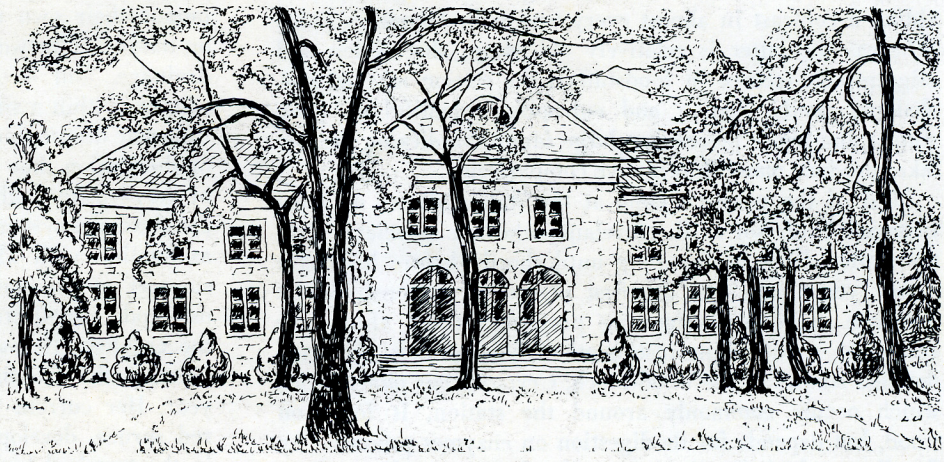
Mountain Lake Biological Station

By ELIZABETH MURRAY
Dept. of Biology, U.Va., Charlottesville



Sketch by Lucile Walton, Danville

IF a local resident of Giles County, Virginia, were asked what was to be found at Mountain Lake, he would probably reply, ". . . a lake, a hotel and a bug station . . . ." If pressed further as to the activities at the latter, he might say that the folk there spent their time fooling around with snakes. This reputation seems rather one-sided and limited, and so an attempt is made here to set the record straight.

The Mountain Lake Biological Station (alias 'bug station') completes its forty-first summer session this year. The station is situated nearly 4000 feet up on Salt Pond Mountain in southwestern Virginia. It has a magnificent location for inland field biology, surrounded by beautiful and largely unspoiled countryside with a rich variety of habitats and abundant flora and fauna.

Mountain Lake itself is one of only two large natural lakes in Virginia. It is almost a mile long, about a fifth of mile wide and about 150 feet deep. At the south end of the lake stands the Mountain Lake Hotel, a resort which has been in operation since 1856. Behind the hotel rises the highest point of the area, Bald Knob, 4363 feet. At the north end of the lake there are large boulders of Clinch sandstone resting on the underlying formation of Martinsburg shale, and it was probably when the boulders slid into their present position, damming up the stream which had previously flowed down this narrow valley, that the lake was formed. At the present time there are no streams running into the lake; it is fed solely from several deep springs on the bottom. Outflow is by seepage through the natural dam at the north end into Pond Drain and the New River and so eventually into the Gulf of Mexico.

The history of the lake in recorded times is known since the middle of the eighteenth century although some of the accounts about it are conflicting. The lake was discovered in 1751 by Christopher Gist, who was exploring and mapping the area for the Ohio company. It seems probable that he found the lake in very much the same condition as it is today. Since that time, reports that the lake has been completely dry on several occasions are confusing. However, it is likely that there were at least two periods when the water was extremely low if not completely absent. One of these was a prolonged period of several decades at the end of the eighteenth century during which time a number of sizable trees grew on what is now the bottom of the lake. These were partially immersed and hence killed when the lake filled up again. At the turn of the twentieth century, hotel employees sawed off the trunks of the trees to prevent damage to the lake boats, but some stumps were still seen on the lake bed by Dr. Frederick Marland, who wrote his doctoral thesis in 1967 on the lake. Another brief dry or low period is supposed to have occurred just after the end of the Civil War. Dr. Ivey Lewis, one of the co-founders of the station, recorded an eyewitness account from an elderly local lady who visited the lake during this time when she was a girl.

When Dr. Lewis and Dr. Bruce Reynolds, professors of biology at the University of Virginia in Charlottesville, founded the Biological Station in 1930, they used Thompson cottage, belonging to the hotel and close to the lake, as the laboratory. Four years later, operations were moved a mile beyond the lake to the site which the station still occupies today. This land was provided in perpetual lease to the station by Mr. John B. Laing, who owned considerable acreage on Salt Pond Mountain. Additional land is available now for station use through the generosity of Mr. and Mrs. James Wiltshire, and in the adjoining Jefferson National Forest where 1500 acres have been designated a scenic area. Biological research may be conducted by the University on this land, but timber cutting and other development will not be allowed.

Facilities at the station have gradually increased over the years. The main stone laboratory was built in 1939 with money from the General Education Board. It was extensively renovated in 1965 with a large grant from the National Science Foundation. There is laboratory and classroom space for the running of four courses at a time, and additional rooms and equipment for about fifteen research workers. The summer session is divided into two five-week terms, so that eight courses can be given. These are taught at the graduate level on a variety of subjects. Herpetology, Invertebrate Physiology, Algology and Plant Taxonomy, Animal Behavior, Pteridology, Mammalogy and Ecological Genetics were offered in 1970. Courses include lectures and laboratory work with many field trips into the surrounding countryside. The directorship of the station is shared today by two University of Virginia professors, Dr. James L. Riopel and Dr. J. J. Murray, Jr., who run the summer session in alternate years.

There is at present living accommodation at the station for about 100 people. Four large cottages on the main lawn

The author has spent four summers at Mountain Lake since her husband became co-director of the biological station in 1964. Dr. J. J. Murray, her father-in-law and our Bird of the Month author, has taught ornithology there.

serve as dormitories for single people, two for girls and two for men. In addition, there are sixteen cottages and five apartments for couples and families. One of them, Rafinesque cottage, is equipped as an all-year-round unit with a small laboratory at one end and a complete efficiency apartment at the other, so that investigators may come up to do research when the rest of the station is not open. During the summer sessions all meals are provided in a central dining room, with the catering staff supplied by the Food Services of the University. The buildings are all called after station benefactors or southern biologists. The original idea was to have a place at the station named for a famous scientist from each of the southern states.

Some recreational facilities are provided, volley-ball, badminton, ping-pong, boating and swimming. There are trails through the surrounding forest which are kept cleared for hiking by members of the station. The Appalachian Trail runs within a few miles of the grounds, and there is a good hiking trail now to the Cascades, a local beauty spot and a favorite collecting area for station botanists.

In addition to Mountain Lake, the station also has its own lake, on the eastern side of the main laboratory. This was made in 1965, the construction money coming from an anonymous donor. It is an interesting lake ecologically, providing a contrast in almost every way with Mountain Lake. Whereas the latter is relatively old, deep, sheer-sided and oligotrophic (scarce in foodstuffs), the station lake is new, shallow, gently sloping and eutrophic (plentiful in foodstuffs) and hence possesses a large fauna. Studies on the two lakes produce many informative comparisons.

Most of the research done at the station draws on local material. Professor L. R. Cleveland, who was associated with the station from its founding until shortly before his death a few years ago, was the first person to demonstrate the presence of cellulose-digesting protozoa in the alimentary system of wood-feeding insects other than termites. He made detailed studies of the wood-roach, *Cryptocercus punctulatus*, which occurs commonly around the station. It feeds on wood, but depends for its digestion on enzymes produced by flagellates which live in its gut. In their turn, these protozoans depend for survival on the wood which the roach eats. This is a very good example of efficient symbiosis and Dr. Cleveland's monograph describing it, published in the Memoirs of the American Academy in 1934, still stands as one of the great classics of protozoology.

The salamanders of the area have been attracting considerable attention in recent years. Dr. James Organ, from New York, has been making extensive studies on population structure and behavior in the family Plethodontidae or lungless salamanders. About 20 or more species of these occur in the Southern Appalachians and hence are accessible to herpetologists at the station. Many salamanders have elaborate reproductive behavior and some of the courtship patterns have been observed for the first time in the laboratory at Mountain Lake and recorded on film. Due to the wide variety of suitable habitats and the fact that many of these were not frozen during the last glaciation period, the salamander fauna of this area is one of the most abundant to be found in the world.

Flowering plants always provide popular subjects for study. Besides the course on Plant Taxonomy which is often offered in the summer session, there are individual investigators with special plant interests. Dr. Ritchie Bell, from Chapel Hill, N.C., is a frequent visitor, working on distribution problems in such groups as the Scrophulariaceae and Compositae. Dr. R. K. Burns, who was originally best known for his work on the early development of the opossum, has recently devoted his energies to the orchids and lilies of the region. He has been encouraging many species to grow and proliferate in a small fenced garden round his cottage at the station, and has had remarkable success now with four lilies and over two dozen orchids which are thriving and blooming under his careful attention.

The ferns of the Appalachians form a large and highly varied plant group. Dr. Warren Wagner, who teaches the Pteridology course at the station, has collected extensively in the area. He has had considerable success in finding grape-ferns (*Botrychium*), wood-ferns (*Dryopteris*) and club-mosses (*Lycopodium*), many of them of northern affiliations and some beyond the previously known southern limits of their range. One of the Pteridology students this year collected a species within twenty miles of the station which was not formerly known east of South Dakota. Dr. Wagner has drawn on local material for his cytogenetical research on fern species and some of their hybridization problems, and is optimistic that almost any eastern temperate fern might be found in the Mountain Lake region.

Many other specialists come to the Biological Station to pursue their own research interests. The laboratory stands on the divide between the James River and Mississippi River drainage, and so freshwater biologists have a chance to sample, within a small area, animals from streams with very different destinations. Dr. Horton Hobbs, a former director of the station, has added much knowledge to the taxonomy of crayfish, through his work with species from these different drainage systems. Some of his research is carried out in association with Miss Margaret Walton who spends every summer at the station, and is primarily interested in the ostracods (small crustaceans) which live in association with the crayfish. Her sister, Miss Lucile Walton, who has contributed the frontispiece to this article, also comes every year. Her current work is on the insect which attacks the red spruce, developing what are known as 'pineapple galls' in the terminal buds and producing gross malformations in the growth of the tree.

So it is not all 'fooling around with snakes' at the 'bug station.' Actually, during the first term of the recent summer session, when Dr. Harry Jopson of Bridgewater College was teaching the Herpetology course, only one rattlesnake was brought in. This was found by the Plant Taxonomy class and hastily killed. The boys responsible asked me what one could do with a dead rattlesnake, and when I said "... cure the skin and eat the meat ..." and they realized I was not joking, they took my advice. Dr. Jopson, who always collects a large number of non-poisonous species during his course, usually manages to get one live rattlesnake during the summer. He likes to give a short demonstration with this for the instruction and safety of all members of the station, and to put it on display at the station's Open House, which is arranged sometime during the Herpetology course.

Perhaps the fact that we had neither a rattlesnake nor a copperhead on display at Open House this year will reduce our reputation for taking a disproportionate interest in snakes. And perhaps the other demonstrations of classwork and research which were on show at that time, together with these remarks, will help to give a more realistic picture of the Mountain Lake Biological Station.