a square window cut into this tube immediately adjacent to the solid portion. This window is of such a size as to correspond with the area in which the holes are drilled in the outer jacket (*A*). The edge of the square window (or windows) is filed to form a cutting knife or knives if more than one window is made as in the larger units. This tubular knife fits snugly within the outer jacket and rotates freely when activated by the pin *E*. (*3*) The brass plunger (*C*) which telescopes snugly into the open end of the hollow knife is able to rotate with it since it operates freely on the bearing at *F*, thus preventing the maceration of tissues which would occur if the plunger were fixed. The outer jacket and the knife can be made more economically of seamless steel tubing fitted into brass parts to form the shank, thus reducing the amount of machine work necessary. These three mincing parts are readily interchangeable and may be removed quickly from the activating mechanism for loading and cleaning either by retracting the bearing *F* after loosening the thumbscrew *G* or by removing the supporting bar *H* from the threaded rods.

The activating mechanism is mounted on a heavy board by supporting arms attached to the gear box at such a height that the crank may be turned readily. Rotation of the knife and the advancement of the plunger occur simultaneously when the crank is turned. The two threaded rods are geared to the crank and engage the crossbar *H*. By means of this mechanism, the plunger is advanced one sixteenth of an inch for each ten turns of the knife, thus assuring the same uniform rate of tissue advancement and cutting irrespective of the speed at which the crank is turned. This is an absolute essential if a uniform particle size of tissue is to be obtained. Since the plunger can not be advanced without simultaneous operation of the knives it is impossible to squeeze tissues through the openings in the outer jacket without this material being cut, an occurrence common to the Latapie type mincer. The activating mechanism could be improved mechanically by making it possible to alter as desired the ratio of tissue advancement to knife speed. Other modifications, such as a mechanical drive and a lathe-bed type of arrangement for supporting the mincing unit, would add to the convenience but also increase the cost.

By constructing several sizes of the three essential mincing parts, all having uniform dimensions at the shank end, and by using interchangeable casings and knives, we have found it convenient to mince quantities of tissue from 0.25 to 30 grams. Dr. A. E. Axelrod, of the Department of Biochemistry, is using a small mincing unit of 4 mm plunger diameter which will deliver 200 milligrams of tissue from a 250-milligram rat heart. The efficiency of delivery is much greater with larger units, although a small waste of tissue is inevitable because of the small dead space between the knives.

Values for Q_{O_2} obtained on tissues minced with this apparatus compare very favorably with those obtained from the larger Latapie mincer. This mincer will cut soft tissues like brain or liver into discrete particles. Dr. V. R. Potter[2] has found that this apparatus yields a liver mince of "the critical particle size needed to permit adequate inward diffusion of oxygen with minimum loss of cytochrome due to outward diffusion." Fibrous mammary tumors, cartilage and even soft bone, which are refractory to mincing with the Latapie or simple pressure mincers, are reduced readily in the apparatus as described.

The mechanical features were designed by J. S. Hipple, Medical School mechanician, who also constructed the apparatus.

M. H. SEEVERS
F. E. SHIDEMAN

UNIVERSITY OF WISCONSIN

A COMBINED FIXATIVE AND STAIN FOR THE CILIA AND TRICHOCYSTS OF PARAMECIUM

THE combined fixative and stain described here offers numerous advantages over the methods now used for the demonstration of trichocysts and cilia. The structures are stained instantaneously and the normal contour of the animals is faithfully preserved. The trichocyst stain is prepared as follows: Copper sulphate, 5 per cent., 50 cc; hydrochloric acid, 0.1N, 12 drops; blue ink, 5 drops.

If it is desired to stain the cilia only, the hydrochloric acid is omitted from the formula. To use the stain, add two drops to the culture on the slide, place cover glass and examine. The best preparations are usually found around the edges.

JAMES SUMNER LEE

DEPARTMENT OF BIOLOGY,
NORTH CAROLINA COLLEGE FOR NEGROES,
DURHAM

[2] V. R. Potter, *Jour. Biol. Chem.* (in press).

BOOKS RECEIVED

BAKST, AARON. *Mathematics—Its Magic and Mastery.* Pp. xiv + 790. Illustrated. Van Nostrand. $3.95.

BARRER, RICHARD M. *Diffusion in and through Solids.* Pp. xiii + 464. Illustrated. Cambridge University Press, Macmillan. $6.50.

FUSON, REYNOLD C., RALPH CONNOR, CHARLES C. PRICE and H. E. SNYDER. *A Brief Course in Organic Chemistry.* Pp. x + 248. 24 figures. Wiley. $2.50.

HALL, WILLIAM T. *Textbook of Quantitative Analysis.* Third edition, revised. Pp. xiv + 364. 51 figures. Wiley. $3.00.

KNOTT, JAMES E. *Vegetable Growing.* Third edition, revised. Pp. 356. 80 figures. Lea and Febiger. $3.25.

SAMPSON, H. C. *Work Book in General Botany.* Loose-leaf. Pp. vi + 242. Illustrated. Harper.