ZOOLOGY

Chairman: T. M. SONNEBORN, Indiana University

Professor R. M. Cable, Purdue University, was elected chairman of the section for 1943.

Mating reaction of double animals in *Euplotes patella*. E. LAWRENCE POWERS, JR., University of Notre Dame.—The double animal in *Euplotes patella* possesses two nuclear complexes, each equivalent to the complex possessed by the ordinary single animal. Mixture of the double animals with appropriate single animals results in conjugation between the two types of animals. It has been possible, therefore, to breed doubles containing nuclear complexes of varied genotypes. In many instances double animals have been produced which possess two complexes, one containing the alleles determining one mating type and the other containing the alleles determining an entirely different type (six mating types, numbered I through VI, have been described for this variety of *E. patella*). These double animals were then tested for mating type. The evidence supports the contention that in producing the mating type of E. patella each of the mating type alleles acts independently of any other mating type gene that may be present in the same nucleus.

Social organization and leadership among sheep. J. P. SCOTT, Wabash College.—A moving picture in color showed the daily and seasonal cycle of social life among domestic sheep. In descending order of importance, social behavior of females may be classified as allelomimetic (mutual imitation), epimeletic (care of others), fighting, sexual, and shelter seeking. For males sexual and fighting behavior are more important and epimeletic non-existent. Social dominance may be developed through any type of social behavior. In sheep the most important type of dominance is achieved through a reward—association of the mother with eating. The result is that the elder ewes become the leaders of the flock in most activities.

Growth studies as an aid in fisheries management. W. E. RICKER, Indiana University.—The age of most of the common Indiana game fish can be determined from the markings on their scales. If the populations of a given species, in different lakes and streams, be compared in respect to average rate of growth, it provides an objective measure of the suitability of each habitat for that fish; at least from the point of view of obtaining optimum production. Rate of growth is determined principally by (1) food available, and (2) the abundance of the fish in question and of its competitors. Pond experiments have shown a very nice reciprocal relation between growth rate and abundance. At any given level of available food, the total weight of fish produced in a season varies little, over quite a wide range of population densities. In theory, a standard optimum range of growth rates could be set up, with which

the observed growth in natural waters could be compared. Information necessary for such a standard is, however, not yet available for any species of fish in Indiana.

Respiration of the reptilia as influenced by the composition of the inspired air. D. E. STULLKEN, W. C. RANDALL, and W. A. HIESTAND, Purdue University.—Fourteen species of reptiles representing the four major orders of the class *Reptilia* were used for studies of normal breathing and the effects of hypoxia, hyperoxia, and hypercapnia. Respiratory movements were recorded by the use of appropriately constructed plethysmographs designed to accommodate the particular reptile. An exception was made in the case of the alligator whose respiratory movements were recorded by means of an accordion type pneumograph. Plethysmographs and pneumograph communicated with a recording tambour writing on a long paper kymographion. Gases of different composition were applied by way of special hoods designed to fit loosely over the reptiles' heads. The gaseous composition of the air stream inside the hood was checked by a Haldane apparatus. Amplitude and rate of respiration were recorded for each of the four orders for various mixtures of gases.

A comparison of the role of the afferent vagal fibers in respiratory control in birds and mammals. W. A. HIESTAND and W. C. RANDALL, Purdue University.—A modern concept of respiratory regulation must take into consideration at least two modifying influences affecting the behaviour of the lower, so-called *apneustic center*. The primary function of the apneustic center is that of producing a maintained inspiration. It is apparent that the apneustic center in vertebrates lower than the homoiotherms is the primary center and that the respiration of these animals is essentially of the apneustic type. Such animals lack an ability to breathe rapidly with the possible exception of the small lizards. The later phylogenetic development of higher centers seems expressly for the purpose of modifying the slow apneustic rhythm. The location of such higher centers has been shown to be approximately at the level of the pons, or even the higher region of the hypothalamus. That the vagal nerves contain inspiratory-inhibitory or expiratory-excitatory fibers or both has been indicated by various findings accumulated since the original investigations of Hering and Breuer. Rabbits show a change to a slower respiratory pace after section of one vagus, which becomes still more profound with section of the second. Birds after vagotomy are barely able to breathe. The respiration rate of the common fowl may drop to as few as four strokes per minute after bilateral vagotomy. In the panting mammal, section of either or both vagi has no effect on respiratory rhythmicity which indicates that the vagi are inactive during mammalian panting. However, in the bird (domestic fowl) the vagi are necessary for panting, for if they are both sectioned the panting immediately is lost and is replaced by slow non-panting rhythm. If only one vagus is sectioned during panting no change in rhythm results. If instead of section of the vagi, cocainization is used, the effects will be the same, i.e. when both vagi are incapacitated panting ceases.

Studies on Monogenetic Trematodes. IX. Host specificity of Pomoxis Tetraonchinae. J. D. MIZELLE, D. R. LAGRAVE, and R. P. O'SHAUGHNESSY, University of Notre Dame.—Mizelle (1936, '38) repeatedly observed four species of Tetraonchinae (*Cleidodiscus capax*, *C. uniformis*, *C. longus*, and *C. vancleavei*) on the gills of white crappies (*Pomoxis annularis*) taken from Illinois and Oklahoma waters. Of these, only two (*C. capax* and *C. vancleavei*) were recovered from the gills of black crappies (*P. nigromaculatus*) which were examined during the same investigation. Anxious to determine whether or not all four species of the parasites in question might possibly occur at times on the black crappie, Mizelle examined additional hosts from Reelfoot Lake (Ridgely, Tenn.) and the Mississippi River in Illinois, and in no case did *C. longus* or *C. uniformis* occur on the gills of the black crappies but did occur regularly on the gills of white crappies along with the other two species listed for this host.

Another case of intestinal myiasis. MARCUS W. LYON, JR., South Bend Clinic, and JOHN D. MIZELLE, University of Notre Dame.—The accumulated data available at present indicate that many ingested fly larvae do not survive the environmental conditions of the digestive tract while others do and produce intestinal myiasis of different degrees of intensity. The present case involves larvae of *L. sericata* and an undetermined species of *Sarcophaga* which were identified by Drs. Herms and Stewart of the University of California. A twenty-three-year-old housewife living in an unscreened house in the residential part of South Bend, Indiana, consulted the South Bend Clinic on several occasions for various complaints. In 1938, she complained of a burning sensation on urination. At that time her appetite was good and her bowels were regular without the use of laxatives, but she occasionally became nauseated and vomited after eating. In July, 1940, her urinary condition became worse and necessitated her getting up at night. On July 5, 1941, the patient submitted a stool for examination. It was of normal color and consistency and negative except for a few threads (10-12 mm. long) of definite plant origin. On August 5, 1941, she submitted another stool of the same general nature except that it contained many large dipterous larvae (about 10 mm. by 1½ mm. in diameter). The present case, characterized by the symptoms of nausea, vomiting, and abdominal distress is conspicuous by the absence of diarrhea which is generally one of the chief symptoms of intestinal myiasis. The history regarding the urinary trouble is interesting since Chandler (1941) recorded a case of urinary myiasis with essentially the same symptoms.

Noctuidae of Steuben County. G. S. RYAN, Angola.—This paper consists of records of the family Noctuidae which cover the period from May 1, 1937, to October 1, 1941. The records are based on sixty-two species and represents thirty-seven genera. Some of the specimens are rare, and others are common. The data cover the periods that the moths are in flight.