

tate appears when diluted with distilled water. Heating the antiserum to 58° C. for two hours destroys about 60 percent of the immune bodies in all three types.

Heating to 56° C. for two hours does not impair its protection value.

All protection tests were made by Miss W. Carey Noble, to whom I am greatly indebted.

161 (2684)

On the function of the colonic spindle (*Fusus coli*) of the rabbit.

By JOHN AUER.

[From the Department of Pharmacology of the St. Louis University School of Medicine, St. Louis, Mo.]

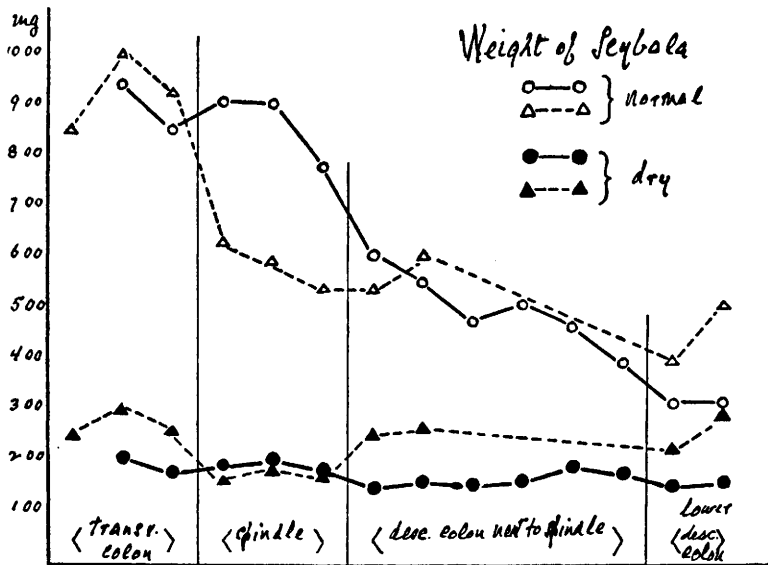
In previous notes¹ attention was drawn to an apparently undescribed, macroscopic, spindle-shaped, sphincter-bearing structure which connects the transverse colon of the rabbit with the descending colon.

One of the main functions of this organ apparently is to prevent, under normal conditions, the passage of scybala before they have been deprived of most of their water content. This seems to be accomplished largely by mechanical pressure exerted on the moisture-soaked scybala by the muscular spindle, the passage of the pellet into the descending colon being prevented by contraction of the sphincter at the spindle neck.

Evidence for this action is furnished by inspection of the active spindle in the living animal, and by inspecting and weighing the scybala in the order of their location in the transverse colon, the spindle and in the descending colon. In the living rabbit under morphin narcosis, where peristalsis has been accelerated by the intravenous injection of 0.1 to 0.3 mg. of physostigmin, one may occasionally see a spurt of fluid spiralling through the neck of the spindle into the descending colon, as a powerful per-

¹ *J. Pharmacol. and Exper. Therap.*, 1925, *Proc. Soc. Pharmacol. and Exp. Therap.*, and *Proc. Soc. Exp. Biol. and Med.*, 1925, xxii, 301.

istaltic contraction of the spindle tries to drive the mass through the closing sphincter. Obvious differences in the size, appearance and consistency of the various scybala in the different sections of the region in question also indicate the same fact. The most conclusive evidence of this mechanical dehydrating action of the spindle is however obtained when the scybala of these regions are weighed. The accompanying graph illustrates this statement; the normal weights are those which were obtained immediately after autopsy; the dry weights of the same scybala are those obtained after drying to a practically constant weight at room temperature. The weights on the same ordinate with the same symbol represent the same scybalum in the normal and the dehydrated state; those on different ordinates are different scybala; only two series of observations from different animals are recorded, as they well illustrate what is generally found under normal conditions. It will be noticed that the weight of the normal scybala drops abruptly in the spindle, and this loss of weight continues at a slower rate in the descending colon immediately adjoining the spindle. That this loss of weight is due to the loss of water is indicated by the relatively equal weight of the



Weights of the various scybala in their order of occurrence in the different sections of the colon of the rabbit. The weights are recorded as found on immediate autopsy and after drying to a constant weight.

various scybala when dried (see graph). This relative equality of dry weight of scybala in the different sections of the gut may be most striking in some animals (see circle-bar series in graph); in other animals the variation in weight of the dry fecal residue is more pronounced.

The differences in the normal weight of scybala briefly described above are not found in those rabbits where peristalsis of the colon has been hurried by drugs or by disease processes.

Whether or not the rate of absorption varies in the different colonic segments will be discussed at another time.

The diet of the rabbits consisted chiefly of oats and hay, with some green stuff; water was available at all times.

162 (2685)

The relation of contractile and food vacuoles to rhythms in *Paramecium*.

By W. BYERS UNGER. (Introduced by L. L. Woodruff).

[From the Osborn Zoological Laboratory, Yale University, New Haven, Conn.]

Experiments were undertaken to determine the relation between metabolic activity, as indicated by the rate of contractile vacuole pulsations and the size and number of food vacuoles formed, and the occurrence of rhythms in the division rate. The animals studied were pedigree races of *Paramecium aurelia* and *Paramecium calkinsi*. Two cultures of each species were studied for 115 days under constant culture conditions. Observations were made daily and averages computed for the per diem division rate, food vacuole number and size, and the pulsation rate of the anterior and posterior contractile vacuoles.

In *Paramecium aurelia*,¹ depressions in the rate of contractile vacuole pulsation are, in general, synchronous with the low points of the rhythms in the division rate and with the occurrence of endomixis. The posterior contractile vacuole pulsates

¹ Woodruff, L. L., *Biol. Bull.*, 1917, xxxiii, 51.