

## ZOOLOGY

Chairman: JOHN D. MIZELLE, University of Notre Dame  
JACKSON WEBSTER, Hanover College, was elected chairman for 1955

---

### ABSTRACTS

**The Isolation of *Endamoeba histolytica* from Experimental Infections in Rats.** MAX C. MCCOWEN and MAURICE E. CALLENDER, The Lilly Research Laboratories.—In our laboratories we have experimentally infected young rats (30-35 gm) intracecally with the NIH 200 strain of *Endamoeba histolytica* associated with *Escherichia coli*. Since the Shaffer-Frye medium has been found to be satisfactory for maintaining strains of intestinal protozoa we have used the S-F medium to determine the culturability of *E. histolytica* from young rats with experimental infections.

Seven hundred twenty-five rats were examined by direct examination at autopsy and by use of the S-F medium at 37° C. Five hundred fifty-six rats were positive by direct examination. Samples from the cecal contents of 502 rats or 90.3 per cent subcultured positive in the S-F medium. One hundred sixty-nine rats were negative at autopsy but 70 or 41.4 per cent of the subcultures from the cecal contents of these negative animals became positive in the S-F medium.

A higher culturability rate was obtained with the S-F medium than with Egg Yolk Infusion medium or Boeck-Drbohlav medium.

**The Use of the Ichthyokinometer for Measuring Pharmacological Activity.** LT. THOMAS ADAMS, Purdue University.—The ichthyokinometer is a lever device attached to a fish by means of a thread and mounted appropriately to record the swimming movements on a moving kymograph drum. As the fish moves in the water the extent of its movements can be traced by the excursions of the writing lever. The influence of such factors as temperature, light and chemical agents can be measured qualitatively and quantitatively by an ichthyometer. Since the recording is due to active muscular movements it is suggested that the device be called an "ichthyokinometer." On display is such a device attached to a goldfish. The recording machine is a slow speed kymograph made by the Harvard Apparatus Co. of Dover, Mass. The drum makes one revolution in 10 hours. Some records are on display of the influence of certain drugs on the swimming activity of fish and are so labeled. Early and late effects of drugs can be seen by such a recording.

**Studies on Monogenetic Trematodes. XVIII. Nature of the Attachment of Tetraonchinae to the Gills of Centrarchids.** JEWELL E. BERRY, RALPH ONOFRIO and JOHN D. MIZELLE, University of Notre Dame.—Examination of sections of gills from four specimens of *Chaenohryttus gulosus* (Cuvier and Valenciennes) and one of *Micropterus salmoides* (Lacépède) revealed one hundred twenty tetraonchid parasites which were studied with regard to attachment to the host tissue. In every case, except

one, the haptor of the parasites was inserted between adjacent gill filaments. Apparently, the attachment of these parasites causes no damage to the host since neither leucocytic infiltration nor other striking histological changes were observed.

**The Locomotion of Frustules of *Craspedacusta*.** SEARS CROWELL and CHARLES F. LYTLE, Indiana University.—One of the types of bud produced by the polyps of the freshwater jellyfish, *Craspedacusta sowerbyi*, Lank. is the frustule or planuloid. Those slowly move away from the parent over the substratum, settle down and transform directly into new polyps. This report describes the mechanism of creeping.

A rhythmic contractility of the body was made evident when continuous measurements were made of the length, width, and the position of the anterior end of the frustule. The tip moves forward rapidly as the diameter of the frustule is decreased. This tip then retracts slightly, and nearly comes to rest as the diameter of the body increases. Then a new cycle begins. The posterior end moves forward irregularly and appears to be drawn along by the activity of the anterior two-thirds of the frustule. A complete cycle takes about three minutes.

A three-minute cycle appears very slow for contractile tissues in Cnidaria. However, similar cycles of contractility of from two to seven minutes are known in stolons, and in the body of developing hydranths of *Obelia* (Hammett; Berrill).

The speed of creeping is only one to two millimeters per hour. Hence it would seem that the frustules are more significant in population increase than in dispersal of the species, unless perhaps the frustules are often moved by exogenous forces, such as water currents.

**Some Effects of Colchicine Upon the Reproduction of *Paramecium caudatum*.** SR. AGNES JOSEPH DONOVAN and ARTHUR L. SCHIPPER, University of Notre Dame.—An increase in the rate of fission was observed when *Paramecium caudatum* was cultured in media containing colchicine (0.000125, 0.00025, and 0.0005%). The division rate per day of the experimental animals averaged 9 to 15% higher than was noted for the controls. Acceleration was found to be in inverse ratio to the concentration employed. The time required for the initiation of conjugation of the animals reared in the experimental media averaged 25% less than for the controls. It was noted that a larger percentage of the colchicine-treated paramecia conjugated in comparison to the non-treated organisms. Greater activity was found in the colchicine-treated animals; the vitality of the cultures persisted longer. No cytological alteration of either the macro- or the micronucleus was observed as a result of exposure to colchicine.

**The Trap-Door Spider, *Pachylomerides adouinii*, in Southern Indiana.** SHERMAN A. MINTON, JR., Indiana University Medical Center.—The trap-door spider, *Pachylomerides adouinii* Lucas, is reported from Indiana on the basis of an adult female collected near Floyd Knobs. This discovery provides further evidence that the southern portion of Knobstone Escarpment may be a survival pocket for certain southern animals.

**Maintenance of the Killer Trait by kk Animals in *Paramecium aurelia*, Variety 4.** P. K. CHAO, Indiana University.—When gene K of a killer of stock 51, variety 4, of *P. aurelia* is replaced by k, the animals become

sensitive within 8 to 15 fissions at maximum fission rate at 27° C. A method has been discovered, however, for maintaining the killer trait in all kk cultures for more than 30 fissions and in about half of them for more than 100 fissions. The method is as follows: The kk-plus-kappa animals derived by autogamy from heterozygous Kk killers are kept at 14° C. for a period beginning after the first and extending until after the sixth post-fertilization fission. Thereafter, these cultures were maintained at 27° C. Such kk killers became sensitives in 15 fissions when they were put back at 14° C. after the 35th fission. Either autogamy or conjugation with isogenic culture d186 kk causes the loss of the killer trait. Moreover, the killer trait is lost if the original kk animals are kept at 14° C. from the start. The maintenance of kappa by kk animals (derived from Kk killers) thus depends upon the combination of a short early exposure to 14° C. followed by subsequent culture at 27° C.

**Some Observations on the Behavior and Food Habits of Two Species of *Myotis*.** CAMERON GIFFORD, Earlham College.—An account is given of weights of two species of *Myotis* (*M. sodalis* and *M. lucifugus*) and of the diets which were most successfully used for these in captivity. A record of food and weights was kept for three months. A description of the training of these bats to fly to the author for food is given, with other observations on behavior in captivity.

**Acidophilic Granules in the Basophiles of Laying Hens.** FERNANDUS PAYNE, Indiana University.—The cause of ovulation in birds has long been an interesting but unsolved problem. The experiments of Rothchild and Fraps with fowl clearly indicate a release of the ovulating inducing hormone from the pituitary between six and four hours before ovulation. A study of pituitary cytology demonstrates the presence of acidophilic granules in the gonadotropic secreting basophiles of laying hens and their absence in non-laying hens and cocks. There can be no confusion between these granules and mitochondria. The granules are presumed to be either a hormone or a chemical substance from which a hormone is derived. The fact that the acidophilic granules are found only in laying hens leads to the suggestion that they might be concerned with ovulation, but if so the release of the ovulating inducing hormone is probably cumulative rather than sudden.

The study further shows that a given cell type, the gonadotropic secreting basophile of the pituitary of the laying hen may secrete both basophilic and acidophilic granules. The presence of acidophilic granules in these basophiles in no way implies that they are chemically the same as the acidophilic granules in the acidophiles.

**Bird Frequency of Delphi, Carroll County, Indiana.** VIRGINIA ESTEN, Delphi.—A preliminary study of the bird population of Delphi and vicinity was made during the school year 1953-54. For this, forty-four field trips (averaging one hour each, from 7:45 a. m. to 8:45 a. m.) were taken as a part of a regular high school advanced biology class. Four routes were established and maintained; three located within walking distance of the school, inside the city limits, and the fourth about five miles east of the city limits.

On each trip, all birds seen or heard were recorded, with an attempt

made to omit any duplication. Raunkaier's Law of Frequency was used to determine the frequency ratios of the 109 species reported. It was found that there was a correlation between this and other frequency studies using this law. The frequency rating for each species has been established to serve as a guide for further study of this problem.

Due to the time limits imposed, nocturnal birds have been slighted and there are no allowances made for effects of adverse weather changes. One must consider that this study covered three seasons of bird life (fall migration, winter, and spring migration) in one general area. Previous frequency studies were conducted daily during the breeding season.

However, it is believed that this study has laid the groundwork for further study and gives a reasonably clear picture of the bird life in and near Delphi during the school year. The use of Raunkaier's Law of Frequency is a reliable method to study bird population in a given area which can be compared with that of another area at the same time, or with the population of the same area at a different time.

**Unusual Concentration of Bats of the Genus *Lasiurus* Found in a Missouri Cave.** RICHARD F. MYERS, Cornell University, and ROBERT E. LEWIS, University of Illinois.—While collecting bats for banding in July and August of 1954, the discovery of specimens of both *Lasiurus borealis* (Muller) and *Lasiurus cinerius* (Beauvois) was made in a Missouri cave. This cave, located approximately eight miles north of Waynesville, Missouri, Pulaski County, is one of a series to be found in the bluffs bordering the Gasconade River. Fifteen living specimens and thirty-five skulls of *L. borealis* were taken while two living and three skulls of *L. cinerius* were kept for skins. Of the fifteen *L. borealis*, three were kept for skins and the remainder were banded and freed. The greatest concentration of remains was found in or around a large pile of rocks which had fallen from the roof of the cave about 500 yards from the entrance.

The presence of bats of this genus in caves is apparently rather rare, as only three past occurrences have been recorded. Attempts have been unsuccessful in ascertaining why these two species, both allegedly tree bats, were found in this particular cave. Much work on this problem remains to be done.

**The Reoccurrence of the Freshwater Medusa Near Richmond, Indiana.** MURVEL R. GARNER, Earlham College.—The appearance of the freshwater medusa, *Craspedacusta sowerbyi*, in an artificial pond was reported by the author before this body in 1931. Specimens continued to be found for a few summers, then they seemed to disappear. Numerous specimens were again taken in the late summer of 1954. This is believed to be the longest recorded interval of habitation by the species. A plea that future records of the species include more comprehensive data is made.

**A Report on the Analysis of One Hundred Thirty-two Pellets of the Long-eared Owl, *Asio wilsonianus*.** EARL F. GEORGE, Earlham College.—The pellets used in this study were taken from a pine planting in Jackson County, Indiana, during the period extending from February 4 to March 24, 1954. The classification of diagnostic bones was as follows: *Cricetinae*, to genus; *Microtinae*, to genus, except *Microtus ochrogaster* and *M. pennsylvanicus*, which were taken to species; *Sorecidae*, to genus; *Muridae*, to

genus; *Aves*, to family, where possible. The total number of animals found was 249. The percentage relationship found between mice, shrews, and birds was as follows: mice, 89.1%; shrews, 2.4%; birds, 8.5%. The percentage relationship found between the categories of animals was as follows: *Peromyscus*, 51.4%; *Microtus ochrogaster*, 21.9%; *M. pennsylvanicus*, 4.3%; *Synaptomys*, .4%; *Mus*, .4%; *Unidentified Rodentia*, 10.4%; *Cryptotis*, 2.4%; *Fringillidae*, 2.8%; *Icteridae*, .4%; *Paserformes*, .4%; *Undetermined Aves*, 4.9%. Total *Aves* percentage, 8.5%.

**Gene Testing in Collie Dogs.** LEE FORD, Butler, Indiana.—One object of inbreeding is to get the individual as homozygous as possible, thereby "testing" the genes by seeing their phenotypic effects. After six years of "gene testing" in collie dogs, the following can be recorded: (1) Approximately 40% of the genes in this line were "tested" and found to be "good" genes. (2) Type of collie in all inbred litters is quite similar. (3) No color change or structural abnormality was noted. (4) Collies studied were tricolors (black, tan, white). The tan appeared to segregate into lighter and darker tan. (5) Size of all mature dogs not available, but apparently little or no decrease in size. (6) Bone structure is good. (7) No lack of vigor noted. (8) No decline noted in strength of constitution. (9) In females tested, litter size remains seven or more. (10) Dispositions improved, collies all friendly, curious, eager, lovable. (11) No noticeable increase in nervousness observed. (12) The collies have not lost their alertness nor intelligence from this inbreeding.

**The Use of an Oxygen Dissociation Curve in the Interpretation of Animal Activity.** CLARENCE J. GOODNIGHT, Purdue University.—The rapidity of response of animals to stimuli varies greatly among related forms. Some species are sluggish in habit, relying on some mechanism other than speed to obtain their food and to escape from their enemies. Others are fast and respond rapidly to danger or food.

Among the turtles, the box turtle, *Terrapene*, moves slowly and relies on closing up its shell to protect itself against attacks. On the other extreme, the snapping turtle, *Chelydra*, swims rapidly and responds by quick thrusts of its jaws to the presence of food or enemies. An examination of the oxygen dissociation curves obtained for these two species of turtles shows some of the physiological reasons for this difference. The oxygen dissociation curve for *Terrapene* is hyperbolic while that of *Chelydra* is sigmoid in shape. Thus *Chelydra* is able to unload oxygen at a much greater partial pressure of tissue oxygen than is *Terrapene*. This interesting correlation of activity and oxygen dissociation curve suggests possibilities of the use of these curves to help interpret animal activity.

**Sodium and Potassium Movements in Frog Muscle Following Isolation to Ringer Solution of Varying Potassium Concentration.** WILLIAM K. STEPHENSON, Earlham College.—Frog sartorius muscles were soaked at 2-6° C. for 24 hours in saline solutions with varying potassium and sodium concentrations ( $K + Na = 110 \text{ mEq./l.}$ ). Immediately after soaking the muscles were blotted, weighed, digested in  $HNO_3$ , and analyzed for K and Na with a flame photometer. In solutions with K concentrations of 0 to 4 mEq./l. K loss decreased markedly as the K concentration of the soaking fluid was increased. Above 4 mEq./l. of K, additional K in the soaking

fluid did not decrease K loss, since K was retained at a concentration very near to that of fresh muscle. Within the range of K and Na concentrations used in the experimental solutions the average increase of fiber Na remained constant. Thus, a constant amount of Na moved into the fibers while varying amounts of K left the fibers. These results demonstrate that the passive movements of sodium and potassium in isolated frog muscle are not coupled.

(This work was carried out at the Univ. of Minnesota and was aided in part by Contract Nonr-24900 Office of Naval Research administrated by H. B. Steinbach.)