the partition in the separation cell, and the contents of the top compartment analyzed for activity. These contents may then be diluted to a volume sufficient to refill the cell and the above experiment repeated. After several such cycles, if the ratio of activity to the amount of the CS left in the top compartment remains constant, then it may be concluded that no substance, whatever its concentration, sedimenting significantly faster than the CS, is active.

Similar considerations should apply in electrophoresis separation-cell experiments.

References

1. BURGERS, J. M. *Proc. Acad. Sci. Amsterdam,* 1941, **44**, 1045.
2. LAUFFER, M. A. *J. biol. Chem.,* 1943, **151**, 627.
3. LAUFFER, M. A., and MILLER, G. L. *J. exp. Med.,* 1944, **80**, 521.
4. POLSON, A. *Proc. Soc. Exp. Biol. Med.,* 1948, **67**, 294.
5. POLSON, A., and SHEPPARD, C. C. *Biochim. Biophys. Acta,* 1949, **3**, 137.
6. PUTNAM, F. W. *Science,* 1950, **111**, 481.
7. SHARP, D. G., *et al. J. biol. Chem.,* 1946, **165**, 259.
8. TISELIUS, A., PEDERSEN, K. O., and SVEDBERG, T. *Nature,* Lond., 1937, **140**, 848.

Germaniferous Lignite from the District of Columbia and Vicinity[1]

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A unique accumulation of germanium has recently been found in lignite remains of *Cupressinoxylon wardi* Knowlton, 1889, from the Patuxent formation (Lower Cretaceous) in the District of Columbia and vicinity. The discovery was made in the course of spectrographic studies on concentrations of germanium, gallium, vanadium, and other elements in ash of American coals.

The highest content of germanium heretofore reported was in germanite from Tsumeb, Southwest Africa, and from the Belgian Congo; that mineral contained 6–10 percent. The ash of *C. wardi* contains up to 6 percent and many of the samples contain 3–5 percent. The ash content of the samples (air-dry basis) is between 2 and 9 percent. The average content of germanium in the crust of the earth is estimated to be 1×10^{-4} percent. Consequently, in the ash of *C. wardi* the concentration is more than 10,000 times the average.

The ashes of samples of *C. wardi* also contain vanadium (0.7%–5.0%), chromium (0.1%–0.8%), and gallium (0.03%–0.2%). Some of the samples show a large concentration of copper. Examination of the ash of Pleistocene wood in this area indicates contents of a few hundredths of 1 percent of germanium.

The *C. wardi* was identified by R. W. Brown of the U. S. Geological Survey. We are also indebted to Henry Mela, Jr., and F. S. Grimaldi of the Trace Elements Section of the Survey for confirmatory chemical analyses for germanium.

[1] Published by the permission of the director, U. S. Geological Survey.

Rapid Carbon Dioxide Test for Sickling

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Sickle cell disease is a notorious mimic and deceiver. There is need for a method to demonstrate sickling which is rapid, dependable, and simple. Sickling tests in present use are not completely satisfactory. The sealed moist preparation method (*5*), the moist stasis test (*9*), and the oil-sealed tube technique (*1*) may not give positive results for many hours. The rapid bacteriologic method (*11*) requires caring for the perpetuation of the culture and does not lend itself to use in the physician's office. Recently advocated methods involving the use of various reducing substances such as BAL (*12*), cysteine (*12*), hydrogen sulfide (*12*), sodium dithionate (*8*), sodium hydrosulfite (*4*), cevalin (*3*), and sodium bisulfite and ascorbic acid (*3*) share the common disadvantage that these reducing agents are extremely unstable and must be freshly prepared.

We wish, therefore, to describe a simple and rapid method, utilizing carbon dioxide, by which sickling can be regularly demonstrated within 5 min from the time the blood sample is drawn. The test can be conveniently performed in the physician's office.

Five to 10 ml of venous blood is collected in an oxalated tube. The blood is transferred to a 250-ml Erlenmeyer flask, and a stream of pure carbon dioxide from a small, commercially available cylinder is directed into the neck of the flask for 10–15 sec. The flask is then immediately stoppered, and the blood is gently swirled about several times. The blood darkens. After the flask has remained stoppered for 5 min, the cork is removed and a drop of blood is quickly transferred by means of a pipette to a clean cover glass. A vaseline-sealed preparation is immediately made on a slide, and the cells are viewed under high-dry magnification. Speed is essential in the transfer of the drop of blood from the flask and in making the vaseline-rimmed preparation. The presence of unequivocal sickling under high-dry magnification indicates a positive result.

Twenty-seven Negro patients who showed delayed sickling after 1–57 hr on the routine sealed preparations (*5, 9*) all gave positive findings immediately with the carbon dioxide test. Ten Negro patients who showed no sickling on the standard sealed tests gave negative results with the carbon dioxide method; the negative findings in this latter group indicate that the procedure of the new test does not of itself cause sickling.

The number of susceptible cells that sickled under the conditions of the carbon dioxide method varied somewhat from case to case. In most instances it was estimated that a minimum of from 20% to 30% sickle cells was present, but in two of our positive cases lesser numbers were found. When present, sickling was always obvious and unequivocal. In all positive cases a conspicuous number of erythrocytes that did not sickle showed distortion and angularity, which was never seen in the negative controls and which evidently represents a