used as an aid in the selection, assignment, and classification of men.

Evidence That the Tests Measure Military Value. It has been thoroughly demonstrated that the intelligence ratings are useful in indicating a man's probable value to the service. The data on this matter presented in the following pages are typical:

--- ENLISTED MEN (13792) - RELATIVELY ILLITERATE
 — ENLISTED MEN (82936) - LITERATE
 CORPORALS (4023)
 — SERGEANTS (3393)
 O.T.C. (9240)
 — OFFICERS (8819)

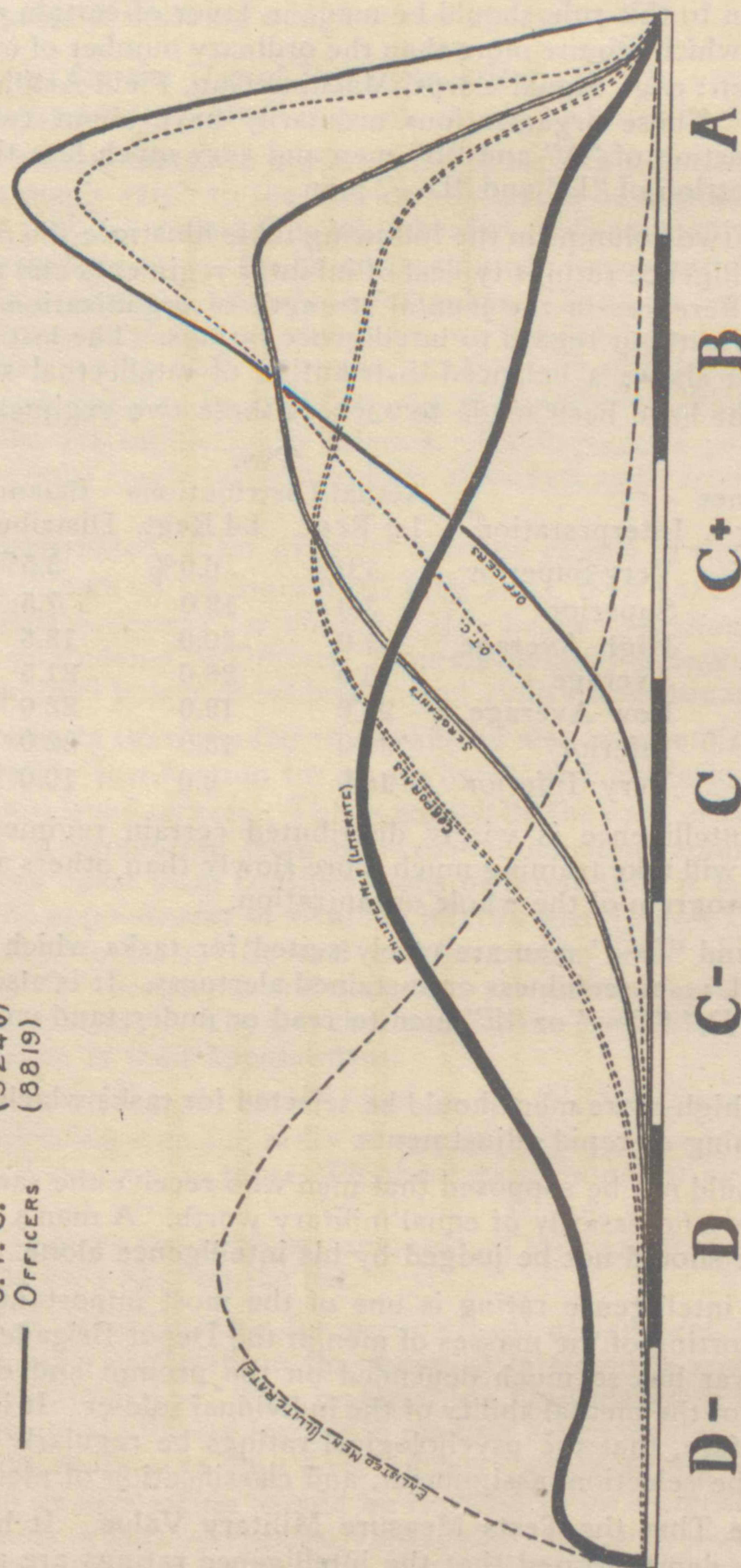


Figure 1. The distribution of intelligence ratings in typical army groups, showing the value of the tests in the identification of officer material. The illiterate group given Beta; other groups Alpha.

The psychological ratings have proved valuable not so much because they make a better classification than would come about in the course of time through natural selection but chiefly because they greatly abbreviate this process by indicating immediately the groups in which suitable officer material will be found, and at the same time those men whose mental inferiority warrants their elimination from regular units in order to prevent the retardation of training. Speed counts in a war that costs fifty million dollars per day.

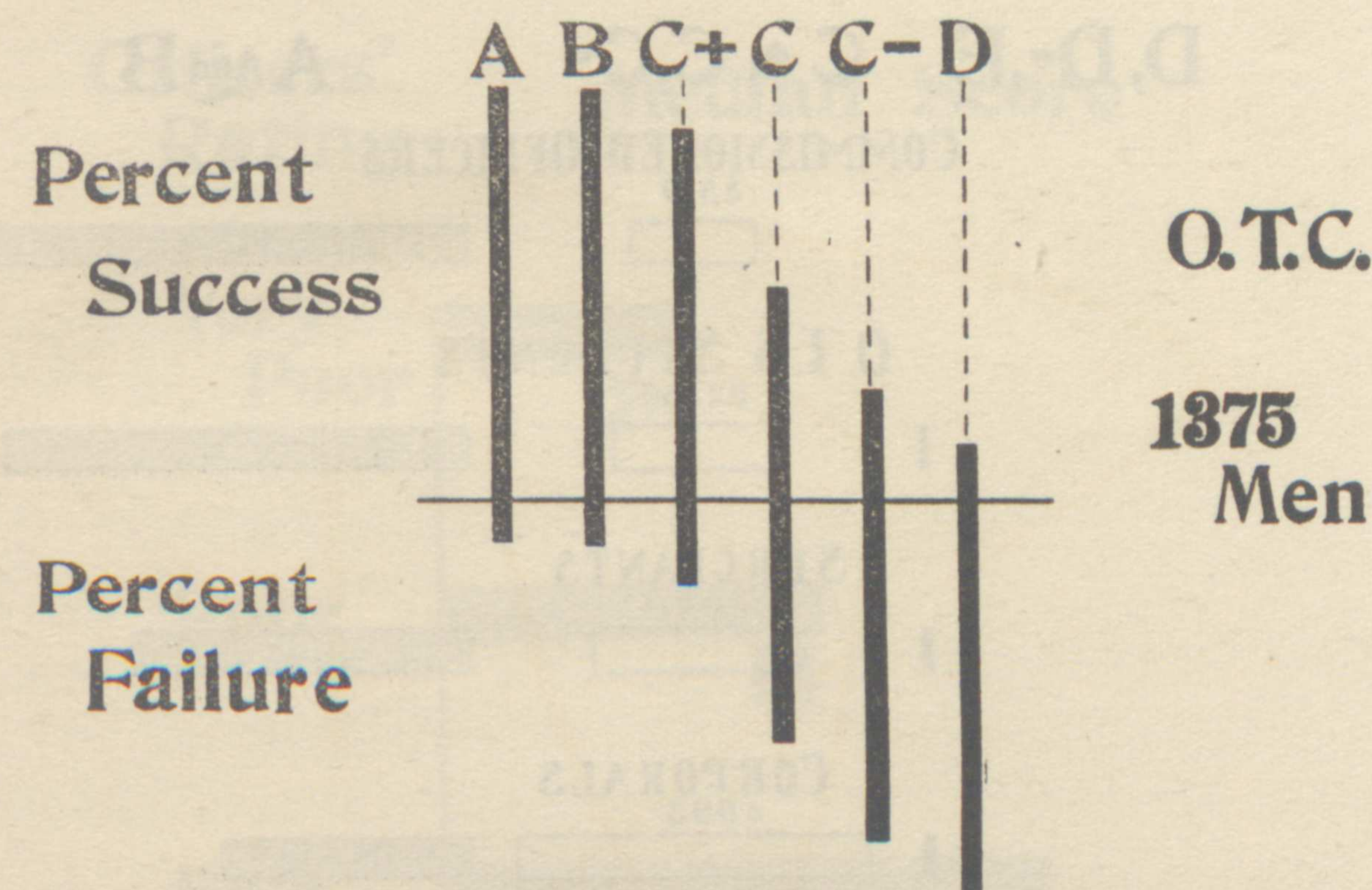


Figure 2. Success and failure in Officers' Training Schools.

Note the rapid increase in elimination in grades below B. Of those above C+, 8.65 per cent were eliminated; of those below C+, 58.27 per cent. Figure 2 shows the results for three schools, having a total enrollment of 1375.

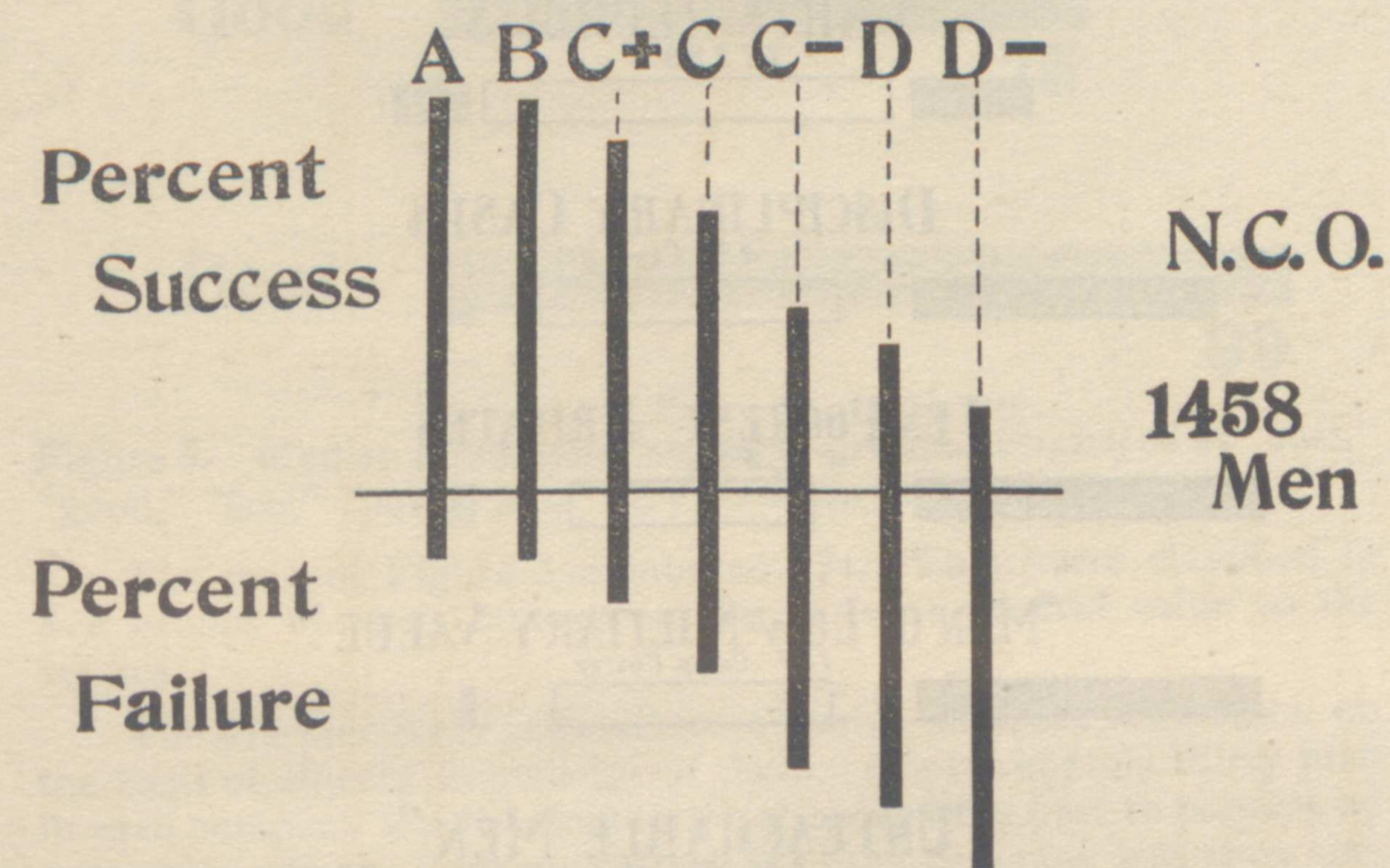


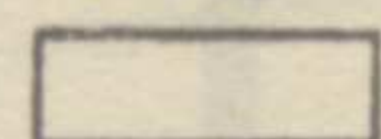
Figure 3. Success and failure in Non-commissioned Officers' Training Schools.

Note the rapid increase in eliminated in the grades below C. Of those above C, 18.49 per cent were eliminated; of those below C, 62.41 per cent. Figure 3 shows the results for four schools, having a total enrollment of 1458.

D,D-,E C+,C,C- A^{And}B

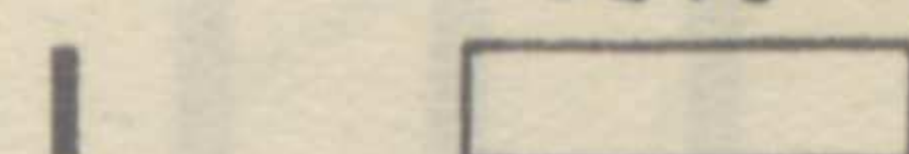
COMMISSIONED OFFICERS

8819



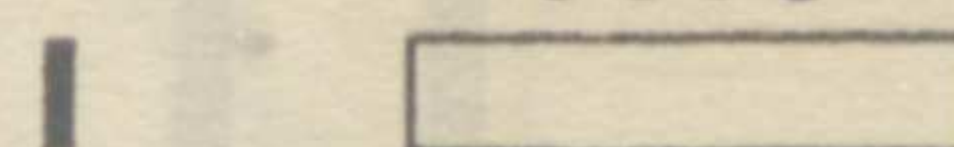
O.T.S. STUDENTS

9240



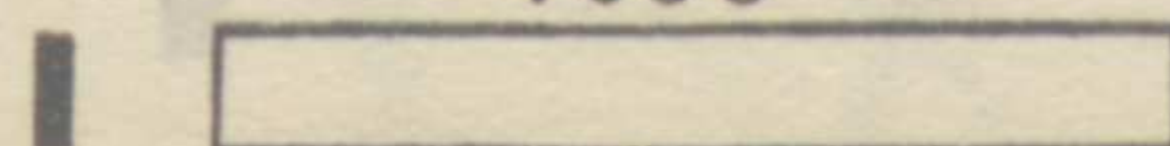
SERGEANTS

3393



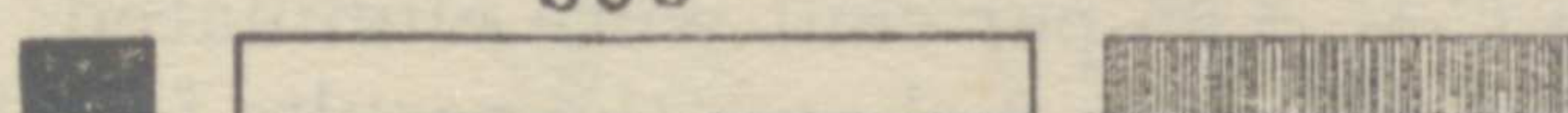
CORPORALS

4093



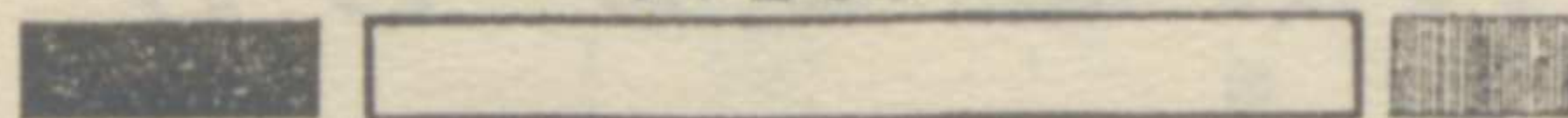
"TEN BEST" PRIVATES

606



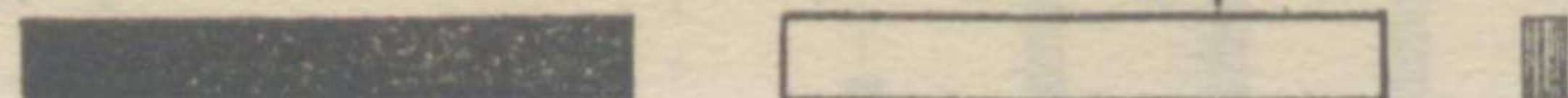
WHITE RECRUITS

77299



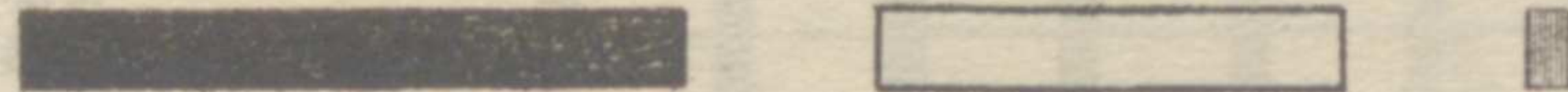
DISCIPLINARY CASES

471 Camp Dix



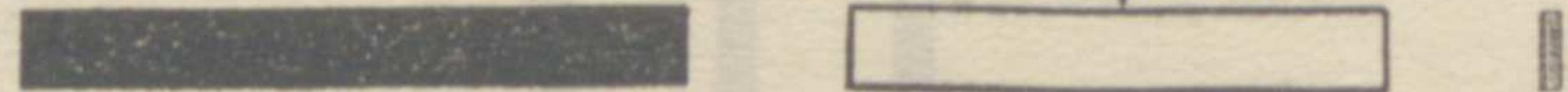
"TEN POOREST" PRIVATES

582



"MEN OF LOW MILITARY VALUE"

147 Camp Custer



"UNTEACHABLE MEN"

255 Camp Hancock



Figure 4. Proportion of low, average, and high grade men in typical groups.

Note the striking intellectual contrast between those who have been selected as officer material and the men who have been designated as unteachable or of low military value.

Officers'
Rating

Median Score

Very
Poor

28

Poor

51

Fair

70

Good

75

Best

99

Figure 5. Median intelligence scores of groups designated as "best," "good," "fair," "poor," and "very poor" in military value.

The men of Figure 5 numbered 374. They were classified in five groups by their officers on the basis of general value to the service.

The 374 men were selected from twelve different companies, on the basis of officers' knowledge of them. Approximately thirty men in each company were ranked in serial order from best to poorest by a superior officer. This rank order for each company was then correlated with the rank order furnished by the tests. In seven of the twelve companies the correlations were between .64 and .75. The average correlation for the twelve companies was .536. These correlations are high, considering the large number of factors which may enter to determine a man's value to the service.

Explanation of Figure 6. Commanding officers of ten different organizations, representing various arms in a camp, were asked to designate: (1) The most efficient men in the organization; (2) men of average value; (3) men so inferior that they were "barely able" to perform their duties.

The officers of these organizations had been with their men from six to twelve months and knew them exceptionally well. The total number of men rated was 965, about equally divided among "best," "average," and "poorest." After the officers' ratings had been made, the men were given the usual psychological test. Comparison of test results with officers' ratings showed:

- That the average score of the "best" group was approximately twice as high as the average score of the "poorest" group.
- That of men testing below C—, 70% were classed as "poorest" and only 4.4% as "best."
- That of men testing above C+, 15% were classed as "poorest" and 55.5% as "best."
- That the man who tests above C+ is about fourteen times as likely to be classed "best" as the man who tests below C—.
- That the per cent classed as "best" in the various groups increased steadily from 0% in D— to 57.7% in A, while the per cent classed as "poorest" decreased steadily from 80% in D— to 11.5% in A. Considering that low military value may be caused by many things besides inferior intelligence, the above findings are very significant.

In an infantry regiment of another camp were 765 men (Regulars) who had been with their officers for several months. The Company Commanders were asked to rate these men as 1, 2, 3, 4, or 5 according to "practical soldier value," 1 being highest and 5 lowest. The men were then tested, with the following results:

- Of 76 men who earned the grade A or B, none was rated "5" and only 9 were rated "3" or "4."
- Of 238 "D" and "D—" men, only one received the rating "1," and only 7 received a rating of "2."
- Psychological ratings and ratings of Company Commanders were identical in 49.5 per cent of all cases. There was agreement within one step in 88.4 per cent of cases, and disagreement of more than two steps in only 7/10 of 1 per cent of cases.

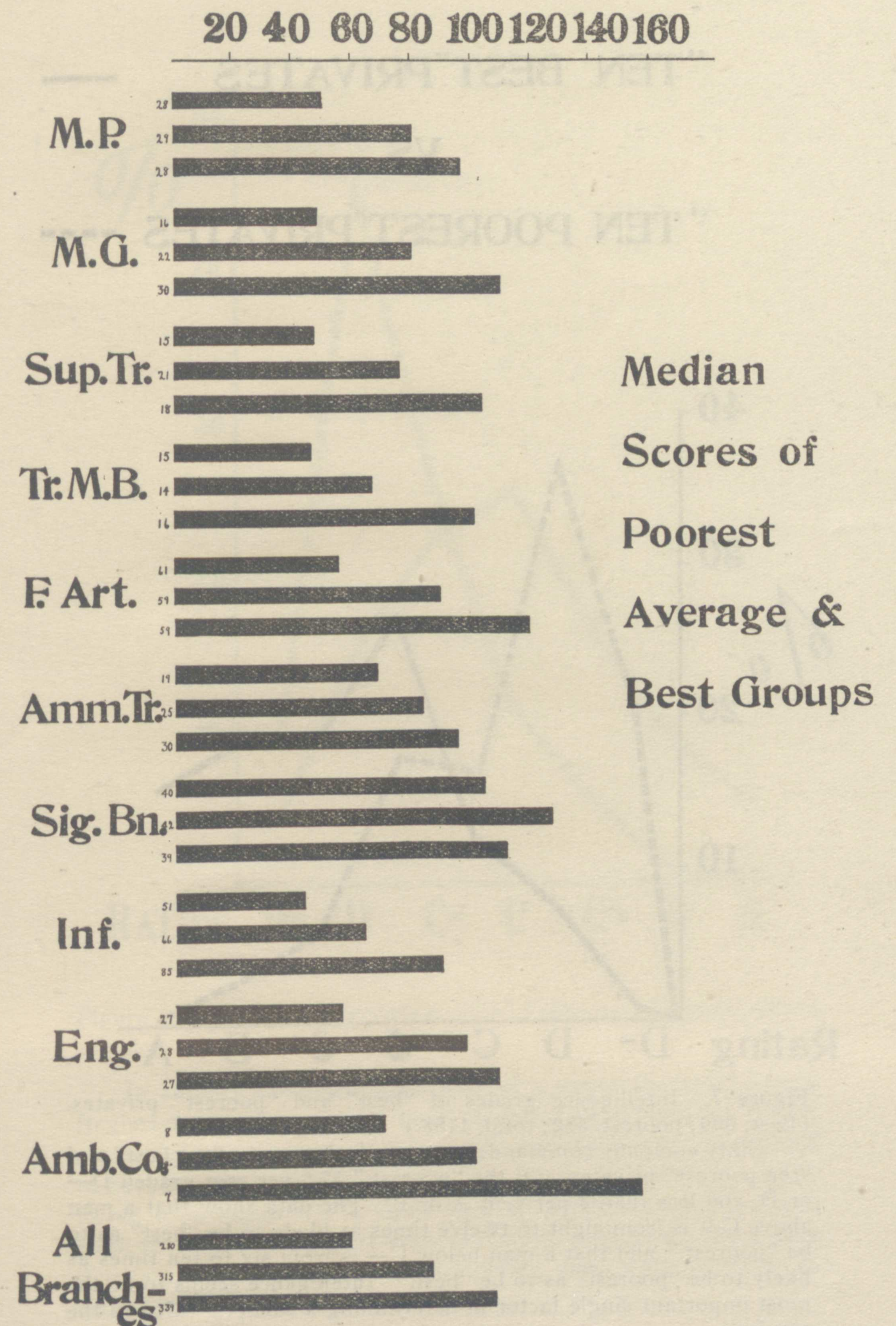


Figure 6. Median intelligence scores of "poorest," "average" and "best" men in various arms of the service.

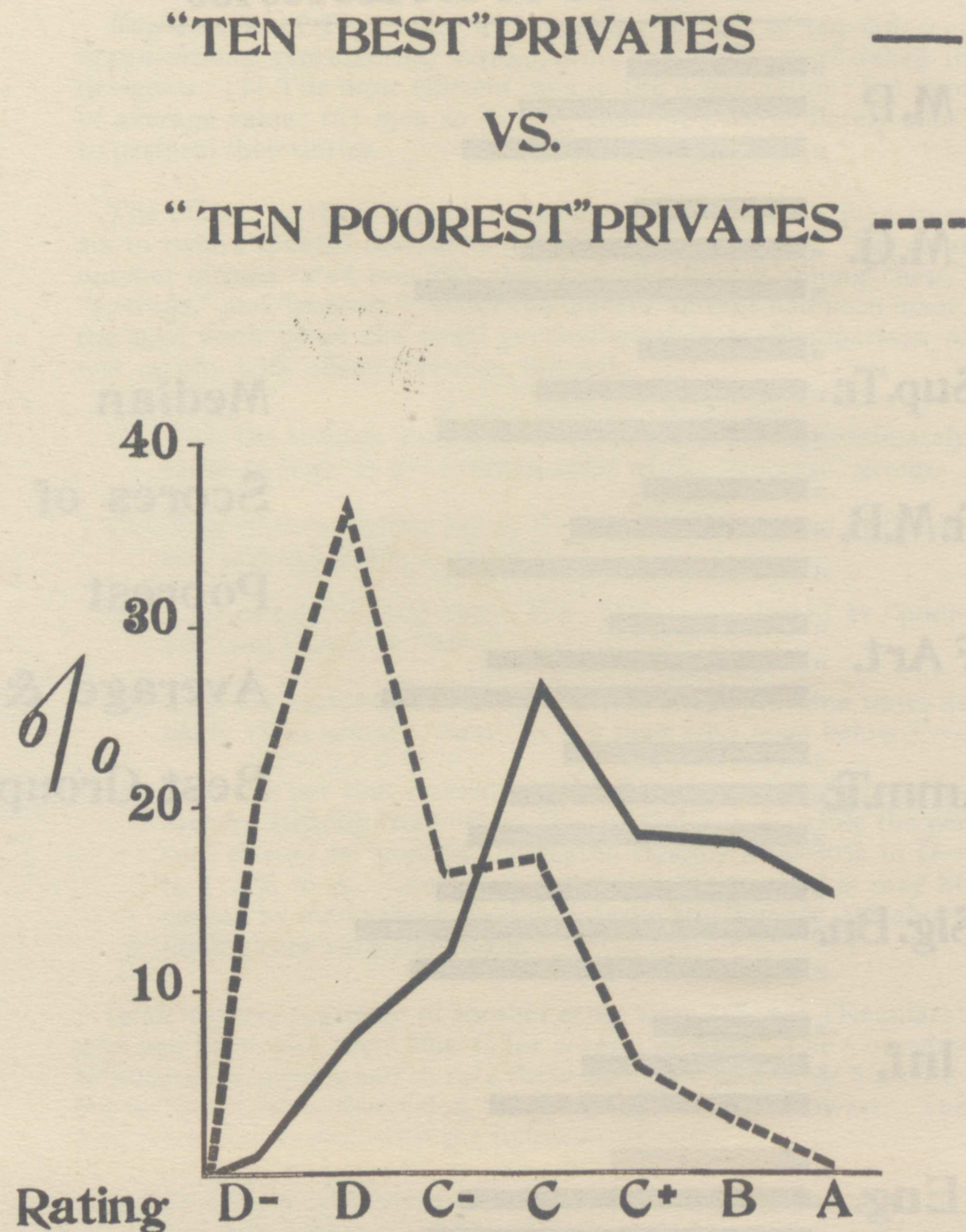


Figure 7. Intelligence grades of "best" and "poorest" privates. (Best, 606; poorest, 582; total, 1188.)

Sixty company commanders were asked to name "ten best" and "ten poorest" privates. Of the "poorest," 57.5 per cent graded D— or D, and less than 3 per cent A or B. The data show that a man above C+ is from eight to twelve times as likely to be "best" as to be "poorest"; and that a man below C— is from six to ten times as likely to be "poorest" as to be "best." Intelligence seems to be the most important single factor in determining a soldier's value to the service.

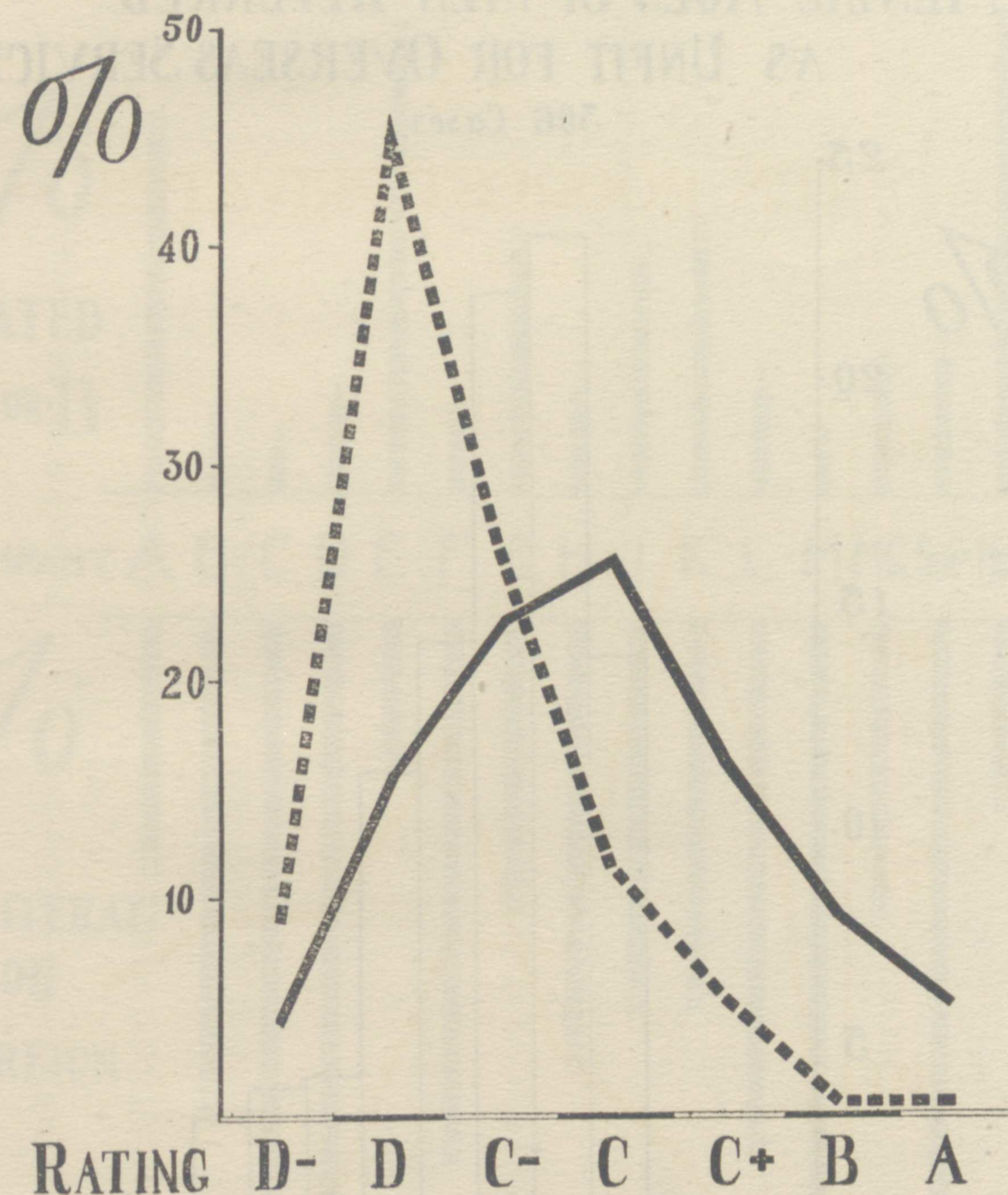


Figure 8. Men of "low military value" (147)—compared with a complete draft quota 12341).

In another camp 221 inapt men of a negro Pioneer Infantry Regiment were referred by their commanding officers for special psychological examination. Of the 221, nearly half (109) were found to have a mental age of 7 years or less. These men had been transferred from camps where there were no psychological examiners, consequently they had not been previously examined. Such data illustrate the danger incurred in building units without regard to mental ratings.

MENTAL AGES OF MEN REFERRED AS UNFIT FOR OVERSEAS SERVICE

306 Cases

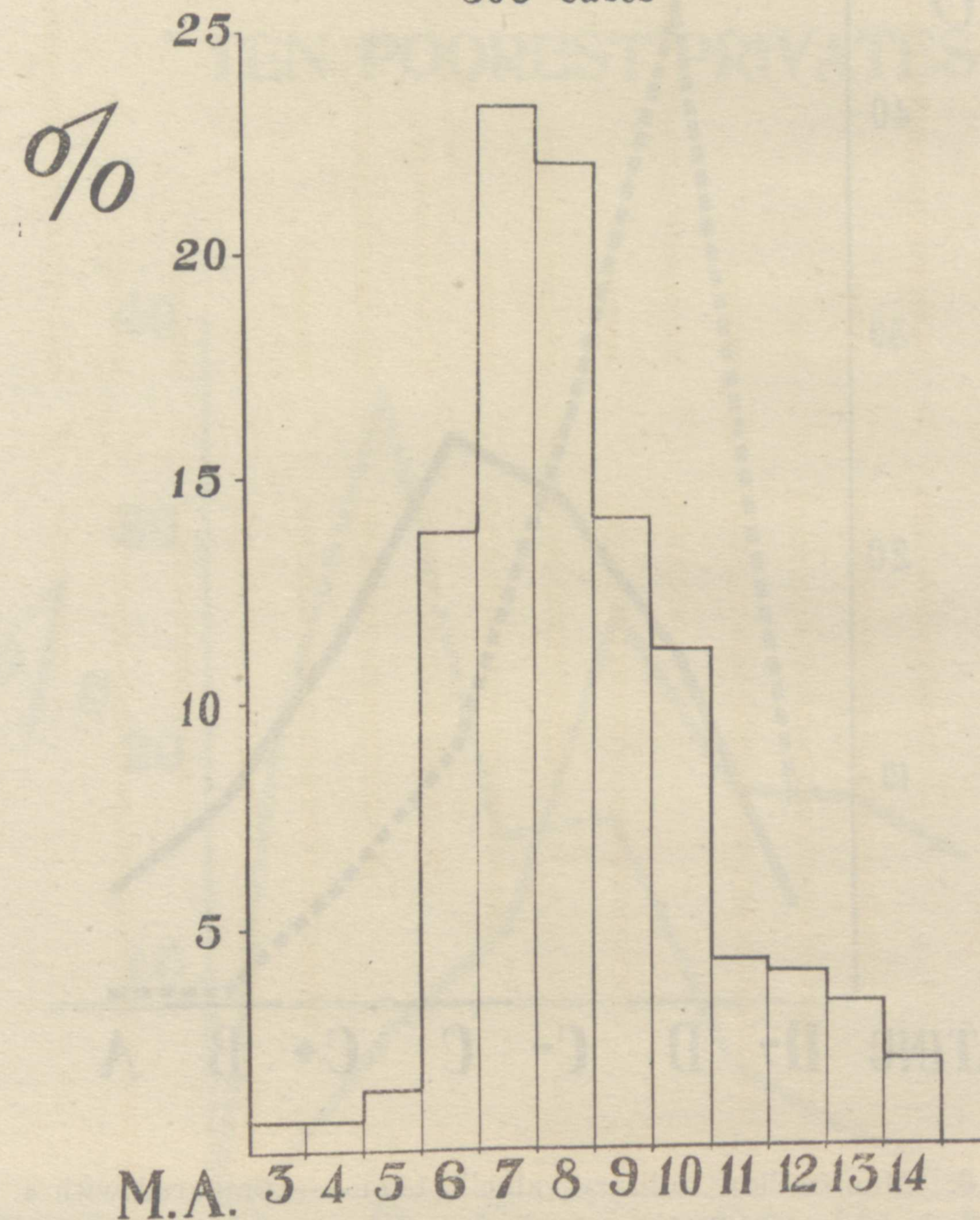


Figure 9. Mental ages of 306 men referred as mentally unfit for overseas service.

In a unit about to go overseas 306 men were designated by their commanding officers as unfit for overseas service. These were referred for psychological examination, with the result that 90 per cent were found to be mentally ten years or lower, and 80 per cent nine years or lower.

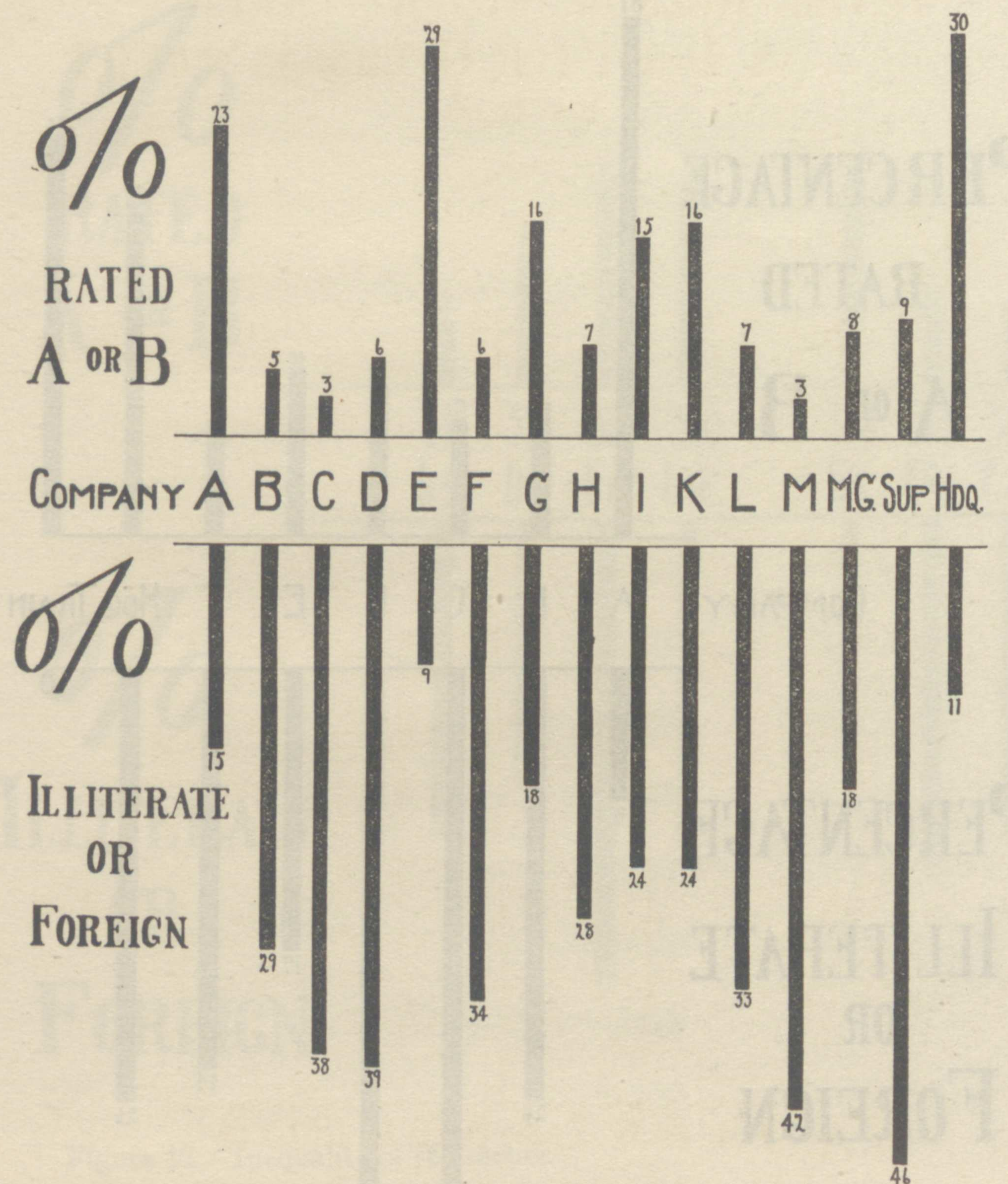


Figure 10. Inequality of companies in an infantry regiment.

Mental tests reveal the weak links in the army chain. As a result of findings like those illustrated by Figures 10, 11, and 12, the intelligence ratings are being widely used as a basis for equalizing or balancing the mental strength of units. As many as 25,000 men have been permanently assigned to a Division in a few hours on the basis of intelligence scores and tables of occupational needs.

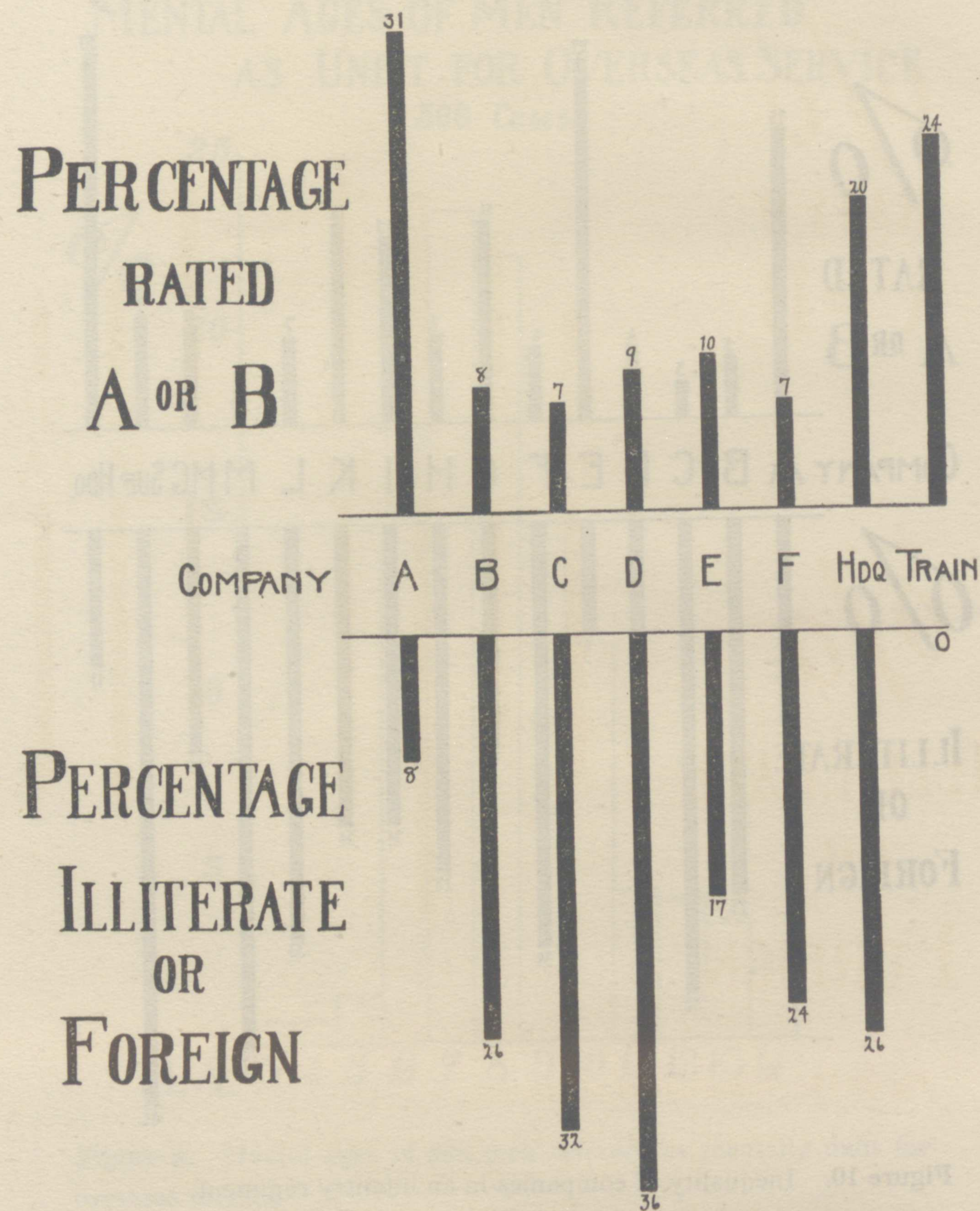


Figure 11. Inequality of companies in an engineering regiment.

In the regiment shown in Figure 11 a redistribution of men was made on the basis of the evidence submitted by the psychological examiners. One year later an officer of this regiment reported on the success of the experiment. He stated that in the opinion of the officers of the regiment its efficiency had been increased 100 per cent by the redistribution.

%
RATED
A OR B

%
ILLITERATE
OR
FOREIGN

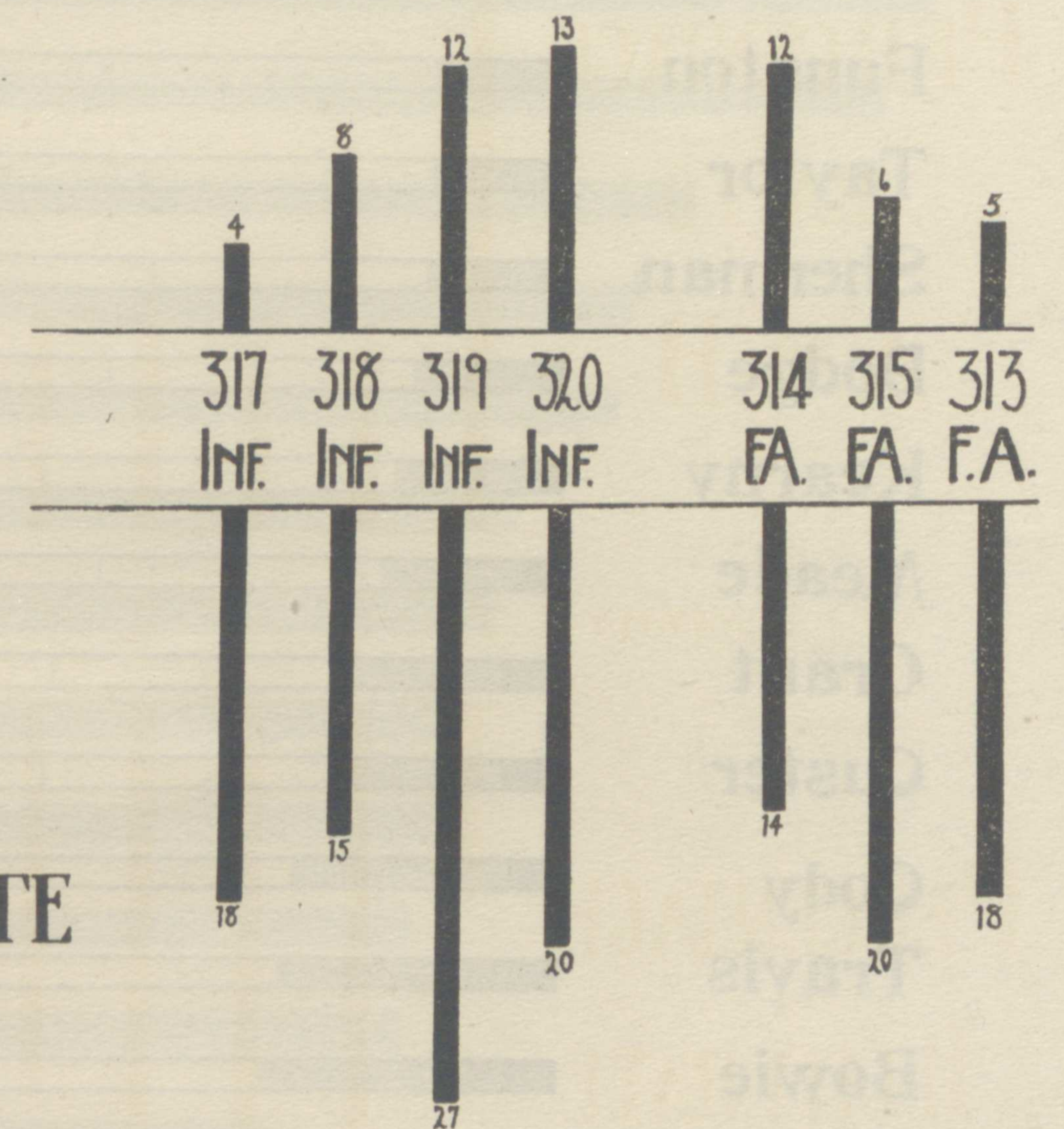
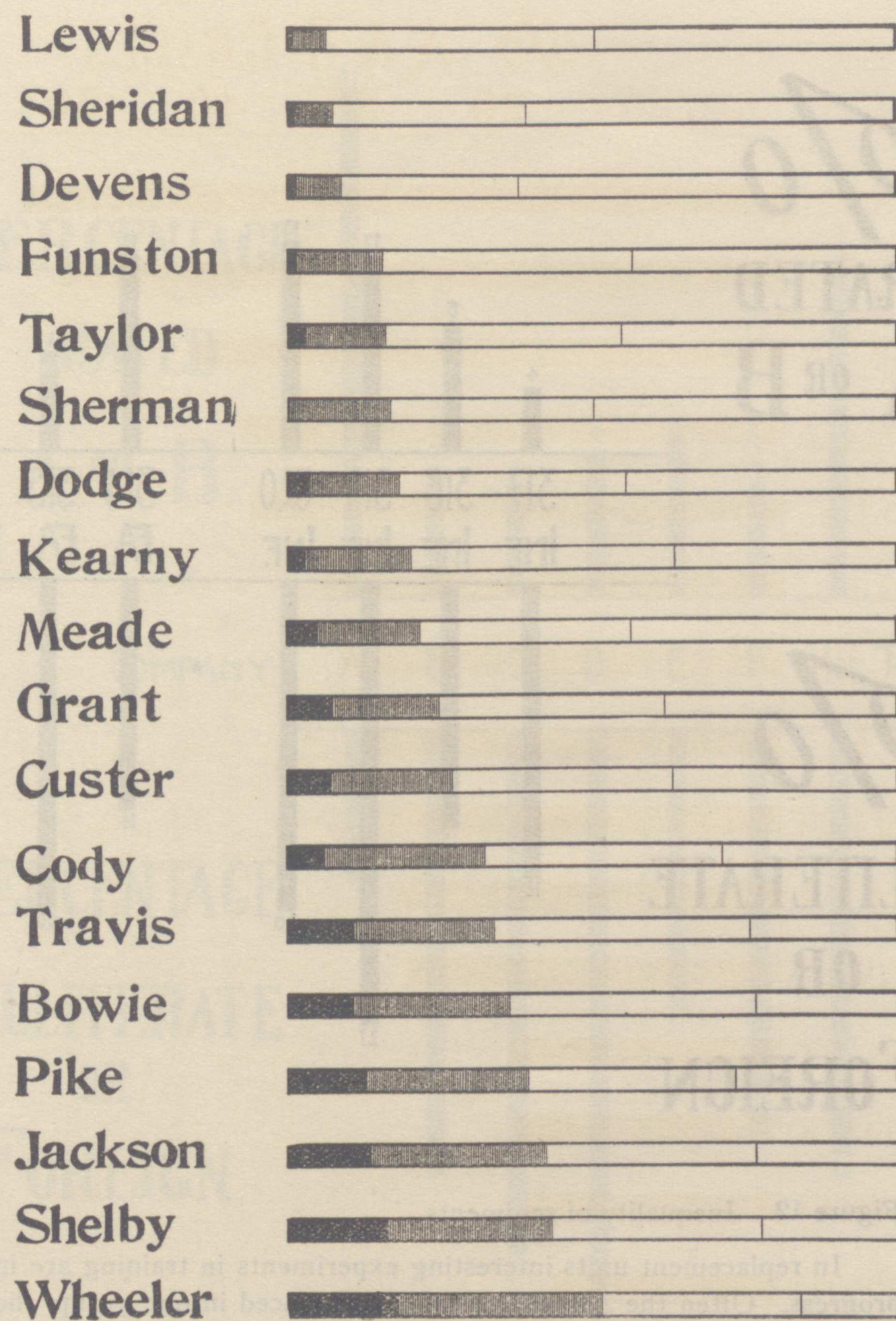


Figure 12. Inequality of regiments.

In replacement units interesting experiments in training are in progress. Often the A and B recruits are placed in one group, the C+, C, and C— men in another group, and the D and D— men in a third group. By such classification it has been found possible to secure greater speed in training. High grade men are not delayed by the inapt, and low grade recruits are given specially qualified instructors, special forms of drill, and various kinds of individual attention. Thus all recruits progress as rapidly as their individual ability permits.



Below C+ ■ C+ ■ A & B □

Figure 13. Inequality of mental strength in eighteen Officers' Training Schools, 4th Series (Total enrollment 9,240).

The proportion of A grades in the above schools varied from 16.6 to 62.4 per cent; the proportion of A and B grades combined from 48.9 to 93.6 per cent; and the proportion below C+ from 0 to 17.9 per cent.

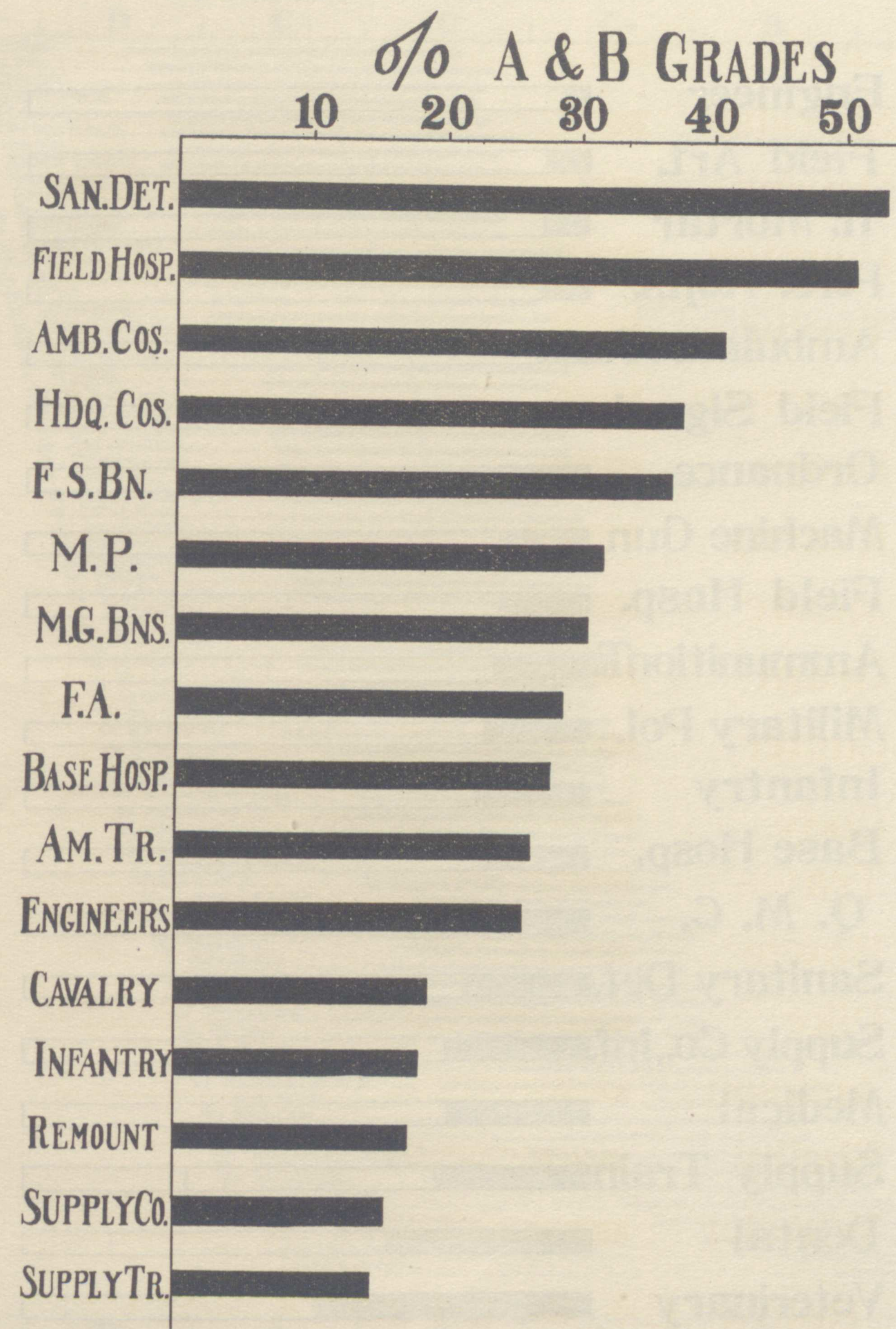
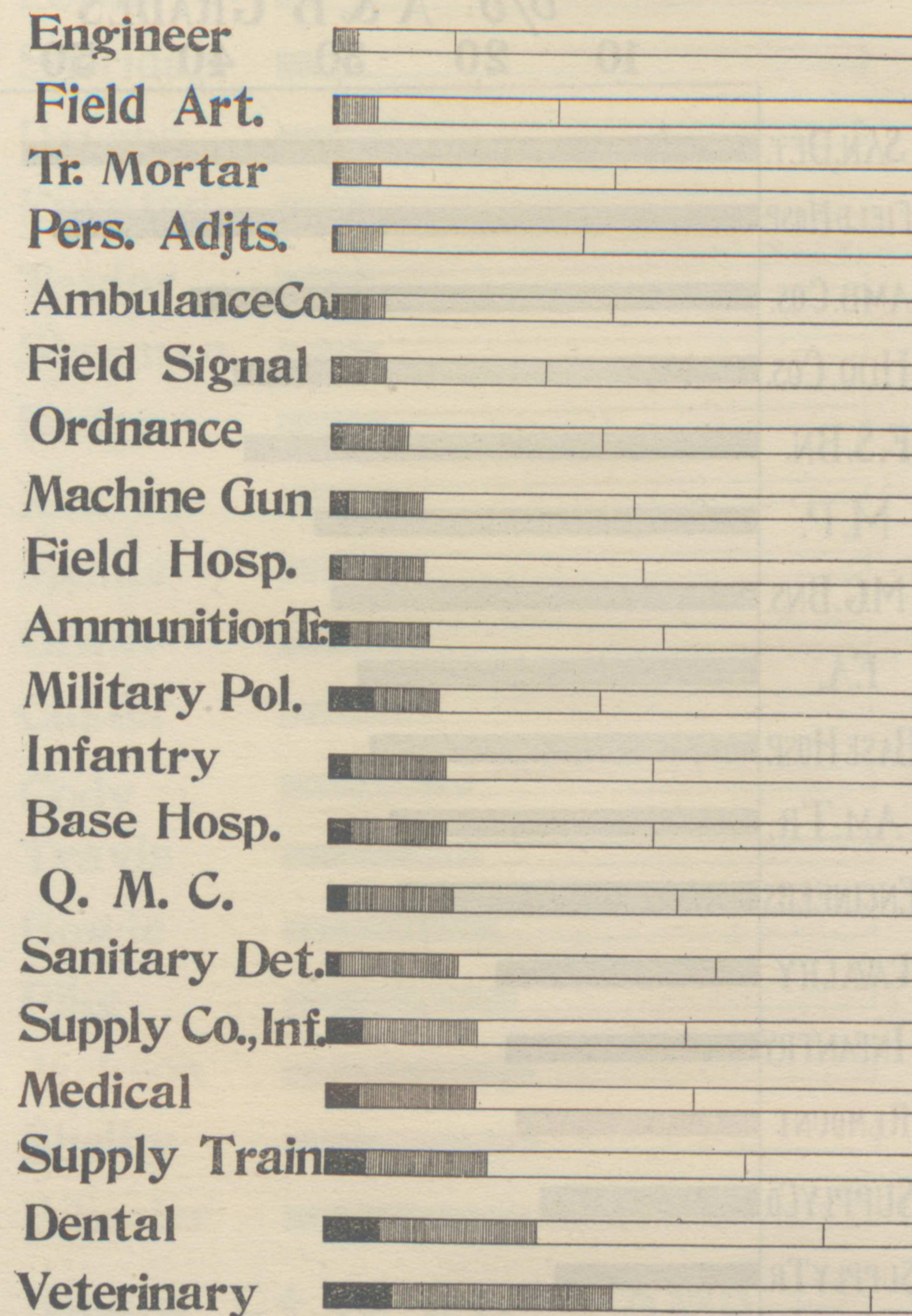


Figure 14. Comparison of Arms of Service.

The above figure shows the per cent of enlisted men grading A or B in various arms of the 34th Division. Different arms of the service do not require the same mental strength. Experience shows that few men of D or D— grade can be safely used in Field Artillery, Machine Gun Battalions, or Field Signal Battalions.

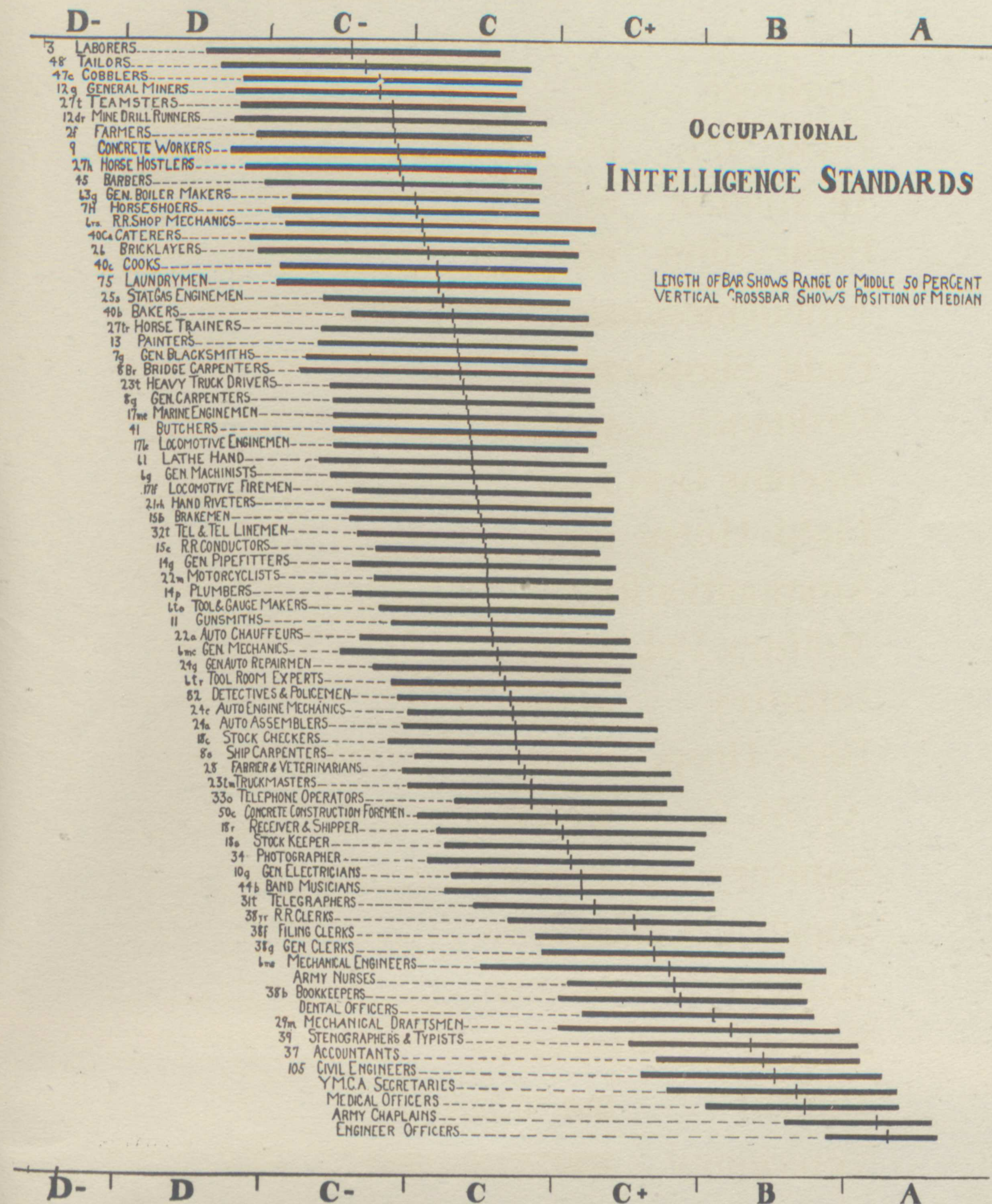
OFFICERS' GRADES



Below C+ ■ C+ ■ A and B □

Figure 15. Proportion of high and low grades in various officer groups.

The proportion of A grades varies from 8 to 79 per cent; the proportion of A and B grades combined, from 52 to 96 per cent; and the proportion below B, from 4 to 48 per cent. Note the remarkably high ratings of engineer officers.



OCCUPATIONAL INTELLIGENCE STANDARDS

LENGTH OF BAR SHOWS RANGE OF MIDDLE 50 PERCENT
VERTICAL CROSSBAR SHOWS POSITION OF MEDIAN

Figure 16. Occupational Intelligence Standards.

Bar shows range of middle 50 per cent. The vertical cross bar shows position of median. The figure is based on data for approximately 36,500 men. Numbers at extreme left are key numbers of occupations. Data taken from soldiers' Qualification Cards.