

and arteries may not have the same fabrick as those of the Intestines . . . I propose to be considered and examined by persons of more acute hands and judgment; as I do all what I have here delivered, nor daring too much to trust even the informations of my own hands and eyes, till I find them confirmed by those of others, more judicious as well as more dextrous in making experiments.

After two centuries Professor Carey has supplied the needed confirmation *except in one particular*; he finds that the spiral winds in the opposite direction! Carey describes a "left-handed helix,"—a spiral which reverses the direction of the rotation of the embryonic stomach and goes counter to the twisting of the œsophagus. But Dr. Cole recorded the type familiar in dextral gastropod shells, which accords with the rotation of the stomach. Although it often happens in nature, as noted by Thompson, that two opposite systems of geodetic spirals exist together, and interfere with one another, forming a criss-cross pattern<sup>1</sup> (and indeed such a condition has been recorded for the œsophageal muscles of ruminants<sup>2</sup>), it can not be invoked to reconcile the conflicting statements regarding the direction of the intestinal spiral, since both Cole and Carey agree that there is but one well-defined cleavage. Under these circumstances, the question has been referred to Professor Sykes, who, during the past season, while studying in the Harvard Laboratory, has frequently unwound the circular muscle of the intestine. Although his results are to be published elsewhere, I am permitted to report that he has verified the early work of Dr. Cole in regard to the direction assumed by the spiral; it is dextral. If this is so, Dr. Carey's explanation of that primary torsion of the embryonic intestine which determines the disposition of small and large bowels in the adult, though very ingenious, must be considered illusory, for it depends on sinistral coiling and tension.<sup>3</sup>

The origin of the spiral trend of the muscles is ascribed by Dr. Carey to "the rotating spiral

growth of the epithelial cells,"<sup>4</sup> but this is a phase of the problem which invites further study.

FREDERIC T. LEWIS

HARVARD MEDICAL SCHOOL

### NEARCTIC PROTURANS

THE Protura—the most primitive of all the insects, if indeed they are insects—were first reported from the Nearctic Region in 1909. In that year the eminent Italian zoologist and entomologist, F. Silvestri, collected and described under the name of *Eosentomon wheeleri*, a single species from New York. For the next twelve years no record was added from the vast area of the Nearctic.

The second record from this region was obtained in 1921 from the vicinity of Washington, D. C., the first specimen being found by H. S. Barber, who accidentally came across it in some leaf mold in which he was rearing beetle larvæ. Other specimens of the same species, which proved to be new, were soon taken, and the species described by the writer as *Acerentulus barberi*.<sup>1</sup>

Following the initial discovery at Washington the writer has been fortunate enough to encounter Proturans in large numbers and in considerable diversity at Takoma Park, Maryland. Here during the spring of 1921 no less than twelve species, representing six genera, were found, ten of them proving to be new. These have been described in a paper presented at a meeting of the Entomological Society of Washington.<sup>2</sup>

To these records obtained in the vicinity of Washington are now added several more from widely separated localities, and in some instances from different life zones of the Nearctic Region. These localities are as follows: Chesapeake Beach, Md.; top of Blue Ridge Mountains, near Bluemont, Va. (elevation 1,200 feet); near Prospect Hill, Va.;

<sup>4</sup> *Anat. Rec.*, 1920, Vol. 19, p. 220.

<sup>1</sup> "A Second Nearctic Species of Protura, *Acerentulus barberi*, new species." *Ent. News*, Vol. XXXII, pp. 239-241.

<sup>2</sup> "New Genera and Species of Protura," *Proc. Ent. Soc. Wash.*, Vol. XXIII, No. 9, pp. 193-202, Pl. XVI.

<sup>1</sup> *Growth and Form*, 1917, p. 489.

<sup>2</sup> Owen: *Comp. Anat. of Vert.*, 1868, Vol. 3, p. 470.

<sup>3</sup> *Journ. Gen. Physiol.*, 1920, Vol. 3, p. 76 *et seq.*

