Clinical and Other Notes.

CLASSIFICATION OF THE ARMY INTAKE ON A BASIS OF PHYSICAL CAPACITY: REPORT OF A SUGGESTED METHOD.

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The need for a method whereby men called up for service in the Army could be graded in accordance with their physical capacity has long been felt but, up to the present, no simple and reliable method has been evolved. The present system of medical categorization is based largely on the presence or absence of organic defects and conveys no clear idea of functional capacity. Accurate information, based on tests of function, regarding a man’s physical performance would be of considerable practical value. Taken in conjunction with the selection grading it would enable men to be posted to the particular branch of the Service most suited to their physical and mental capabilities.

The essential features of any method are ease of application to large numbers and reasonable reliability. The following is a description of a method devised to meet both these requirements.

It was considered that the two most important qualities to be measured, from the point of view of military service, are strength and endurance. A third, but less important, quality is agility and although, for the sake of completeness, it would be desirable to measure this quality a reliable test has not yet been found.

Strength was measured by two tests:

(1) Strength of arms, shoulders and dorsal region was measured by the number of heaves to a horizontal beam. The beam was arranged at a height, when the man was hanging at full arms stretch with hands shoulder breadth apart, his feet were just clear of the ground (fig. 1A). Starting from this position the man heaved to the beam until he could just touch it with the tip of his nose (fig. 1B). This was counted as one complete heave. The maximum number of heaves was recorded.

(2) Strength of legs and lumbar region was measured in the following manner. A pulley-weight system was constructed as illustrated in fig 2. The man stood with his feet a little apart, bent down and grasped the crossbar as shown. The knees were flexed and kept together between the arms. This was the starting position. A complete lift was accomplished by extending the knees and back, keeping the arms straight. This movement raised the weight from the floor. The end point was the first failure to accomplish a complete lift. The total number of lifts was recorded. The weight finally chosen for this test was 140 pounds. This weight could be comfortably lifted by every man but the total number of lifts accomplished even by the strongest was not excessive and the end point was definite.

From these two tests total strength was calculated in the following manner:

(1) Strength of arms, shoulders and dorsal region = Number of heaves to the beam × Body weight in pounds.

(2) Strength of legs and lumbar region = Number of lifts × 140 pounds.

Total strength in pounds = 1 + 2.

To convert these values into foot poundals it would be necessary to measure the distance through which the body weight in 1, and the 140 pound weight in 2, were moved, but it was thought that the final figure for total strength would be reasonably reliable without the introduction of these additional measurements.
Endurance was measured by time taken to run three miles in Army boots, this being the shortest distance which it was felt constituted a real test of endurance. Boots were worn for two reasons:—

(1) In view of rubber shortage gym shoes may not always be available at training centres.
(2) The wearing of boots adds considerably to the severity of the test.

The results of the tests were correlated as follows:—

The stronger the man, the larger will be the figure representing his total strength in pounds. The better his performance on the run the smaller will be the figure representing his running time in seconds. Therefore if the total strength in pounds be divided by the running time in seconds the resulting figure will bear a direct relationship to the man’s total physical capacity.

(a combination of strength and endurance). A poor performance in the tests of strength in combination with a poor running time will give a low figure. A good performance in both strength and endurance tests will give a high figure.

Written as a formula, if P. G. represents Physical Grade,
S represents Strength in pounds,
E represents the running time in seconds, then

\[ \text{P. G.} = \frac{S}{E} \]
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This simple calculation gives a figure of real practical value in assessing a man's physical capacity in terms of strength and endurance. It was found in practice that the great majority of results fell between 1 and 5. It is suggested that these tests may be used to place a man in a physical grade (P. G.), ranging from 1 to 5; 1 being the lowest and 5 the highest. Any man whose results fell between 1·5 and 2 would be 1+, between 2·5 and 3, 3+ and so on. A few men will give results over 5 but 5 grades would probably cover the great majority of the Army intake in their first week or two of training.

The method described was tested out at an Army Convalescent Depot. The following routine was adopted. The tests were performed by volunteers from men who had completed their rehabilitation and were awaiting posting. All candidates selected were Category A1 and professed themselves to be free from any residual effects of their original disability. The tests of strength were performed in the morning and the run in the afternoon. The men were paraded in the gymnasium at 09.00 hours dressed in gym vests, shorts and Army boots. Their age, height, and weight were recorded. The heaves to the beam were performed first, then the lifts. The men were paraded again at 14.00 hours. A three miles' course had been measured along reasonably level road (ideally speaking the course should be level as possible to ensure uniformity of results at different training depots). The men started off in a body, having been instructed that each man must put up his best performance. A time-keeper and two recording clerks were posted at the finishing post. The number of men completing the tests was 238. The results obtained are recorded on a graph (fig. 3). This shows the total number falling in each grade and the average age. Eight men failed to attain Grade I. These are shown as 1−. Although the numbers are relatively small, the fact that there is a wide variation in performance amongst men in category A1 is well illustrated.

![Graph showing physical grade distribution](image-url)
SUMMARY.

A method of grading men according to their physical performance is described. The results obtained in the case of 238 men in Category A1 are presented. Five main grades and five intermediate grades are suggested, based on the results of three tests. The method is simple and could be readily applied to large numbers. If, after a more extensive trial, the results were found to be reliable, it is suggested that the physical grade would be of considerable value in determining the branch of the Service to which a man should be posted.

DISPOSAL OF SULLAGE WATER IN EGYPT.

By Lieutenant-Colonel A. M. Critchley, Royal Army Medical Corps.

Wherever troops are encamped the disposal of sullage water becomes a problem which, if not successfully solved, gives rise to a nuisance. This problem is especially important in a country like Egypt where collections of water assist the breeding of insect pests and become definite menaces to the camps and their neighbourhood. The following article briefly describes some of the methods employed to deal with the sullage water both in the arid desert regions and in the highly watered Delta district.

The vast increase in the number of troops stationed in this country has led to the erection of many new camps which, owing to the military situation coupled with the needs for stringent economy in supplies of engineering materials, have not always been ideally sited or constructed so that the most efficient method from the sanitary viewpoint could not be employed invariably.

MAIN DRAINAGE.

In some of the barracks the solution of sullage water disposal has been to discharge into the municipal sewerage system and this has been adopted whenever practicable.

DISPOSAL INTO IRRIGATION CHANNEL.

A few camps, situated near cultivated land but not near dwellings, have been piped and the sullage water passed through a sedimentation tank in which chemical treatment with ferrous sulphate and lime has been carried out prior to discharge into an irrigation channel. Provided the first thirty or forty metres of ditch after the outflow are kept cleansed, this method has proved satisfactory.

SOAKAGE PITS.

Temporary camps have utilized this method of disposal but it is a method which has not been successful in semi-permanent or permanent camps. Contrary to common belief, sand will not absorb unlimited supplies of water so that the pits block up and flood. This failure of absorption may be due to several causes. Thus, faulty supervision of grease traps or high atmosphere temperature fails to remove grease which coats the sides of the pits, rendering them practically impervious. Again, sand contains a high proportion of clay or plaster of Paris according to the area and the action of the water reduces its powers of absorption quickly.

EVAPORATION PANS.

This method so often employed in hot climates has proved eminently suitable in many camps. A series of pans is fed in turn with sullage water which has previously passed through grease traps. The water evaporates rapidly and by the time the pans have been filled, the first one is ready to receive water again. The water is run in to a depth of 6 inches and, if not entirely free from grease, this is left as a hard deposit on the surface of the pan and is removed by scraping and incinerated.