A second ichthyological program carried on at the Mt. Desert Island Laboratory during the summer months was continuation study of freshwater fishes, the results of which will be included in a monograph on the early life histories of the fishes of Lake Erie and its tributaries, which the writer is preparing for publication during the early winter. Mr. Vernon S. L. Pate assisted in this work. Over 15,000 larval and postlarval fishes were examined, identified, and described, and thirty-six camera lucida drawings of developmental stages completed.

10. ANTARCTIC COLLECTIONS

By R. F. Shropshire, *Buffalo Museum of Science*

During the summer of 1930, while working with the scientific staff of the Buffalo Museum of Science in their study of Frenchman's Bay and adjacent waters, work was started on material brought back from the Antarctic region.

This material was collected while on the Byrd Antarctic Expedition and can be divided into two groups. First, there is a series of sea water filtrations made between New Zealand and the Bay of Whales, from which it is hoped that some insight into geographic distribution may be obtained. These filtrations were made by passing water from the ship's pump through no. 20 bolting silk filters and preserving the residue.

The second group of material was obtained by melting pieces of ice broken from ice floes in the Antartic pack ice, and centrifuging the water. So rich is the phytoplankton community in the Antarctic Ocean that when the sea freezes, the ice is often discolored by the tremendous number of individuals frozen into its mass.

The identification of species and the preparation of a taxonomic list of diatoms found frozen in ice was started. In addition to diatoms, an interesting number of copepods were found.

11. THE OPALINID CILIATES OF THE GREEN FROG

By Robert Hegner, *The Johns Hopkins University*

All species of American frogs are infected with opalinid ciliates except the green frog and the bull frog. There is one report of an infection in a green frog (Kudo,1922). Green frogs, tree frogs and leopard frogs were studied during the summer of 1930 in an attempt to answer the following questions:

Do the adult green frogs on Mount Desert Island harbor opalinids? Ten specimens of various ages were examined. No opalinids were found but other protozoan parasites were present, including the ciliate, *Nyctotherus,* and the flagellates, *Trichomonas* and *Hexamita.*

Are young tadpoles of the green frog infected with opalinids? Large numbers of young tadpoles were examined and nearly all of them had the rectum abundantly infected.

At what stage in its life-cycle does the green frog lose its opalinids? Thirty-five metamorphosing tadpoles were examined. Fifteen with two hind legs each were all infected. Twenty with four legs each were all uninfected. Apparently the opalinids are lost during the period following the appearance of the hind legs and preceding the appearance of the front legs.

Why do green-frog tadoles lose their opalinids at this time? Previous work (Hegner 1922) indicated that this is not due to a change in food from the largely vegetarian diet of the tadpole to the largely animal diet of the adult. It is suggested that during metamorphosis the digestive glands produce a secretion that is unfavorable for the opalinids.

Can young adult green frogs be reinfected with opalinids from green-frog tadpoles? Eight specimens were inoculated per os and thirty-nine per rectum and killed and examined at various intervals. Apparently the trophozoites of the opalinids were unable to pass through the stomach and reach the intestine in a viable condition. Trophozoites remained alive in the rectum as long as seventy-two hours, but most of the specimens disappeared within twenty-four hours, and the one or two that remained were quiescent and evidently near death. None were found in five frogs after ninety-six hours.

Do tadpoles of the leopard frog retain their opalinids during metamorphosis or do they lose them and later become reinfected in the young adult stage? Twenty-two specimens were examined; five without legs, eight with two legs and nine with four legs. All of those without legs and with two legs harbored opalinids. Three of the nine with four legs were infected with opalinids. These observations, while not conclusive, indicate that the tadpoles of the leopard frog retain their opalinids during metamorphosis.

Do tadpoles of the tree frog retain their opalinids during metamorphosis? Sixteen specimens were examined; six with two legs and nine with four legs. All were well infected with opalinids. Evidently the opalinids of the tree frog are able to withstand conditions during metamorphosis and carry the infection into the adult stage.

Further work on the opalinids of the green frog should involve a study of the digestive secretions of the metamorphosing tadpoles and of the adults compared with those of the tree frog. Opalinid cysts should be used for infection experiments with young adult green frogs. A larger number of leopard-frog tadpoles should be examined. Toad tadpoles should also be studied. The cultivation of opalinids in artificial media and infection experiments with pure lines of various species of opalinids should also be attempted.

12. THE COMPARATIVE ANATOMY AND PHYSIOLOGY OF THE VERTEBRATE KIDNEY

By E. K. Marshall, Jr., *The Johns Hopkins University*

A general program of attempting to correlate the morphological structure of various vertebrate kidneys with their function has been undertaken. It is believed that such a comprehensive study will furnish an understanding of renal function from a broad biological viewpoint, will give a basis for the proper evolution of experiments on the lower animals in their bearing on human kidney physiology, and will help to localize the processes concerned in urine secretion in the histological differentiated segments of the renal tubule.

A preliminary study of the glomerulus in various vertebrate kidneys has been recently completed and published (Marshall and Smith, 3). This indicates that the gomerulus is primitively a water excreting organ, but has become modified in mammals to serve as the main route for the excretion of waste products. The hypothesis developed from the above study demands that the rate of urine flow of marine teleosts should normally be very low compared with that of fresh water teleosts. However, such experimental determinations of the urine flow of marine teleosts as have been made are frequently rather high. Doctor A. L. Grafflin, in his report given below, clearly shows that under normal conditions of existence the urine flow of marine teleosts is very low. He has further studied the cause of the increased urine flow under ordinary experimental conditions. His work is important in furnishing for the first time a base line for the functional study of marine teleosts.

There is now clear evidence that both filtration-reabsorption and tubular secretion are concerned in the production of urine by the kidney. An attempt is being made to study the relative importance of these two processes in various classes of vertebrates. A brief report of such work is given below for marine teleosts.

A. *The Importance of Filtration-reabsorption and Tubular Secretion in the Kidney of Marine Teleosts.*

It is known (1) that glucose is not eliminated by the aglomerular kidney except in merest traces. It is, however, readily excreted under certain conditions by the glomerular kidney. There is in addition strong evidence to believe that the administration of phlorizin prevents the reabsorption of glucose by the tubule. A comparison, therefore, of