

## Special Articles

### HÆMATOLOGICAL TECHNIQUE

#### PART XII\*

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and

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#### *The investigation of a case and the reporting of results*

THE question that we are frequently asked is, what do you consider the minimum examinations that should be carried out in a case of anæmia? We should be forced to reply that, with the exception of those in part X, which apply particularly in hæmorrhagic diseases, at least all the examinations that have been described in this series should be made for the proper investigation of a patient.

In actual practice, nearly all the blood examinations can be carried out from a single specimen of blood and do not take a good technician more than an hour, if the Price-Jones curve is excluded. A certain amount of time can be saved by omitting the Arneht count, the fragility test, and the enumeration of thrombocytes, and there are many circumstances in which these tests will give little information of practical value. This leaves the hæmoglobin estimation, the total red and white cell counts, the reticulocyte count, cell volume percentage estimation (hæmatocrit) and sedimentation rate, van den Bergh's reaction, and white cell differential count, to be done as a minimum routine procedure in every case.

The findings will indicate whether these examinations should be supplemented. Sternal puncture gives very valuable additional information, but it must not be considered as a short cut to diagnosis for it will seldom be of any value without a complete blood count, and further the identification of the various cells is very skilled work that necessitates considerable experience.

There will be occasions when electric current is not available and in these circumstances it will not be possible to estimate the cell volume percentage satisfactorily. Although the mean corpuscular hæmoglobin (MCH) usually runs more-or-less parallel with the mean corpuscular volume (MCV), it will be advisable to make

\* It was not the original intention to publish another article in this series. These notes were written as the final chapter of *Hæmatological Technique*, the booklet referred to in our editorial note in the May number. On reconsideration, we have decided that it will make this series more complete, if we reprint these notes and the forms here.

*Hæmatological Technique* is now on sale, and may be obtained from Messrs. Thacker, Spink and Co. (1933), Ltd., Esplanade, East, Calcutta.

some measurement of the red cells, and, as in our experience clinical halometers are very inaccurate, the mean cell diameter should be measured by the modification of Price-Jones method that we have described.

The inclusion of the erythrocyte sedimentation rate (ESR) in the minimum procedures might be questioned, but, if a Wintrobe's tube is used for cell-volume estimations, the ESR requires no additional apparatus and entails no extra labour, except the taking of a reading at the end of an hour, and the information it gives is often useful.

Gastric analysis is important when the question of pernicious anæmia arises and in some cases of microcytic anæmia of doubtful ætiology, but we would not give it a high place in the order of importance, in the investigation of cases of anæmia in this country.

For the complete investigation of the ætiological factors many other examinations will have to be carried out, e.g., the urine for albumin, blood, and ova; the stools for protozoa, helminths, and pathogenic bacteria, for fat content, and for the presence of occult blood; and the blood for 'blood grouping', the Wassermann reaction, cholesterol, albumin/globulin ratio, etc.

*Controlling progress.*—Circumstances will usually dictate how often blood examinations should be carried out during treatment, but there are certain points which we will consider here.

In the first place, when a seriously-ill patient is admitted into hospital, he is often suffering from some degree of hæmo-concentration, and a second examination made a few days after admission shows a marked drop in hæmoglobin percentage, whereas the patient's condition may have improved considerably. If allowance is not made for this fact, the effect of the first treatment that is given may be misjudged, and we have always adopted the practice of making a second examination before prescribing specific treatment (except in urgent cases where an immediate blood transfusion is indicated).

Further, there are many nutritional anæmias in India in which there is a steady improvement directly the patient is put to bed and given a good diet. Allowance must also be made for this fact, if the value of any special form of treatment is being estimated and, in such circumstances, at least two weeks of rest and diet should be allowed before the specific treatment is started.

We make a practice of repeating the blood examination, including hæmoglobin percentage, red cell count, reticulocytes, cell volume percentage, van den Bergh's reaction, and ESR, and examination of the film for abnormal cells, once a week, or earlier if a setback is suspected or if the treatment is to be changed. In special cases other examinations, such as the platelet and leucocyte counts, are also repeated.

When any specific form of treatment is given a reticulocyte count is done daily from the 4th until about the 12th day, or, in a case where

there is a reticulocyte crisis, until the reticulocyte percentage has fallen to its previous level.

The printed forms that we use in the School are shown below. There is quite possibly room for improvement in these forms, and we have modified them from time to time, but we find that, without being cumbersome, they are sufficient for our purpose.

Form 1 is the ordinary report form which is sent to the ward and attached to the notes (size 8½ by 6½ inches).

Form 2 is the sternal puncture report form, similarly sent to the ward and attached to the notes; a résumé of this is entered on the reverse of form 3 (size 8½ by 5½ inches).

Form 3 is the card which we keep in the laboratory. The important data on which progress is judged are entered on the face of the card, and other data and records of examination that are not usually repeated, on the reverse (size 8½ by 6½ inches—stiff card).

FORM 1

S. T. M. ANÆMIA DEPT.

BLOOD REPORT

Name ..... Sex ..... Age ..... Ward ..... Bed .....

Hæmoglobin (Hellige normal hæmometer) per cent

Gm. per 100 c.cm.

Red blood cells: per c.mm.

Reticulocytes per cent

Cell volume: per cent

Mean corp. volume: Cu. µ.

Mean corp. hæmoglobin: γγ

Mean corp. hæm. conc.: per cent

White blood cells: per c.mm.

per cent per c.mm.

Neutrophils

Lymphocytes

Large mononuclears

Eosinophils

Basophils

Arneth count, I II III IV V Weighted mean. Blood group.

Abnormal cells.

Platelets per c.mm.

Coagulation time. Bleeding time.

Fragility of red cells. Prothrombin time. Capillary resistance.

Sedimentation } Observed rate (1 hour) } Corrected

Van den Bergh's } Direct test } Indirect mg. per 100 c.cm.

Opinion:

Date .....

FORM 2

S. T. M. ANÆMIA DEPT.

STERNAL PUNCTURE REPORT

Name ..... Age ..... Ward ..... Bed .....

Total nucleated cells..... Reticulocytes .....

Endothelial cells:

Red cell series:

Megaloblast.....

Erythroblast.....

Macroblast.....

Normoblast.....

White cell series:

Granular series—

Myeloblast.....

Pre-myelocyte.....

Neutro. myelocyte { A..... B.....

„ meta-myelocyte.....

„ band.....

„ segmented.....

Eosino. myelocyte.....

„ meta-myelocyte.....

„ band.....

„ segmented.....

Basophil.....

Non-granular series—

Lymphoblast.....

Lymphocyte { A..... B.....

Plasma cell.....

Monoblast.....

Pre-monocyte.....

Large mononuclear.....

Megakaryocyte.....

Undifferentiated.....

Parasites.....

Date .....

