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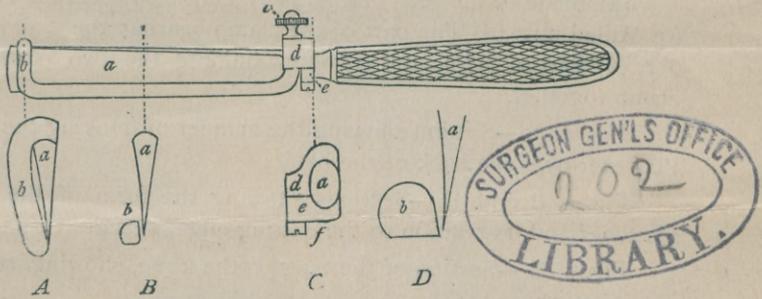
SECTION FLATTENER FOR DRY SECTION CUTTING.

(Note 1 and 2.)

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IN making sections by the so-called dry method, the curling of the sections has proved the most serious difficulty. This defect in the method is of especial importance when serial sections are made, for in that case *every section must be saved*.

To overcome this difficulty a brush has been recommended, but to use this requires one of the hands of the operator or an assistant. Schultze, as an attachment to the microtome, has devised a spring which rests upon the sections and holds them against the knife as they are cut; but this requires a sliding microtome and hence its application must be somewhat limited (note 3). Our own efforts in solving the problem have been directed toward the composition of the imbedding mass and an attachment to the ordinary section knife or razor, suggested by *Valentine's knife*. This modification consists in replacing the second blade of Valentine's knife by a rod. We



have named the attachment a *Section Flattener* (see Fig. 1, b). It was first attached to a razor and then to a section knife; in both cases it has been found entirely satisfactory, as it prevents the rolling of section even when the object is imbedded in the hardest paraffine. Indeed, in using it the imbedding mass may be safely about three degrees C. higher melting point than is permissible without it. A section knife or razor with this attachment may be used with any microtome or free hand. Besides its special use in preventing the curling of sections, the section flattener serves as a guard to the edge of the knife.

The section flattener consists of a rod (b) of spring brass about 5 mm. in diameter, flattened on two sides (B and D), extending

parallel with the edge of the knife and projecting about 2 mm. beyond it. Opposite the cutting edge, the space between the rod and knife is about 1 mm., while nearer the back of the knife the distance is greater (Fig. 1 D, a, b). At each end the rod is bent at right angles. Next the handle it passes through a hollow cylinder (Fig. 1, d), into which it is secured by a milled nut (Fig. 1, c). At the free end of the knife, the rod is hooked over the back of the blade (Fig. 1, A), the spring of the wire securing it firmly. At the two angles of the rod, it rests on the blade so that in cutting sections any amount of pressure may be applied at these points. The rod is attached to the knife by means of a clamp, which consists of two pieces clasping the tang and held together by a screw (Fig. 1 C). To clean the knife and rod, or to remove sections, the rod may be raised as it swings freely in the hollow cylinder attached to (d). The rod may be entirely removed—as is necessary in sharpening the knife—by removing the milled nut (c); the entire apparatus may be removed from the knife by loosening the screw (f).

Fig. 1. The Section Flattener attached to a section knife:

(a) Blade of the section knife; (á) Tang; (b) Section Flattener; (c) Milled nut; (d) The part of the clamp bearing the hollow cylinder; (e) Part of the clamp; (f) Screw holding the two parts of the clamp together.

Fig. 1, A.—Section showing the manner of hooking the Section Flattener over the back of the blade.

Fig. 1, B and D.—Sections showing the form of the Section Flattener and its relation to the cutting edge, except at the ends.

Fig. 1, C.—Section of the tang of the knife, showing the manner of attaching the clamp.

(1) A brief account of this *Section Flattener* is given in our paper (Serial Microscopic Sections) in "The Medical Student" for November, 1883, p. 14.

(2) Since writing this article, our attention has been called to a somewhat similar device by Andres, Giesbrecht and Mayer (Neuerungen in der Schneidetechnik: Mittheil. Zool. Station Neapel, 4 Bd. 3 Hft. (1883) pp. 429—436. An abstract of this paper is published in the Journal of the Royal Microscopical Society for December, 1883, p. 916, and in the December number of the American Naturalist, p. 1312. As our device seems simpler and is applicable to every form of section knife we thought worth while to give this somewhat complete description of it.

(3) F. E. Schultze. Ein Schnitt Strecker, Zool. Anzeiger, 1883, p. 100.