

REPORT OF THE ASSOCIATE DIRECTOR AND RESIDENT BIOLOGIST OF THE REEL- FOOT LAKE BIOLOGICAL STATION

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The success of the fifth summer session of the Reelfoot Lake Biological Station may be attributed to the wisdom and foresight of the Board of Trustees of the Tennessee Academy of Science. The purchasing of additional equipment, the repairing of the foundations for the laboratory building, and the awarding of scholarships to competent research scholars after a careful investigation of their qualifications was carried on with efficiency by the several members of this group who have the welfare of the station ever foremost in their minds.



Fig. 1. A seminar group of investigators at Reelfoot Lake Biological Station. Left to right: M. V. Parker, Susie Green, C. E. Moore, Mrs. D. S. Collins, D. S. Collins, Fred R. Cagle, Frank R. Brown, Louise C. Baker, Wendell Whittemore, and C. L. Baker.

The Biological Station building with five laboratory rooms is well equipped with laboratory furniture and aquaria for living specimens. The open ground floor is covered with a concrete base and serves as an excellent laboratory for cages of living snakes, turtles, and birds. In order to protect the building from termites it was necessary to place large concrete blocks under each foundation post. In addition many of these supports were replaced. The concrete floor was extended on all four sides out beyond the foundation blocks for about one foot, all lattice was raised from the ground for a distance of six

inches, and every wood connection with the ground was broken. As an additional precaution against termites, the caretaker is supplied with creosote with which to paint all concrete blocks at intervals during the winter. These improvements were made by using native labor under the direction of the resident biologist and resulted in a considerable saving in expense.

An outstanding addition to the laboratory equipment is the photographic dark room which has made possible the developing and printing of photographs used to illustrate biological investigations. Other permanent equipment added during the summer includes numerous collecting nets, tow-nets for plankton, dip-nets, laboratory glassware such as specimen bottles, beakers, graduates and thermometers, hygrometer, rain gauge, cages for snakes and turtles, and a special vivarium for amphibia. A gravel walk was built from the laboratory steps to the outer gate.

Research at the station was carried on in various fields of biology, chemistry, and public health by a group of investigators so that the equipment and facilities of the station were used to the fullest extent. In order to correlate the various fields of endeavor a weekly seminar was held at which time each worker reported in detail his observations and general progress and received suggestions and constructive criticism from other members of the group.

Dr. Ogden Baine, Professor of Chemistry, and O. C. Yonts, a chemistry major, both of Southwestern, made an intensive study of the chemical composition of the waters of Reelfoot Lake. More than one hundred analyses were made at the laboratory and these results have been correlated with the distribution of the aquatic vegetation and fish life.

Louise C. Baker, Research Assistant, Southwestern, Memphis, studied the mating habits and life history of *Amphiuma tridactylum*, the Conger-Eel, and attempted to induce ovulation by injections of anterior pituitary. These experiments are being continued through the winter in the Southwestern Biological Laboratory.

Fred R. Cagle, student and assistant curator of the Museum, Southern Illinois State Normal University, Carbondale, Illinois, collected data on egg laying habits of the Slider Turtle (*Pseudemys troosti*), the Musk Turtle (*Sternotherus odoratus*), and the Painted Turtle (*Chrysemys picta*), studied the life history of the common water snake (*Natrix rhombifera*), and prepared a series of reptile embryos and other preserved material for his museum.

D. S. Collins, a graduate of the University of Arkansas, and at present teacher of biology in the High School, Union City, Tennessee, made an intensive survey of the Microdrili, a group of aquatic earthworms of Reelfoot Lake. Eighteen species were described and special notes have been made on their habitats and ecological relationships.

Dr. J. Henry Davis, Professor of Biology, Southwestern, Memphis, made a phytoecological study of the aquatic vegetation. From

quantitative studies of the plant populations, the vegetation was roughly divided into three aquatic zones and five types of aquatics. Measurements of water depths and conditions of water temperature and pH were made in these zones. The zonation of the plants was definitely correlated with depth and fluctuation of the water and the depth and nature of the accumulated soil materials.

Miss Susie Green, a graduate of George Peabody College for Teachers, Nashville, and at present of the teaching staff of the Sidney Lanier High School, Montgomery, Alabama, identified twenty-seven species of aquatic and semi-aquatic Hemiptera of Reelfoot Lake and adjoining streams. These species represent nineteen genera and ten families.

Dr. C. E. Moore, Professor of Biology, State Teachers College, Memphis, continued his taxonomic survey of the flora of the lake shore and vicinity.

Malcolm V. Parker, graduate of Southwestern, Memphis, collected forty-six species and subspecies of Amphibia and Reptiles which brings the total list of the Reelfoot Lake district to approximately fifty species. He finds that the economic value of the turtles indicates a need for regulation of indiscriminate collecting and that civilization has brought about a noticeable reduction in the numbers of various specimens of the lake. A study was begun concerning the wanderings of snakes, turtles, and frogs. One hundred thirty-two snakes, fifty-two turtles, and numerous frogs were marked and released (no poisonous snakes were included in this group). Only a few of these specimens have been recaptured to date.

Wendell Whittemore, a student of Southwestern, Memphis, assisted the Associate Director in the routine duties of operating the station such as building cages, obtaining supplies, collecting specimens, and keeping the laboratories and equipment in proper order. In addition he made a very careful survey of the summer birds of the lake, spending several hours each day on the open waters of Blue Basin and vicinity.

The Associate Director collected several hundred specimens of various fishes of the lake. Many of the larger forms were obtained from commercial fishermen while the smaller types were taken with hand seines. Their diagnostic characteristics were tabulated and summarized in a paper on commercial, game, and rough fishes of Reelfoot Lake. A detailed study of the smaller forms will be continued at a later date. In a preliminary survey of these types, several species were found that deserve special mention. Thus *Notemigonus hayi*, *Erimyzon sucetta*, and *Notropis cercostigma*, taken from Reelfoot Lake, results in an extension of the geographical distribution of these forms as given in the recent check list by Jordan, Evermann and Clark (1930). Several hundred feet of movie films were made of the station, the lake, the aquatic vegetation, and living turtles and fish in the laboratory aquaria.

The Division of Malarial Investigation of the United States Department of Public Health was represented this season by Frank R. Brown of the School of Medicine, Vanderbilt University, who studied the life history and habits of *Anopheles walkeri*.

In addition to the above mentioned workers, numerous other investigators used the facilities of the station for brief intervals. Among these may be mentioned Drs. LePrince and Johnson of the United States Public Health Service, Memphis, Mr. J. W. Fox of David Lipscomb College, Nashville, and Frank Trapido of the National Park Service. Classes in nature study and field biology of George Peabody College for Teachers, Nashville, Southern Illinois State Normal University, Carbondale, Illinois, and Murray State Teachers College, Murray, Kentucky, paid short visits to the station. An ever increasing number of tourists, farmers, fishermen, sportsmen, and students were conducted through the laboratories and observed the experimental specimens, the aquaria population, and general procedure of biological research. The questions asked by these visitors concerning the everyday facts and fables of fish, snakes, and turtles indicated the importance of an educational program for the layman which includes elementary principles of nature lore, game conservation, and protection of wild life.

The experiences of one season as Resident Biologist allows the Associate Director to discuss briefly the practical value of the station, the necessary equipment needed, and a program for future research. The Lake, with its abundant aquatic vegetation (Davis, 1936), serves as a feeding ground for millions of migratory water fowls and as a natural hatchery for numerous types of game fishes. Hundreds of sportsmen and fishermen of Tennessee and neighboring states from Illinois to Louisiana find it worth while to return year after year for hunting and fishing. In order to preserve the natural resources of Reelfoot Lake and maintain or even increase the diminishing supply of ducks and game fishes a very thorough biological survey should be made. Most of the research in progress during this season included certain phases of such a survey, yet much remains to be done. A hydrographical study should be made of the lake depths and the topography of the bottom soils. An analysis of soil samples from the lake would give an indication of future favorable or unfavorable conditions of the lake for game, and an annual record should be made of the water level, temperatures of air and water in relation to rainfall, snow, and winds. Data should be collected on the kinds, number, weight, and size of all fish taken by amateur fishermen. Such a census has been made in California, Michigan, and Wisconsin by use of CCC labor. Practically no investigations have been made on the feeding habits of game fishes of a warm water lake such as Reelfoot and no observations have been recorded on the time of breeding in Tennessee of our common game fishes. Facts such as these are necessary before laws can be passed to protect spawning fishes. No hard and fast line can be drawn between research that is of direct sig-

nificance to the increase in fish population and that which is of indirect or of no significance. The abundance and distribution of such forms as turtles, snakes, frogs, birds, trees, and shrubs of the lake and vicinity may influence the development and abundance of all of the important fishes and water fowls.

Several years of research on such a biological survey is needed. The United States Bureau of Fisheries, the National Park Service, and the Biological Survey of the federal government are in a position to cooperate in such a program. Certain funds are necessary to provide boats, chemicals, nets, laboratory equipment, living conveniences, and the general living expenses of trained investigators. The development of the biological station will be determined largely by our ability to become associated with those state and federal departments that are directly concerned with fisheries research and game conservation.