ZOOLOGY

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ABSTRACTS

Effects of Iradiation of *Ascaris* Eggs. C. S. BACHOFER, University of Notre Dame.—Fertilized eggs of *Ascaris lumbricoides suum*, still in the pronuclear stage, were irradiated with X-rays and with ultraviolet radiation. All eggs showed considerable delay in the initiation of pronuclear fusion, as well as delay in cell cleavage and prevention of embryogenesis. The first point was contrary to results reported with *Arbacia*, in which X-irradiation had no effect on the time required for fusion of pronuclei.

Sharp differences in the effects of X-rays and UV were found. A dose of X-rays capable of producing a 400% increase in the time required for the initiation of pronuclear fusion produced an increase of 50% in the time required for cell cleavage. This dose of X-rays prevented 70% of the eggs from completing embryogenesis. On the other hand, a dose of UV capable of producing a 400% increase in pronuclear fusion time increased the cleavage time 65% and prevented only 5% of the eggs from completing embryogenesis. Higher doses of UV, however, checked cleavage much more efficiently than X-rays, but permitted much higher survival values than X-rays.

All experiments conducted in equilibrium with air were paralleled with anaerobic experiments designed to throw some light on possible recovery mechanisms. It was found that deoxygenation and incubation for 24 hours after irradiation, before aerobic incubation, was capable of shortening the time required for fusion of pronuclei and for cell cleavage, as well as increasing the percentage of eggs that were capable of completing embryogenesis, with one exception, namely, survival after UV-irradiation at low and medium doses was not enhanced by post-irradiation anaerobiosis.

The Anatomy of *Plagitura parva*. JEWEL E. BERRY, University of Notre Dame.—*Plagitura parva* Stunkard, 1933 is an intestinal parasite of the salamander, *Triturus v. viridescens* (Rafinesque). Living specimens measured up to 7.0 by 2.0 mm. The body is flattened dorso-ventrally and is elongated and oval in outline. The cuticle is armed with spines over the anterior third of the body and along the entire ventral surface. The oral sucker is subterminal and is smaller than the ventral sucker which is located about 0.2 mm. posterior to the bifurcation of the intestinal ceca. The musculature of the body wall consists of an outer layer of circular-, a middle layer of longitudinal-, and an inner layer of oblique muscles. Extrinsic muscles pass from the body walls to the oral sucker, acetabulum, and pharynx. The excretory vesicle is Y-shaped. The two arms of the Y lie laterally in the medulla in the anterior half of the body. The main stem of the excretory vesicle opens into an

ampulla, which opens to the outside by an excretory pore at the posterior tip of the body. The brain is situated dorsally between the oral sucker and the pharynx. It consists of a pair of lateral ganglia connected by a commissure. Two pair of nerves are given off from these ganglia anteriorly. One of these pairs proceeds to the oral sucker and the other innervates the anterior part of the body wall. Three nerves originate from the posterior portion of each ganglion. Of these, the middle is the lateral nerve. Of the other two posterior nerves from each ganglion, the innermost proceeds toward the pharynx and the other toward the lateral part of the body wall. The basic structures of the digestive system, as well as the male and female genitalia, do not greatly differ from those in most members of the class Trematoda.

Relative Quantitative Photometric Determinations of Total and Polymerized D. N. A. During Nucleomegaly in Trichinosis. ANTONIO E. HARRISES, University of Notre Dame.—Samples were taken of rat skeletal muscle infected with *Trichinella spiralis* larvae at various stages of infection. The Feulgen nucleal reaction was used to follow relative changes in total desoxyribose nucleic acid in the nucleic acid of the nucleus. The methyl green stain was used as an indication of nucleic acid polymerization. A general consideration was given as to the specificity of the Feulgen nucleal reaction and the methyl green stain. It was concluded that both are specific for their respective substances in the nucleus.

Relative quantitative measurements were accomplished with the use of Photovolt-Model-512 and the respective monochromatic bands of light for absorption measurements were isolated with a Wratten B-Filter (No. 58) and a Wratten F-Filter (No. 29).

This investigation uses nuclear sizes and their respective transmission values as bases for the following conclusions: that during nucleomegaly, the Feulgen nucleal reaction indicates that there is a compensating dispersion of absorbing molecules and that the amount of total D. N. A. is then believed to remain constant. Methyl green staining indicated that depolymerization of D. N. A. occurred during nucleomegaly but when degeneration ceased, there was believed to be a recovery of polymerized D. N. A.

It should also be stressed that quantitative histochemistry is a relatively new field and that absorption measurements must be cautiously observed with the view point that many variables are present.

The North Central Conference on Biology Teaching. WILLIS H. JOHNSON, Wabash College.—The second regional conference on biology teaching was held at Douglas Lake, Michigan, August 19-30, 1955. About 90 high school and college teachers participated in the conference. The conference was sponsored by the NABT on a grant from the National Science Foundation. Some of the problems considered and some of the recommendations agreed upon were outlined.

The Effect of a Protein-free Diet on the Acid and Alkaline Phosphatase Activity in the Mouse Liver. DENNIS M. O'BRIAN, University of Notre Dame.—The effect of a protein-free diet, supplemented with a

Vitamin diet fortification mixture, on the acid and alkaline phosphatase activity of the mouse liver was observed. To determine the validity of the experimental procedure, various tests were made, and as a result of these it was shown that differences in phosphatase activity can be attributed to the mice themselves. Distilled water was used in the homogenization of the liver; and in the measurement of phosphatase activity, the whole homogenate gave the highest activity. The substrate employed in this investigation was p-nitrophenyl phosphate. On a protein-free diet, there was no observable change in acid phosphatase activity; however in the case of alkaline phosphatase, there was a marked rise in activity. When the experimental mice were returned to the control diet, there was a rapid decrease of alkaline phosphatase activity back to normal. There seemed to be a correlation between the loss of liver weight and protein content with the rise of alkaline phosphatase activity.

The Question of Natural Parthenogenesis in the Wax Moth, *Galleria mellonella*. SISTER MARY LORITA QUINN, R. S. M., University of Notre Dame.—The occurrence of natural parthenogenesis in the wax moth, *Galleria mellonella*, has been successively affirmed and denied by various workers. This report is concerned with a study now in progress to ascertain whether geographical differences in occurrence of parthenogenesis might be the basis for these contradictory reports. For the study, samples of brood comb infected with wax moth larvae and pupae were procured from seven geographical localities in a north-south distribution. A constant humidity (65%) and a varied range of temperatures constitute the experimental growth conditions. At all temperatures two sets of matings (10 males x 10 females) have been made for each locality, one using old brood comb as the larval food, the other, Haydak's formula. Morphological differences have made possible the separation of sexes in the pupa stage. At every temperature, one hundred emerging adult virgin females from each mating have been isolated in screened plastic containers using Haydak's medium as a protection against contamination by the presence of fertilized eggs. Results from the three experiments completed (24° C., 28° C., 33° C.) indicate that at these temperatures viable offspring were not produced though thousands of eggs were laid. In the very few instances where exceptions existed, contamination was suspected as the cause when repeat experiments failed to yield any viable offspring. Results from experiments at 20° C. and at 37° C. are forthcoming.

Ion Movements and Membrane Potential Changes in Frog Muscle Fibers. WILLIAM K. STEPHENSON, Earlham College.—Frog sartorius muscles were soaked in K-free Ringer at 2-6° C. for 11 to 18 hours. Following soaking the mean fiber ion concentration of potassium was about 60 mEq/liter fiber water less than that for fresh tissue; sodium was ca. 80 mEq/lfw greater; and chloride was ca. 50 mEq/lfw greater. Soaked muscles were recovered in 10 mM KCl Ringer at room temperature for 50 minutes. During recovery, a mean value of 30 mEq/lfw of potassium was reaccumulated and 30 mEq/lfw of sodium was extruded, while the chloride concentration remained essentially constant. Mem-

brane potentials were recorded at the beginning and end of the recovery period with the glass microelectrode technique. A mean value of 40 mV was obtained at each of these two times.

In individual muscles, there was no correlation between either the net amount of sodium extruded or potassium accumulated and the membrane potential changes during recovery. Likewise, membrane potentials plotted against log fiber potassium concentration do not give the straight line relationship predicted by the Nernst equation.

These results demonstrate that (1) the membrane potential is not a potassium diffusion potential, and (2) the sodium extrusion mechanism is not directly responsible for the production of the observed membrane potential.

The Rate of Loss of *Trichinella spiralis* Larvae Placed in Mice. JOHN E. KARL, JR., University of Notre Dame.—The object of this problem was to determine the longevity of *Trichinella spiralis* larvae placed in mice and their ability to establish a new infection in a host after they had been subjected to artificial digestion and refrigeration for varying lengths of time. If larvae were found in infected stock rats in sufficient numbers the portion to be used was ground up in a meat grinder and then mixed with artificial digestive juice, placed in an incubator, and allowed to undergo digestion from four to eight hours. The digested meat was then filtered and washed to remove all extraneous matter, and the processed larvae were then placed in a refrigerator for twenty-four to one hundred sixty-eight hours. Each mouse was injected with 210±10 larvae by means of a syringe and a 16 gauge needle the end of which had been fitted with a brass ball. The larvae were counted, placed in a watch glass, drawn into the syringe with 0.5 to 1.0 cc of tap water, and injected into the mouse by forcing the needle down the esophagus to the stomach.

Seventeen groups of ten mice per group were used in the study with groups one to ten being killed at hourly intervals, while eleven to seventeen were killed at two hour intervals. At autopsy the stomach, small intestine and large intestine were removed and placed in a petri dish over a water bath at a temperature of thirty-seven degrees centigrade. After one hour exposure to these conditions, each of these organs was observed for larvae by means of a binocular microscope. It was found that *Trichnella spiralis* larvae leave the stomach of the host very rapidly, with only 1.4 per cent remaining at the end of two hours. The vast majority of larvae was recovered from the small intestine with the number recovered varying inversely with the length of time the host had been infected. Very few larvae were recovered from the large intestine, with the average being 1.2 per cent of the total number injected.

The Projection of Serial Sections in Teaching Embryology. MURVAL R. GARNER, Earlham College.—A technique of mounting embryological serial sections of chick and pig on film for projection in a film strip projector is described. 35mm film is fixed without exposure to light in the usual manner. A frame for holding the film is made by fastening two light strips of wood such as screen molding about an inch apart by

occasional cross pieces. A piece of film as long as the serial section is fastened over the opening in the frame by thumb tacks pushed through the perforations of the film into the wood. The film is treated with Szombathy's gelatin fixative. Short pieces of the serial section ribbon which should have been rather heavily stained in borax carmine are floated on the film with 2% formalin and stretched with the heat of a light bulb. After drying the paraffin is dissolved away by pipetting with xylol and a clear plastic coating such as Krylon is sprayed on. This procedure gives a continuous serial section mounted on a film which can be used as a film strip.