

clinicians will need to co-operate increasingly with the public health officers in order to reap the full benefits of these services. They are the specialists in this branch of medicine, and to them the family doctor must turn for help and advice in the same way as he turns to clinical specialists for help in diagnosis and treatment. In order to do this effectively he must keep in touch with the new methods of prevention and the means of raising standards of fitness.

4. The conclusion seems inescapable that, in order that the medical profession may pass on the benefits of the increasing advances of medical science to the people, the work of the family doctor will become more not less important, and he must be educated in the new principles and concepts not only of curative medicine but also of preventive medicine and positive health measures, and that of all members of the medical profession he has before him the prospect of a career that will bring increasing opportunities for service to the nation and mankind.

A SURVEY OF HÆMOGLOBIN LEVELS OF STUDENTS ATTENDING THE EASTERN COMMAND PHYSICAL TRAINING SCHOOL

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UNTIL recently, idiopathic hypochromic anæmia was generally regarded as a disease of women, and in their extensive bibliography Wintrobe & Beebe (1933) could discover in the literature only 18 cases in males of all ages, out of which 5 had developed anæmia following gastric operations. Witts & Burgher (1934) published a series of 24 cases in adult males of which 8 were under 30 years of age, only one showing achlorhydria, while the remaining 16 patients were all aged 40 and over and suffered from gastric disturbances. Britton (1936) classified the anæmias present in 183 unselected patients in all age groups and found only 4 men in which the cause could not be decided.

In 1943 the Medical Research Council conducted a survey of hæmoglobin levels in this country covering men mainly in reserved occupations (M.R.C. Special Report Series No. 252, 1945). This showed that the average level of hæmoglobin in working men under 20 years of age was 15 g. per cent and between 20 and 40, 15.1 g. per cent. Of the whole survey and at all ages 2.5 per cent of males had results under 12.6 g. and 0.9 per cent were under 11.85 g. They noted that these figures included numerous agricultural workers in whom

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the average percentage was rather low. In the same survey, among 990 Canadian Base troops, only one man had a hæmoglobin level below 12.6 g. per cent and the overall average was 16.1 g.

Shorthouse & King (1951) investigated 20 cases of hypochromic anæmia in young soldiers seen at the Cambridge Military Hospital over a period of two years, while Leonard (1954) surveyed 4,221 Royal Air Force recruits, discovering 47 cases below 12 g. per cent in which no cause could be found, and of these 37 were under 10.5 g.

The present investigation follows the survey by Stewart, Yeates & Barnfather (1957) of normal Army recruits and is written to emphasise the large number of recruits with anæmia and takes into account some of the factors that may bring a man under the care of a Command Physical Training School.

For a number of years the Home Counties District Laboratory has performed routine hæmoglobin investigations on all entrants to the Eastern Command Physical Training School at Shorncliffe. The results of these investigations since 1954 have been collected, a graphical report of the figures produced and some comparison made with reported results on normal fit young men.

Of the soldiers sent to the Physical Training School since early 1954, over 97 per cent consisted of recruits from Eastern Command depots in their first six weeks of training who were considered likely to benefit from an intensive physical development course. The majority were men who were over-weight or under-weight, and the remainder had failed at various stages of their recruit training. They had all been given a full physical examination either by civilian or service medical boards before and on entry to the Army, and the greater number were examined again before recommendation for the course. The few who were not recruits were generally sent to the School by Guards regiments as not being up to the high standard they required, and these also had undergone a recent medical examination.

METHOD

Capillary blood was taken in each case between 2 and 4 p.m., using the standard issue 20 cu. mm. hæmoglobin pipette. Unfortunately the method of estimating hæmoglobin was not standardised throughout the investigation, although since December, 1954, over 500 specimens have been examined using an M.R.C. Grey Wedge photometer to estimate oxyhæmoglobin converted by the use of 0.04 per cent ammonia in distilled water. Between January and December, 1954, some estimations were made using oxyhæmoglobin read in an E.E.L. photo-electric colorimeter.

RESULTS

The results have been recorded in terms of the percentage of hæmoglobin (100 per cent=14.8 g. per cent) and are shown graphically in Figure 1. 732 estimations were available for survey, covering a period from January, 1954 to October, 1956. The mean hæmoglobin value obtained was 93 per cent (13.8 g.

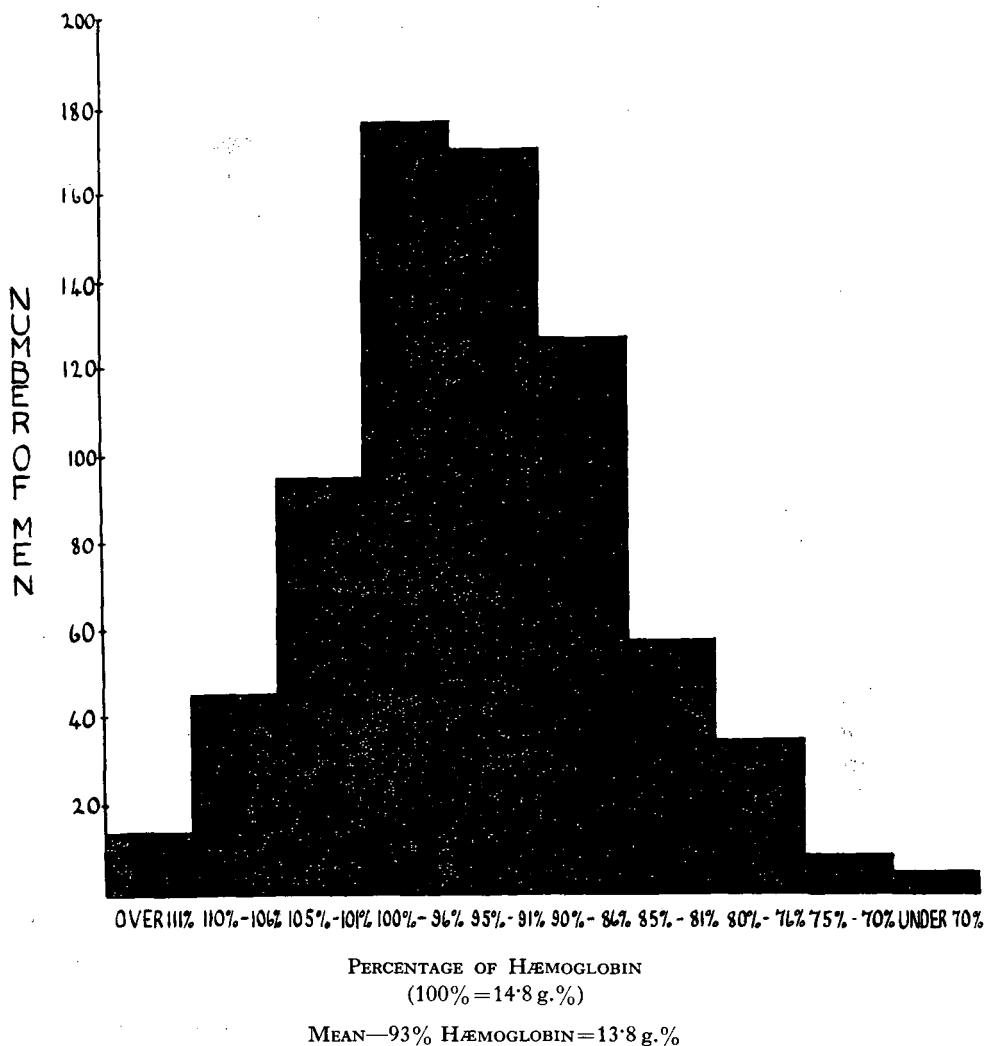


Fig. 1. Histogram of routine haemoglobin estimations performed on men on the Eastern Command Physical Training School course. January, 1954—October, 1956

per cent) with extremes of 55 to 117 per cent (8.2 to 17.4 g. per cent). 103 men (14 per cent of the total) showed values below 12.6 g. per cent and 12 men below 11.1 g. per cent.

DISCUSSION

The mean haemoglobin in young male adults has been calculated on a number of occasions and the results have been reviewed by Stewart *et al.*, (1957) who added estimations on 229 Army recruits and found a mean value of 15.3 g. per cent.

This present survey was made on men who had been selected for physical

training because they were below general standard although otherwise medically fit. Each man had been passed fit before entry to the Army and was re-examined afterwards during his first week of training. Before these figures were analysed it was considered likely that the mean would be slightly lower than that for the general population, and in addition a small proportion would fall substantially below the standard deviation at the lower end of the scale. These assumptions have been borne out by the results obtained, but the mean of 13.8 g. per cent, which is 1.5 g. per cent below that calculated by Stewart *et al.*, is considerably lower than would have been originally estimated. That this result is not due to unfair weighting by abnormally low figures is illustrated by the fact that only four men (0.55 per cent) had results below 10.4 g. per cent, of which the lowest was 8.2 g., and if these four results were rejected the mean would still be only 13.9 g. per cent.

It is unfortunate that the method of estimating hæmoglobin was not standardised throughout the investigation, but McFarlane (1951) states that for general use the M.R.C. Grey Wedge photometer measuring oxyhæmoglobin was accurate with a coefficient of variation of 4.3 per cent, while the photoelectric photometer is said to have a variation of about 5 per cent. It has been assumed that these variables cannot have materially influenced the result and any errors would be balanced over 732 estimations. All estimations were performed at the same time of day over the whole period, McCarthy & Van Slyke (1939) and Stemgle & Schade (1957) having demonstrated the occurrence of a physiological diurnal variation of hæmoglobin of about 10 per cent.

Leonard (1954) in his series of over 4,000 Royal Air Force recruits considered a hæmoglobin level of under 12 g. as suggesting definite anæmia and found 1.2 per cent below this figure. In this series 46 men (6.3 per cent) fell below Leonard's level, but it is suggested that 12.6 g. should be regarded as the critical figure below which a man cannot be expected to perform adequately his recruit training and subsequent duties. During the period of this investigation 77,000 men commenced their recruit training in Eastern Command Depots, so that approximately 1 per cent were sent to the Physical Training School, and of these 14 per cent were found to be anæmic.

It may be assumed that no more than 30 per cent of men suffering from anæmia will be sent to a physical development course, so that probably 0.5 per cent of all recruits have a hæmoglobin level below 12.6 g. per cent, which agrees with the findings of Stewart *et al.*

No attempt has been made in this paper to assess the cause of the anæmia in each case, but the general impression gained is that the majority were idiopathic hypochromic in type. This conforms to the observations of Leonard (1954), who found after exhaustive investigation that in 94 per cent of his cases no cause could be discovered.

These results emphasise the importance of regular hæmatological screening of all pupils at Physical Training Schools and, in addition, indicates that a recruit may suffer from hypochromic anæmia of significant degree which will impair his general capacity.

SUMMARY

The hæmoglobin levels of 732 students at Eastern Command Physical Training School were analysed and a surprisingly high proportion of men were found to have mild anæmia.

Some comparison with published figures is made.

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REFERENCES

- BRITTON, C. J. C. (1936). *N.Z. med. J.*, **35**, 154.
 LEONARD, B. J. (1954). *Lancet*, **1**, 899.
 MCCARTHY, E. F. & VAN SLYKE, D. D. (1939). *J. biol. Chem.*, **128**, 567.
 MCFARLANE, R. G. (1951). *Hæmoglobinometry: Recent advances in Clinical Pathology*, 2nd Edn. London: Churchill.
 SHORTHOUSE, P. D. & KING, R. C. (1951). *Brit. med. J.*, **2**, 256.
 STEMGLE, J. M. & SCHADE, A. L. (1957). *Brit. J. Hæmatol*, **3**, 117.
 STEWART, P. D., YEATES, J. R., & BARNFATHER, J. L. (1957). *J. roy. Army med. Cps.*, **103**, 142.
 WINTROBE, M. M., & BEEBE, R. T. (1933). *Medicine (Baltimore)*, **12**, 187.
 WITTS, L. J., & BURGHER, G. N. (1934). *Guy's Hosp. Rep.* **84**, 14.
 Medical Research Council (1945). *Special Report Series No. 252*. H.M.S.O.

EPIDEMIOLOGICAL FEATURES OF MALAYAN LEPTOSPIROSIS

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THE recent occurrence of leptospirosis in troops engaged against the Chinese Communists in the Malayan jungle has stimulated interest in the disease, and reports have appeared dealing with diagnosis and treatment (Fairburn & Semple, 1956; Trimble, 1957; Mackay-Dick & Robinson, 1957). The importance of preventive measures must not be overlooked, however, since no one therapeutic agent is universally regarded as effective.

Epidemiological data collected from 64 consecutive cases of leptospirosis in a Malayan military hospital are presented below. The infection was mild, and only eight cases were jaundiced. All cases were proved by blood culture or serological means.

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