ZOOLOGY

Chairman: ELIOT WILLIAMS, Wabash College

WILLIAM HOPP, Indiana State College, was elected chairman for 1958

ABSTRACTS

Preliminary Studies on Pigmentation in Cave Planarians.[1] ELIOT C. WILLIAMS, JR., Wabash College.—During the course of field studies on the fauna of Donaldson's Cave, Spring Mill State Park, Mitchell, Indiana, an interesting situation was observed in the planarian population. Within the cave the planaria lack pigment except for the eye spots and even these were lacking in some forms. In the stream issuing from the cave, planaria of varying degrees of pigmentation are present. Field observations revealed a relationship between the distance from the cave mouth and the degree of pigmentation. There are more light-colored forms in the stream near the cave mouth than there are downstream. Dr. Libbie Hyman, who described the white planarian from this cave as *Phagocota subterranea* in 1937, examined a series of these worms ranging from white to darkly pigmented and she reported that the only apparent difference between the white form and *Phagocota gracilis*, the common epigean species of the region, is that *P. subterranea* is somewhat smaller in size and lacks pigment.

Laboratory experiments are in progress using two constant temperature cabinets at 11° C, one of which is provided with constant light and the other is completely dark. Observations after three months give some indications of a difference in pigmentation between worms which have been in constant light and those which have been in constant dark. Worms were cut in half and the two halves allowed to regenerate—one in the light cabinet and the other in the dark. Those which have regenerated in the dark show less pigmentation in the regenerated portions than corresponding halves which have been in constant light. Even the original portions of the worms are slightly lighter in many cases. All worms have been fed twice weekly on beef liver and are transferred to clean dishes of dechlorinated tap water following each feeding. All transfers of those worms in the dark cabinet are made in a dark-room with illumination provided by a red photographic dark-room light. They are exposed to this illumination for a very brief time. Comparisons of the worms for degree of pigmentation were also made with this illumination.

Measurements made each week on a series of worms of varying pigmentation, some in constant light and some in constant dark, show

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no significant difference in rate of growth between those in the dark or light or between those of varying shades of pigmentation.

Attempts to graft halves of white and dark worms together have thus far been unsuccessful, but this work is being continued.

Neither asexual or sexual reproduction have occurred as yet in laboratory cultures. Pairs of white and dark worms are isolated so that any genetic control over degree of pigmentation may show up if sexual reproduction does occur.

Further Studies on the Axenic Cultivation of Planarians. C. A. MILLER, J. H. BRUMBAUGH and W. H. JOHNSON, Wabash College.—The planarians used in these experiments were obtained from Turtox Biological Supply House and are tentatively identified as *Dugesia dorotocephala.* Stock cultures of the worms have been in an active stage of asexual reproduction (fission) for the past four months, following a period of sexual reproduction in our laboratory.

Adult individuals of 2.5 cm. in length were freed of all associated forms of life by treating them with a mixture of 12 antibiotics proceeded by sterile water washes through a series of depression slides. The antibiotics used in μg per ml of de-chlorinated tap water were as follows: aureomycin•HCl, 100; chloromycetin 100; tetracycline•HCl, 100; streptomycin sulfate, 50; neomycin sulfate, 50; erythromycin, 50; albamycin, 50; vancomycin, 5; M-16655 (Eli Lilly), 5; trypaflavin, 5; filipin, 5; and penicillin, 100 units. Single washed planarians were kept in the antibiotic solution for at least 72 hours to produce the maximum percentage of axenic worms. Of 40 planarians so treated only 5 were found to be contaminated with bacteria or fungi, and these were confined to a single experiment of six treated worms. Extensive test for detection of contamination of the treated worms have been made, including tests on macerated tissues of the worms.

A few worms have now survived three months, without feeding for the first month of that period. Several fissions as well as complete regeneration of cut portions of axenic planarians have occurred. All axenic worms have fed extensively on sterile egg yolk. However, the egg yolk appears to be deficient in some growth requirement(s) for the worms. Extracts from liver, milk, cereal grasses and yeast are being used to supplement the egg yolk.

Nuclear Proteins and Genetic Information. JAY BARTON II, Saint Joseph's College.—The properties of a firmly bound complex of DNA and insoluble protein isolated from a variety of cell nuclei have been further investigated. Approximately one-fourth of the total DNA of the nucleus is involved in this complex. The purine pyrimidine base composition of the DNA is identical to that of the total DNA of the nucleus indicating that the DNA in the complex is a representative sample of the many different species of DNA molecules existing in the nucleus. A small amount of RNA is present. The protein component of the complex can be shown to be similar to a protein fraction of the microsomes in solubility, amino acid distribution, end group distribution, etc. The correlation of such analytic data with metabolic studies

from other laboratories supports a postulate that the insoluble protein of the complex operates as an information transfer system between the nucleus and the microsomes.

The Development of the Spleen of *Taricha torosa* and its Experimental Modification.[1] LOUIS E. DELANNEY,[2] Wabash College.—The spleen is usually visualized to develop as a mesenchymatous aggregation in the dorsal mesentery in the vicinity of the stomach and duodenum, e.g., in the chick. However, in the West Coast salamander, *Taricha torosa*, initial splenogenesis seems not to be mesenchymatous proliferation but rather a vascularization of the dorsal surface of the gut, seen at least by Twitty Stage 42. During succeeding stages this vascular region becomes delineated from the dorsal surface of the gut and definitively lies in the dorsal mesentery; in this period there is an increase in the sinusoidal appearance of the presumptive spleen and more and more cells of a mesenchymatous or blast nature take residence. By the feeding stage (Stage 46) the small, red spleen is seen through the relatively pigment-free and pellucid body wall. In view of the known simulatory effect on embryonic spleen growth by adult spleen grafts to the chorioallantoic membrane in the bird and in view of the excellent visibility of the developing spleen in *T. torosa in situ*, adult *T. torosa* spleen was presented to late embryos and early larvae by intracoelomic and dorsal fin grafts. Contrary to the well-established evidence of splenic size increase in birds under comparable conditions, seemingly converse results appeared in *T. torosa:* the spleen sometimes failed to be evident. Preliminary sections of "spleenless" animals shows that the failure is not due to absence of initial splenic elements but to a failure of secondary events of splenogenesis. The possibilities of immunological responses are considered and a tentative postulate reconciling the differences in avian and amphibian results is indicated.

A New Type of Killing Action in a Stock of *Paramecium aurelia* from Panama. MYRTLE V. SCHNELLER,[3] Indiana University.—A paramecin that produces the first signs of its effect in ten minutes at room temperature (22-24° C.) has been discovered in a new stock of *P. aurelia* from Panama. This stock is closely related to Varieties 4 and 8. However, it kills only Varieties 3, 5 and 9, none of which overlaps Variety 8 and only slightly Variety 4 in geographical range. Other killers are known in both Varieties 4 and 8, but no other shows any action in less than 2 hours nor this type of killing. It is characterized by the formation of huge blisters, swimming backwards, loss of shape, settling to the bottom, then death.

The paramecin is released into the medium, where it remains active for some time. Animal-free fluid was centrifuged and the supernatant proved very slightly reactive, but the precipitate very strongly so.

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[2] Carnegie Institution of Washington Fellow in Embryology, Summer, 1957, during which time some of the evidence presented was obtained.

[3] This work was supported by a grant from the American Cancer Society to T. M. Sonneborn, Indiana University.

Under the phase microscope, kappa-like particles can be seen in the animals, but they are of much larger size than any other known kappa.

With the advantage of its speed of action, this culture offers the possibility of solving some of the hitherto baffling problems of paramecin action.

Factors Affecting the Toxicity of Sodium Pentachlorophenate to Fish. CATHERINE A. BERKA, Purdue University.—One of the more important industrial toxicants that is released into streams is sodium pentachlorophenate. Experimental studies have shown that it is extremely toxic to fish. Concentrations as low as 0.04 parts per million are often fatal to minnows. In other investigations it was demonstrated that the relative toxicity of this material was influenced by a number of environmental factors including temperature and pH.

Homologies in the Male Reproductive System of the California Pocket Gopher (*Thomomys bottae navus* Merriam). 1957. W. C. GUNTHER, Valparaiso University.—The secondary reproductive organs of the adult male California pocket gopher consist of a single, median dorsal prostate and two lateral prostate glands; two coagulating glands; and two seminal vesicles. The ducts of these separate glands are traced to their respective positions in a structure not heretofore described, tentatively designed as a common ejaculatory duct. This single, median common duct empties into the urethra. Physiological evidence of the activity of the coagulating gland was not detected. A rather complete series of embryos indicate that the glands may properly be homologized with glands of a similar nature in man, rats, guinea pigs, and moles. The common ejaculatory duct appears to arise from the embryonic urogenital sinus. Its exact counterpart in other mammals has not come to this author's attention. The paired bulbo-urethral glands were found to arise also in embryos from the same primordium as similar glands in other mammals.

A Parallelism of Cheek Skin Color in Plethodontid Salamanders. ALBERT E. REYNOLDS, DePauw University.—Skin color descriptions of *Plethodon jordani jordani* and *Desmognathus ochrophaeus carolinensis* are given and utilized to emphasize a striking parallelism between cheek skin color of the former and the "imitator" variety of the latter. Macroscopic external appearance is correlated with histologic skin studies.