

ZOOLOGY

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ABSTRACTS

Some Factors Influencing the Lethal Temperature of *Musca domestica*.
FORST D. FULLER, DePauw University.—The experimental animals, *Musca domestica*, were exposed to elevated temperatures at two widely varying relative humidities. The exposure of the flies for a 15 minute period at the higher relative humidity resulted in 100% fatalities with the temperature between 48.1 and 49.2°C. In dry air however the lethal temperature was found to be between 56.5 and 57.0°C. The flies exposed to the dry air showed a consistent loss of weight in direct proportion to the temperature. In order to rule out the role of water evaporation as a mechanism of increased heat tolerance animals were submerged in a water bath. At a temperature of 45.5°C 95% of the flies died after an exposure of only 10 minutes. This rather sharp fall in the maximum lethal temperature might be explained on the basis of either the elimination of water evaporation as a mechanism to maintain a lower body temperature or the possible toxic effects of certain metabolites which would tend to accumulate under these anaerobic conditions.

Locomotion and Oxygen-Consumption Rhythms in *Uca pugnax*.¹
WILLIAM J. BRETT, Indiana State Teachers College.—Crabs collected weekly were subjected in the laboratory to either normal light-dark changes or to reversed light-dark conditions. Both control animals and light-reversed animals were set up in respirometers and activity recorders maintained in constant low illumination. Averages for 12 to 14 crabs were used for all hourly values. The data were analyzed for possible solar and lunar cycles. Analysis of the daily records for oxygen-consumption and locomotion in controls and reversed crabs showed a lunar cycle with two peaks generally 12 to 13 hours apart. The peaks move across succeeding solar days at an average tidal rate. In the controls the major peak was the one occurring nearer to 12 midnight; whereas, in the experimentals the major peak was the one occurring near 12 noon. The mean lunar cycle for the 29-day period revealed little if any difference between the controls and reversed animals in either oxygen-consumption or spontaneous activity. In oxygen-consumption one maximum occurred at lunar zenith in controls and experimentals, and the second occurred at lunar zenith in the controls and 2 hours before in the experimentals. For locomotion the maxima for controls and reversed animals occurred 2 hours before zenith and 2 hours before nadir. The form of the average diurnal cycle for both locomotion and respiration for the 29-day period between

¹ This study was aided by a contract between the Office of Naval Research, Department of Navy, and Northwestern University, NONR-122803.

July 21 to August 18, 1959 was just the reverse for the controls and the experimentals. In the controls the maximum for locomotion occurred at 1 P. M. and for respiration at 3 P. M. Using a 2-hour locomotion lead over oxygen consumption, a coefficient or correlation of $+0.894$ ($N=24$) between the control animals and $+0.778$ ($N=24$) between the reversed animals for the average diurnal cycle indicates that locomotion produces a considerable effect upon the form and amplitude of the oxygen-consumption cycle.

Bottom Types and Bottom Organisms of the Saint Joseph River Drainage in Indiana. CLARENCE F. DINEEN, Saint Mary's College.—A qualitative analysis and quantitative estimate of the bottom organisms and the types of bottom in the main stream and the chief tributaries based on collections from over 50 areas. Quadrats and dredges were used. Collections were taken in June and in August. Interpretations as to the future changes in populations which might be expected and as to possible potentials of the drainage system to support organisms are made. The study suggests a general trend toward better conditions (in terms of sanitation and of recreational uses) for desirable plants and animals.

Range Extension of the Allegheny Woodrat (*Neotoma magister*) in Indiana. WILLIAM J. WAYNE, Indiana Geological Survey.—Presence of the Allegheny woodrat (*Neotoma magister* Baird) in Indiana was first authenticated from specimens collected at Tobacco Landing, south of Laconia, Harrison County in 1930. It has also been reported from other counties along the Ohio River near this locality. No records have been published that indicate its presence farther north of the Ohio River.

During the fall and winter of 1958 a burrow surrounded by a pile of clay pellets and limestone fragments appeared in the corner of my garage, which is located in a hilly wooded area near the west edge of the Mitchell Plain, 5 miles southwest of Bloomington. Although the animals did not enter live traps, I was able to identify them tentatively on the basis of their nocturnal habits, fecal pellets, and character of the entrance to the burrow, and a few observations by flashlight.

After repeated failures to attract the rodents into live traps, I tried pouring water into a burrow. A few days later, on July 2, 1959, three suckling young were found lying dead on the ground about 40 feet from the burrow entrance. Each had been killed by a bite in the flank. An unbaited snap trap in the entrance to the burrow caught a female two nights later when she brushed it with a piece of bread she had carried from a compost pile. With her capture, the identification of *Neotoma magister* was confirmed. More recent observations indicate that additional animals are still present in the same group of burrows, but so far no other colonies have been noted in the neighborhood. This may be a single isolated colony or it may represent a true range extension; in either event, the area between Monroe and Harrison Counties should be checked for presence of the species.

Ethanol Permeation of Frog Muscle Cells; Energetic Interaction with the Membrane. WILLIAM K. STEPHENSON, Earlham College.—Traditionally ethanol has been presumed to penetrate living cells by passive diffusion. There are, however, two lines of evidence for postulating that, in

frog muscle, ethanol enters the cells by an interaction with the plasma membrane.

Frog sartorius muscles were soaked for ca. 2 hours in Ringers fluid with varying amounts of ethanol added. When weight changes are plotted against time the slope of the resulting curve is a measure of the rate of ethanol entry. Slopes plotted against the percent of ethanol added to the Ringer give a curve which exhibits a plateau between 5 and 9 percent. The plateau suggests that a site of entry of ethanol becomes saturated over this concentration range, and indicates a chemical combination with the membrane. This conclusion is corroborated by the observation that the temperature coefficient (Q_{10}) of ethanol penetration at 7 percent added to Ringer is about 2. A temperature coefficient of this magnitude is characteristic of a chemical reaction rather than a physical process like diffusion.

The Use of Inexpensive Substitutes for Elaborate Equipment in the Zoology Teaching Laboratory. J. D. WITHERSPOON and R. H. WITHERSPOON, Purdue University.—Instructors and students in colleges and high schools with limited budgets can construct simple teaching devices which duplicate, in principle, the expensive originals. A few of those useful in teaching respiration will be considered: (1) a beach ball and dust mask to replace the Douglas bag, (2) a milk bottle oxygen consumption chamber, (3) a Warburg-like device for measuring tissue metabolism, and (4) the filter pump aspirator for decompression studies.

The Influence of Hypothermia and Oxygen on Survival of Mice Following Bilateral Carotid Ligation. J. D. WITHERSPOON and W. A. HIESTAND, Purdue University.—We have previously reported that hypothermia increases tolerance to explosive decompression but not to decompression at 100 mm Hg/min. The reduction of respiratory capacity in hypothermia seemed to prevent mice from adapting to a slower onset of hypoxia. It was reasoned that oxygen might increase survival of hypothermic mice in which both carotid arteries were ligated. Accordingly, four groups with twenty animals in each group were subjected to the following treatments: (1) untreated controls, (2) controls plus 100% oxygen, (3) chlorpromazine hypothermia, and (4) chlorpromazine hypothermia plus 100% oxygen. In each of the first three groups only four out of twenty mice survived for a two hour time period, but in the combination of hypothermia plus 100% oxygen, seventeen out of twenty animals survived for two hours.

Cytology of the S913 Transplantable Lymphosarcoma. AARON K. WARREN, Indiana University Medical School.—Chromosome counts of the S913 lymphosarcoma, a transplantable tumor growing in C57BL/10 mice, have been made to determine the population structure of the tumor. The stemline of this tumor is in the range of 60-75 chromosomes. A morphological study of the chromosomes has revealed marker chromosomes typical of this tumor.