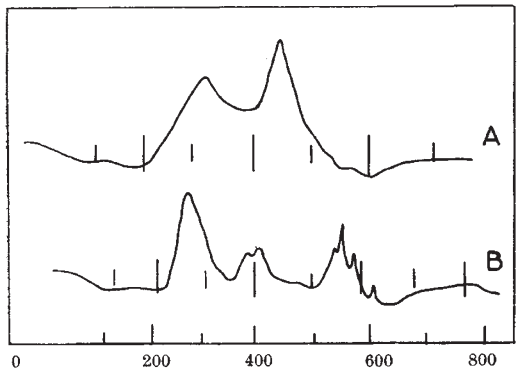

Fig. 2. Complete-combustion differential thermal curves for: *A*, 'humic acid' from *Sphagnum–Eriophorum* peat; *B*, holocellulose from *Sphagnum–Eriophorum* peat

to such differences, variations have been observed in curves for similar fractions separated from peats of different botanical composition.

It has been considered[1] that the area under the exothermic peak in complete combustion may be a measure of the calorific value of coal. The same would be expected to be true of peat, and in addition it may be possible to predict the burning characteristics of different peats from their differential thermal curves.

Systematic application of differential thermal analysis to peats has thus opened up a wide field for further investigation. Several lines are currently being followed up, and it is hoped to publish a more detailed account of the results at a later date.

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[1] Grimshaw, R. W., and Roberts, A. L., "The Differential Thermal Investigation of Clays", Mackenzie, R. C., ed., 404 (Mineralogical Society, London, 1957).

[2] Kanavets, P. I., Klimov, B. K., and Chibisova, K. I., *Transactions of the First Congress of Thermography, Kazan*, 1953, Berg, L. G., ed., 143 (Akad. Nauk S.S.S.R., 1955).

[3] McLaughlin, R. J. W., "The Differential Thermal Investigation of Clays", Mackenzie, R. C., ed., 364 (Mineralogical Society, London, 1957).

Modified Method of Carbon Marking

In the field of experimental embryology, carbon marking has been widely used for tracing the movements of cells[1]. By this method blood carbon particles adhering to the end of a needle are deposited among the cells the migrations of which are to be studied. When experiments are carried out *in ovo*, the needle, before it reaches the embryo, must first pass through the overlying layer of saline, albumen, etc., and the surface-tension effects here, as the needle reaches the surface of this fluid, cause the removal of all the particles not adherent to its very tip. To minimize this effect, it is essential that the needle be held perpendicular, and that a quick stabbing movement be used.

In the method described here, however, these surface-tension effects are eliminated, and hence the needle need not be held perpendicular, and the marking can be carried out slowly and deliberately, and therefore with greater accuracy.

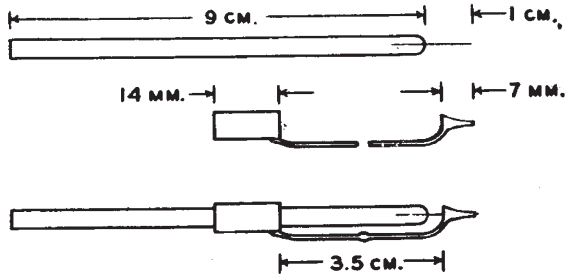

Fig. 1. The components of the carbon-marking device are shown. The dimensions are not in any way critical, but should be varied to suit the size of the individual operator's hand. The handle of the needle is gripped with the forefinger and thumb. The collar is manipulated up or down with the middle finger

The instrument is shown in Fig. 1. It consists of a tungsten needle mounted in a glass handle. A glass capillary tube is fitted over the needle, of a length slightly less than that of the needle itself. To the capillary tube a thin connecting rod is attached. Meanwhile, a collar is made which slides easily up and down on the handle of the needle, and to which a connecting rod is also attached. Both the capillary and the collar are then mounted respectively on the needle and its handle, and the connecting rods brought together and fused with a microburner flame. As the collar slides on the glass handle the capillary moves up and down exposing or covering the tip of the needle.

The instrument is loaded as follows. Blood carbon is placed in a watch glass, and spread out by rubbing with a glass rod. Saline is added. Some of the carbon will float on the surface of the saline, however, but this can be removed by throwing away the saline and refilling. Carbon adhering to the bottom of the watch-glass is picked up under the microscope on the end of the needle; but before withdrawing the instrument from the saline the collar is pushed downwards and the capillary is made to project beyond the tip of the needle so that when the surface film is broken the carbon on the needle remains undisturbed. The embryo is now placed under the microscope and the surface film of the supernatant fluid is broken with the capillary tube still held in the same position, that is, projecting beyond the tip of the needle. The capillary tube is withdrawn slightly exposing the needle tip with its adherent carbon particles. The embryo can now be marked slowly and deliberately in the intended spot.

Care must be taken to ensure that both the needle and the capillary are clean, or the carbon will not go down. Between operations the capillary should be kept wet, otherwise albumen, saline, etc., will clog the instrument. A new capillary is advisable for each operating session.

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[1] Spratt, N. T., *J. Exp. Biol.*, **103**, 259 (1946).