tend to explain what the directive agencies are or how they work—one thing, at least, is plain: that if a very few elementary substances can enter into an untold variety of combinations, and by virtue of this variety can be made to play a vast variety of parts, this result can only be attained by a system of mutual adjustments as immense as the variety it produces, as minute as the differences on which it depends, and as centralized in direction as the order and harmony of its results. And so we come to understand that the unity which we see in Nature is that kind of unity which the mind recognizes as the result of operations similar to its own—not a unity which consists in sameness of material, or in identity of composition, or in uniformity of structure, but a unity which consists in similar principles of action—that is to say, in like methods of subordinating a few elementary forces to the discharge of special functions, and to the production, by adjustment, of one harmonious whole.

And of this unity, we who see it, and think of it, and speak of it—we are part. In body and in mind we belong to it, and are included in it. It is more easy to admit this as a general proposition than really to see it as truth and to accept all the consequences it involves. The habitual attitude of our thoughts is certainly not in accordance with it. We look on "Nature" as something outside of us—something on which we can look down, or to which we can look up, according to our mood; but in any case, something in which we are exceptions, and which we can and ought to regard from an external point of view. It may be well, therefore, to consider a little more carefully "Man's place in Nature"—his share and position in that unity which he sees and feels around him.

AN IMPROVED MICROTOME.

By Wm. Hailes, M.D., Professor of Histology and Path. Anat., Albany Medical College.

This instrument is designed especially for use in the working laboratories of our medical schools and colleges, where large numbers of sections are required for microscopical examination.

It may be employed as a simple instrument or as a freezing microtome, arranged for ice and salt—ether spray, rhigoline, etc., etc.

The employment of ice and salt (coarse) is preferred, because it costs but little and freezes the mass solidly and quickly, and, if desired, 500 or 1000 sections can be obtained in a few moments' time of freezing is about seven minutes, except in very warm weather when it requires a few moments longer.

The instrument does not work so satisfactorily in warm weather, owing to the rapid melting of the surface of the preparation. It is absolutely necessary that the mass should be frozen solid, or the sections cannot be cut smoothly.

An extra freezer may be employed, and while one specimen is being cut the other may be frozen, and by exchanging cylinders (they being interchangeable), no delay is necessary to its continuous operation.

The art of cutting is readily acquired, and when the preparation is frozen it is the work of a few moments to obtain several hundred sections. Two hundred sections, or more, if desired, can be made each minute, and of a uniform thickness of about $\frac{1}{200}$ of an inch (thinner or thicker, from about $\frac{1}{2400}$ inch to about $\frac{1}{200}$ inch, according as pointer is set). See explanation of cut No. 1. The delivery, ease and rapidity with which they can be cut, must be seen in order to be appreciated. It is not necessary to remove the sections from the knife every time, but twenty or thirty may be permitted to collect upon the blade; they lie curled or folded up upon the knife, and when placed in water straighten themselves out perfectly in the course of a few hours. The knife I employ is an ordinary long knife from an amputating case. Perfectly fresh tissues may be cut without any previous preparation, using ordinary mucilage (acaciæ) to freeze in, but most specimens require special preparation. If preserved in Müller's fluid, alcohol, etc.,

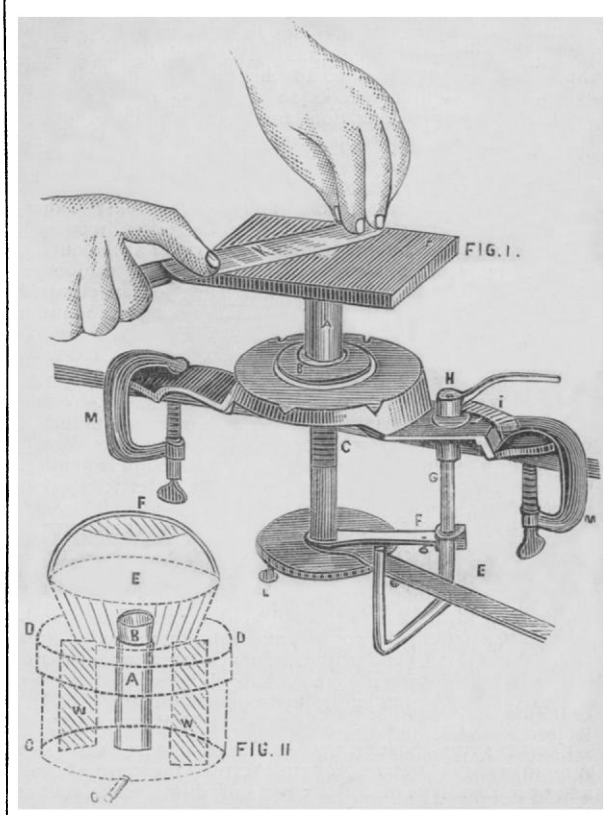

Fig. 1.—Poly-microtome (without freezing apparatus). A, small well, fitting on pyramidal bed-plate; B, pyramidal bed-plate containing different sizes; C, micrometer screw; D, ratchet-wheel attached to screw; E, lever actuating the micrometer screw by means of a pawl engaging in teeth of ratchet-wheel; F, arm carrying a dog, which prevents back motion of screw; G, regulator for limiting the throw of lever, and consequently governing the micrometer screw; H, lever nut for fixing regulator; I, index, with pointer and graduated scale, from $\frac{1}{2400}$ inch to $\frac{1}{200}$ inch; K, knife for cutting sections; L, knob to turn micrometer screw direct when pawls are detached; M, table clamp; T, table of microtome, with glass top to facilitate cutting.

Fig. 2.—A, B, tube containing specimen which is surrounded by freezing mixture in tin receiver C, D; E, F, revolving hopper with wings; W, W, for stirring the ice; G, outlet for melted ice.

they require to be washed several hours in running water; then, according to the suggestion of my friend, Dr. David J. Hamilton, F.R.C.S., etc.,* University of Edinburgh, Scotland, the specimen is placed in a strong syrup (sugar, two ounces; water, one ounce), for twenty-four hours, and is removed to ordinary mucilage acaciæ for forty-eight hours, and is then cut in the freezing microtome.

The sections may be kept indefinitely in a preservative fluid: R glycerinæ, ℥ iv; aquæ destil ℥ iv; acidi carbolici gtt, iij; boil and filter. (Dr. Hamilton). The addition of alcohol, ℥ ij, is advisable.

* See "A New Method of Preparing Large Sections of Nervous Centres for Microscopical Investigation."—*Journal of Anat. and Phys., Vol. XII.*