

SCIENTIFIC PROCEEDINGS.

ABSTRACTS OF COMMUNICATIONS.

Ninety-ninth meeting.

University and Bellevue Hospital Medical College.

President Calkins in the chair.

60 (1435)

The neuromotor system of Euplotes.

By **C. V. TAYLOR** (by invitation).¹

[*From the Zoölogical Laboratory, University of California,
Berkeley, Calif.*]

The fibrillar system of ciliate protozoöns was described by Sharp for *Diplodinium*, by Yocom for *Euplotes*. An integrated fibrillar system in the flagellate *Giardia* was described by Kofoid and Christiansen and for *Trichonympha* and *Trichomitus* by Kofoid and Swezy. The designation neuromotor apparatus has been given to this integrated organ system of the Protozoa, on the basis of morphological considerations and anatomical relations. Experimental proof of the conductile function of certain elements in this system has been accomplished in *Euplotes* by microdissection with the Barber apparatus. With this instrument actuating quartz microscalpels it has been possible to cut selected fibrils and determine the effects of the cutting and subsequent regeneration upon the previously analyzed stereotyped behavior of this organism.

Euplotes patella is a hypotrichous ciliate protozoön about 100–150 microns in length. Its neuromotor system consists of a small bilobed central mass, the motorium, at the corner of the cytostome. From this a fiber runs anteriorly and to the left at the base of the membranelles the full length of the adoral zone connecting with the bases of these motor organs. An extensive fibrillar

¹ Presented by Professor C. A. Kofoid.

lattice-work in the anteriorly projecting oral lip appears to be connected with this fiber. Running posteriorly from the motorium five distinct fibers diverge posteriorly, one each to the five posteriorly located anal cirri. No such fibers pass to the other thirteen cirri, but radiating fibrils from the base of each disappear in the adjacent cytoplasm. There is thus an integrated fibrillar system connecting the presumably sensory anterior lip, the powerful motor oral membranelles and the five major cirri of the ventral surface most active in the walking and swimming movements of the animal.

Structural relations do not indicate a supporting or skeletal function for these fibers. Observation of the fibers of living animals with moving cirri, and of the course and diameter of the fibers stained *intra vitam* and after fixation, showed not the least trace of contractility in any of the fibrillar components of the system except in cirri and membranelles.

The movements of *Euplotes* fall into two main categories, first creeping on the cirri, either (1) straight ahead, or (2) a quick backward movement, or (3) a turn aborally to the right; and second swimming movements of six types, (1) forward without spiral revolutions, (2) forward with spiral revolution, (3) circus movement to the right, (4) circus movement to the left, (5) sharp turn to the right, and (6) rapidly backward without revolutions.

Cutting experiments in which the anterior fiber or the anal fibers were severed were made to test the effect of cutting upon coördination, as revealed in these stereotyped modes of behavior. It is evident from transections of the body and excision of parts that the frontal cirri or anal cirri are indispensable to normal creeping movements, that the adoral membranelles are largely responsible for swimming movement (3), that the anal cirri function chiefly in the performance of creeping movement (2), and swimming movement (5), and that the adoral membranelles and anal cirri cooperate to effect swimming movement (6).

Cutting the membranelle fiber results in conspicuous differences in the behavior of the adoral membranelles on either side of the incision and in abnormal spiral revolutions in swimming.

Severing the fibers to the anal cirri affects both creeping and swimming. Creeping movement (2) is infrequent. Swimming

movement (5) was seldom observed and (6) was never seen after the fibers had been severed.

Destroying the motorium or cutting its attached fibers interrupts coördination in the movements of the adoral membranelles and anal cirri.

Any incision not severing either the membranelle fiber or the fibers to the anal cirri does not impair normal creeping or swimming movements although equal in extent to incisions which sever these fibers and result in loss of coördination. The conclusion is drawn that the fibrils of the neuromotor system are conductile.

61 (1436)

The mechanism of boric acid hemolysis.

By **M. KOSAKAI** (by invitation).

[From the Department of Bacteriology, Cornell University Medical College, New York City.]

Red blood corpuscles can be suspended, without direct injury, in a medium containing 1 per cent. of boric acid.

The corpuscles so treated are completely hemolyzed by sudden immersion in a suitable volume of isotonic saline or sugar solution, or in serum.

Sudden immersion of the treated corpuscles in any volume of concentrated saline or sugar solutions does not cause hemolysis and after such immersion the treated corpuscles are found to have lost their sensitiveness to immersion in isotonic saline solutions.

The gradual addition of a hemolytic volume of isotonic saline solution to the treated blood corpuscles causes no hemolysis and after such addition the treated corpuscles are found to have lost their sensitiveness to sudden immersion in isotonic saline solutions.

These observations indicate that the force operative in the "boric acid hemolysis" is that of osmotic pressure and this assumption is confirmed by the demonstration of a diffusion of the reagent into the corpuscles and by the fact that, for corpuscles that have been treated with a certain concentration of the boric acid, the minimal non-hemolytic concentrations of various substances are of identical "osmotic concentration".