A system of ore mineral identification based primarily on reflectivity and micro-indentation hardness has been evolved and has proved more satisfactory than any other used hitherto. Each measurement normally takes less than one minute to complete and when the values obtained are used in conjunction with other easily observed properties such as colour, anisotropism and reflexion pleochroism, most ore minerals can be satisfactorily identified without recourse to spectrographic or X-ray methods.

Full details of the photoelectric cell apparatus and of the micro-indentation hardness tester will be published elsewhere in due course.

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Plethysmometric Measurement of Swelling in the Feet of Small Laboratory Animals

Various authors have described phlethysmometric[1–3] and planimetric[4–6] methods of measuring the volume of rats' and guinea pigs' feet before and after the injection of irritant substances. Such methods have formed the basis for the determination of the anti-inflammatory activity of adrenal steroids and other agents, and for the measurement of the local response to injections of histamine and histamine-releasing agents.

In the course of an investigation into the anti-inflammatory action of some adrenocorticoids we have developed a plethysmometric method of measuring accurately the volumes of the feet of rats and mice. We have found this method to be superior in its use to existing methods.

The apparatus (Fig. 1) consists of a modified 2-ml. microburette connected to a 5-ml. glass syringe.

Carbon tetrachloride, coloured by the addition of solid sudan III, fills the lower part of the apparatus, and the upper part contains water, to which a few drops of suitable surface-active agent have been added. The wide mouth of the burette is graduated with two marks, *A* approximately 1·5 cm. below the rim and *B* approximately 5·0 cm. below the rim.

The rat or mouse is anæsthetized by an intraperitoneal injection of 50 mgm./kgm. sodium amytal. It is important that the anæsthesia is sufficiently deep to produce a completely flaccid leg and foot, otherwise discordant readings may result from flexion of the animal's limb during measurement. The level of water is adjusted to the mark *A* by means of the syringe; the reading of the water – carbon tetrachloride interface is observed on the burette scale. The anæsthetized animal's foot is introduced into the mouth of the burette until the tip of the foot coincides with the mark *B*, thus causing the water-level to rise in the burette. The syringe is then withdrawn to bring the water-level back to mark *A*; the reading of the water – carbon tetrachloride interface is again observed on the burette scale. The difference between this and the first reading represents the volume of the animal's foot. With our apparatus the volume can be read off directly to the nearest 0·01 ml.

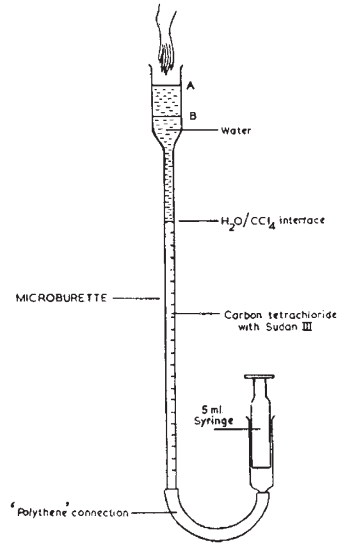

Fig. 1

The apparatus is very simple to use and the determinations both rapid and accurate. In an experiment involving 190 consecutive determinations, the error has been found to be only 1·13 per cent, sufficiently small to be disregarded. Our experiments have shown that the degree of swelling of a formalin-induced inflammation in the rat foot can be followed over a period extending from a few hours to several weeks.

Initial experiments showed that there was no significant difference ($P > 0·9$) between the volume of the rat's right and left hind foot, therefore in our experiments the degree of swelling was estimated by comparing the volume of the treated foot with that of the untreated control.

In our experiments also we thought it of interest to determine the exact location of the swelling, therefore the rats were pretreated with an intravenous injection of Evan's blue thirty minutes before the injection of formalin. The dye was found to be concentrated in the region of swelling. By this means we have been able to measure the swelling accurately and to determine its location.

It is planned to publish these results in greater detail elsewhere.

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