A SIMPLIFIED PRICE-JONES TECHNIQUE*

BY

J. G. HUMBLE

Haematologist to the Westminster Hospital

AND

G. BELYAVIN

Resident Assistant Pathologist, Westminster Hospital

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The measurement of the mean diameter of the red blood cells is still one of the most important observations that can be made. Unfortunately the most accurate method of measurement by the technique introduced by Price-Jones is tedious and time-consuming. To trace the outlines of 500 cells, and then to measure the largest and smallest diameter of each, takes at least four hours. It also requires skill and practice. By the following technique, derived from that of Hynes and Martin (1936), and of Price-Jones as described fully by Mogenson (1938), the mean diameter of 500 cells can be measured and recorded in under one hour. Furthermore, the apparatus used is that found in all laboratories. It may be set up in four minutes.

Method and Material

The film is fixed with Leishman's stain for 1 min., rinsed with distilled water, and superstained with Field's eosin (Field, 1941) for 5 seconds. It is then dried in the air.

A "Pointolite" or similar lamp is used as a source of illumination. Any simple monocular microscope capable of being used in the horizontal position and fitted with a mechanical stage and oil immersion lens is used to project the image of the cells on to a series of rings drawn in indian ink on a white card mounted in a flat wooden base (Plate IIa). The rings are drawn with a fine-pointed compass with intervals of 1/2 mm. The range required is from 4.0 to 12 mm. A line 50 mm. long is also drawn on the card for calibration purposes.

The apparatus used should be set up in a darkened room on a horizontal bench which should be as flat as possible.

The mirror is removed from the microscope, which is placed in a horizontal position. The mirror is then held in a retort stand so as to reflect the light passing through the microscope on to the measuring rings laid on the bench (Plate IIb). The oil immersion lens is now used to adjust the magnification to $\times 1,000$ by projecting the image of the side of a small square in the central ruled area of a thin Thoma-Zeiss haemocytometer (50 μ) on to the prepared card on its board. The haemocytometer grid should have been darkened by smearing on a little Leishman stain and allowing it to dry. The card on its board is adjusted on the bench so that the image of the square lies on the 50 mm. line. By altering the distance of the mirror from the object lens of the microscope the side of one square of the image is made to coincide with the 50 mm. line. The magnification is then $\times 1,000$.

The stained blood film is now substituted for the haemocytometer and the image of the red cells is sharply focused on the card. By moving the card the cell diameters are measured by finding the ring which accurately contains the image of the cell. If the cell measured is not round, the ring chosen is that which is of such a size that the part outside the ring would fit into the gap left inside the ring.

In this way the diameters of as many cells as are required can be measured and recorded. The mean diameter and the standard deviation are calculated in the usual way.

Comment

The film should be as thin as possible and the part chosen for measurement should be where the red cells are not touching each other.

It is not necessary to measure 500 cells in every case, for, as Mogenson points out, the reduction

* From the John Burford Carlill Laboratories.

PLATE II.—(a) The card with the measured circles and 50 mm. line. (b) General view of the apparatus as set up.

of the standard error of the mean diameter obtained by increasing the number of cells examined from 200 to 500 is 7.2 per cent if the standard deviation is normal (up to 0.48) and only 19.2 per cent if the standard deviation is increased to 0.8.

The magnification should not be much increased above $\times 1,000$, for the distinctness of the image decreases the further the light has to travel. The resolving power of the microscope also puts a limit to the magnification that can usefully be employed.

Summary

A simple method of obtaining Price-Jones curves quickly and economically is described.

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