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SOME NOTES ON THE ZOOLOGY OF LAKE ELLIS,
CRAVEN COUNTY, NORTH CAROLINA, WITH
SPECIAL REFERENCE TO HERPETOLOGY.

BY C. S. BRIMLEY.

The writer in company with some of his friends spent about a week in the vicinity of Lake Ellis, Craven County, N. C., in late June, 1905, about two weeks in early May, 1906, and nearly a week each, in late May of 1907 and 1908. On all of these occasions he made observations on and collected specimens of the reptiles and batrachians he came across.

Mr. H. H. Brimley, Curator of the North Carolina State Museum at Raleigh, headed the party in 1905, 1906, and 1908, but was absent in 1907, in which year the party was headed by Mr. Franklin Sherman, Entomologist to the North Carolina Department of Agriculture, who was also one of the party in 1905 and 1908. Mr. R. S. Woglum, at that time acting entomologist in Mr. Sherman's place, was one of the party in 1906.

During our stays there we lived in Camp Bryan, a three-room hunting camp, the use of which together with other privileges was generously granted by Mr. G. A. Nicoll of Newberne.

Lake Ellis is a shallow body of water in Craven County, situated some five or six miles west of Havelock, a station on the Norfolk and Southern railroad. It is between one and two miles in width and breadth, its limits being somewhat indefinite owing to its shallowness and the amount of surrounding marsh which may or may not be actually included in the lake, at different heights of water. Running east and west through the lake is the "north canal," the banks of which are wholly submerged for at least half the distance, and which in its lower portion receives the water of the lake from a ditch entering

obliquely on the south side. The canal empties into Slocum's Creek, which in turn runs into Neuse River some distance below Havelock. A second canal or ditch, the "south canal," runs out of the lake about a mile south of the north canal and parallel to it; but it contains running water only when the lake is comparatively high. Lake Ellis is quite shallow, its depth not exceeding two feet at the times when I was there, and on the submerged bank of the canal, which was our usual route to Great Lake, was only from a few inches to a foot deep except in alligator holes.

Great Lake, a much larger and deeper body of water, lies due west from Lake Ellis, into which it drains, and is separated from Ellis by a tract of woods, about half a mile wide. Little Lake, similar in character to Great Lake, lies about as far from Ellis on the north, and is likewise bordered on the Ellis side by woods. Long Lake and Catfish Lake, the other two lakes of the group, I did not visit.

Of mammals, some cotton mice (*Peromyscus gossypinus*) were taken in the camp in May, 1906, a cotton rat (*Sigmodon hispidus*), was killed outside camp in May, 1908, while roof rats were seen dead by my brother when on a visit there in the winter of 1908-9. Marsh rabbits (*Lepus palustris*) are plentiful in the vicinity, while the Virginia deer, wild cat, opossum, raccoon and bear also occur in greater or less numbers. There were no signs of muskrats around the lakes, nor has my brother ever noticed any during any of his hunting trips there in the winter.

Among the fishes, mud minnows (*Umbra pygmaea*) were not uncommon in the pools where the *Stereochilus* were taken, ditch fishes (*Chologaster cornutus*) were abundant both in the lake and in the pools of water above mentioned, while swamp darters (*Copelandella quiescens*) were also fairly common in the lake. No other fishes of especial interest were noted.

A small shrimp (*Palæmonetes*) was quite common in the lake, as also were crayfish (*Cambarus blandingi*).

A small red creature apparently a mite of aquatic habits was common in the waters of the lake, and was said to sting like "stinging nettles" (Jellyfish), but we were none of us harmed by it.

Quite a large number of species of reptiles and batrachians

were observed, these being mainly Lower Austral forms, and I here give a full list of them, adding also some unpublished records from other portions of eastern North Carolina.

Plethodon glutinosus.

VISCID SALAMANDER.

Found rather commonly under logs in woods in all four years.

Stereochilus marginatus.

MARGINED SALAMANDER.

A single specimen taken under a log in Great Lake woods in June, 1905, and not noted to be other than *Desmognathus fusca* till after my return to Raleigh, first called our attention to the fact that this rare species occurred in this region. Special attention was devoted to securing it in 1906, our efforts meeting with great success. One day Henry, our colored cook, led us to look for an alligator which he had seen in the south canal. On arriving at the canal my hopes began to rise as it was nearly dry, there being no stream running through it, and only a few small pools of water standing in its bed, below where the waters of the lake ceased. These pools looked just the right kind of place for the larvæ of *Spelerpes ruber* and hence by analogy for *Stereochilus* which so greatly resembles them in form. My brother and I set to work to drag out the dead leaves and vegetable mud, and throw it up on the sloping banks of the canal. On doing this the sirens or salamanders would crawl from under the trash and run swiftly towards the water, in doing which they were usually captured after a second or two of exciting suspense. In this way we soon began to get *Stereochilus* and before we ceased operations had nearly a dozen, some being obtained by merely scraping away the covering of semi-decayed vegetable matter around the edges of the pools. In the afternoon my brother kept up the good work and got more specimens.

Two days later, finding that the pools had been about worked out, I went down the bed of the canal and scraped away with my hands the layers of vegetable debris whenever I came to a likely place, and secured in this way something over twenty specimens. They were mostly found lying in little cells just below the surface layer of vegetable matter. One siren, three small *Farancia*, one small *Abastor*, and three *Rana virgatipes* were also captured at this time.

A few days later I was in Great Lake woods and devoted my energies to dipping out the pools at the lower end of the old overflow from Great Lake into Lake Ellis, with the result of getting about twenty *Stereochilus* (about half of them larvæ), half a dozen small sirens, and two small amphiumas.

In 1907 and 1908 the water in Ellis was somewhat higher. Only seven specimens were secured in 1907 (five of them by dipping while the other two were dug up out of the marsh by Sherman while looking for fish-bait), and only about four or five in 1908.

In habits *Stereochilus* seems to approach *Siren* and *Amphiuma* with which it was found associated, being apparently an aquatic mud-burrower.

In general form the animal very much resembles a larval *Spelerpes* but differs from them in its markings. The general larval appearance however, together with the absence of gills is sufficient to easily distinguish it from all our other salamanders.

In color it is brown with longitudinal dark lines along the sides, these being often more or less broken; the underparts are pale usually sprinkled with little dark spots like fly-specks, but they are occasionally marbled or immaculate. The larvæ, which attain nearly the size of the adult before losing the gills, are similar in color, but usually unspotted below and with the lines on the sides less pronounced; occasionally, however, they differ from the adults only in the presence of gills. One adult had the gills lacking but the gill cleft still open. The groups of large pores on the head are very characteristic, and even to the naked eye give it a pitted appearance.

The measurements of fourteen adults, including all the largest, were: Total length, maximum 95, minimum 65, average 81; tail, maximum 45, minimum 31, average 36.7. Eleven larvæ measured as follows: Total length, maximum 87, minimum 62, average 75.5; tail, maximum 42, minimum 29, average 36.7.

Desmognathus fusca.

BROWN TRITON.

Common, usually under trash or dead leaves near water, less aquatic than *Stereochilus*.

Amphiuma means.

DITCH EEL.

Two specimens 201, and 195 mm. long taken in pools in Great Lake woods in May, 1906. These were of course typical *means*, with two-toed feet, and darker and more uniform coloration. Of the two forms of the ditch eel I have had numbers of specimens and have never seen any intergrades. The three-toed specimens (*tridactyla*), of which I have had over a hundred at different times, all from Hale County, Alabama, differed from the two-toed ones in being lighter colored both above and below, and in living specimens at least, in being distinctly bicolored, the underparts being nearly white and distinctly defined from the color of the sides, and not gradually fading into it; the limbs of the three-toed form also seem to me to be more strongly developed than in typical *means*. Typical *means* is distinguished from *tridactyla*, by the smaller number of toes and by the color being blackish above, passing gradually into paler slate below. It does not seem to attain as great a size as *tridactyla*, as although I have handled as many specimens as of the other, I have never seen a *means* attain the size and particularly the girth of the largest specimens of *tridactyla*, I had one recently that measured 29 inches long and 6 inches in girth, and I think I have seen still bigger ones.

Siren lacertina.

BLACK EEL.

Thirteen specimens ranging from 120 to 222 mm. long taken in pools in May, 1906, as described under the head of *Stereochilus*.

Hyla squirella.

SQUIRREL TREEFROG.

A number were sent me by Mr. J. J. Ballard in June, 1905. (Has also been taken at Cape Hatteras by H. H. Brimley, in July, 1905, and by Franklin Sherman near Southport, in October, 1906.)

Hyla femoralis.*

PINE TREEFROG.

Three taken on trees along the edge of the north canal in May, 1907. (Also taken by Sherman near Wilmington in December, 1901.)

Acris gryllus.

CRICKET FROG.

Abundant.

Bufo americanus.

COMMON TOAD.

Three adults taken in May, 1907, were typical *americanus*, and not *lentiginosus*.

Bufo quercicus.

DWARF TOAD.

About half a dozen taken in drier situations in May, 1908. (Also taken by Sherman on Shackleford's Banks, near Beaufort, N. C., in June, 1901.)

Rana pipiens.

LEOPARD FROG.

The commonest and most evenly distributed *Rana* of the region.

Rana clamata.

SPRING FROG.

A single small specimen taken in a pool in Great Lake woods in May, 1907.

Rana catesbiana.

BULLFROG.

Heard on each trip. A few were seen but none taken.

Rana virgatipes.

COPE'S FROG.

Six specimens taken in 1906 and 38 in 1907, none being over 45 mm. in length of head and body. These little frogs were found in shady places wherever there was water, and in such situations acted much like cricket frogs, almost always coming to the surface immediately after jumping into the water, and seldom diving to the bottom and hiding there.

Anolis carolinensis.

GREEN LIZARD.

A few seen each year.

Eumeces fasciatus.

BLUETAILED LIZARD.

A few each year.

*A third of the southeastern treefrogs, *Hyla cinerea*, the Carolina treefrog, was taken by H. H. Brimley at Cape Hatteras in July, 1905.

Liolepisma laterale.

GROUND LIZARD.

Occasional.

Carphophiops amoenus.

GROUND SNAKE.

Taken each year rather commonly under logs in woods.

Farancia abacura.

RED-BELLIED HORN SNAKE.

Three small specimens and three good-sized adults taken in May, 1906. The latter were taken by H. H. Brimley and were *in coitu*, the third specimen, an albinistic male with the red of the lower parts replaced by pure white, being twined up with the other two, a normal male and female. The female, the largest of the three, measured 1,417 mm. long (a specimen taken by H. H. Brimley, near Newberne in 1885, measured 1,847 mm. long and is the largest specimen of which we have heard).

Abastor erythrogramus.

HOOP SNAKE.

A small specimen and an adult taken in 1906. In spite of the vernacular name given, all the evidence seems to point to *Ophisaurus ventralis* (the joint snake), being the hoop snake of vulgar fable. When this latter animal has had its tail broken off at all near its body and has started to grow a new one, the new portion is of quite a different color from the rest of the tail and looks not unlike a short stout horn, and this fact is, I believe, the basis for all the wonderful yarns about the hoop and horn snakes.

Diadophis punctatus.

RING-NECKED SNAKE.

One taken in May, 1906, and another in 1907, both while looking for *Stereochilus* in Great Lake woods. Both specimens had the yellow neck ring incomplete above, it being interrupted in the center by a narrow bar of the color of the back.

Ophibolus getulus.

KING SNAKE.

Rather common.

Bascanium constrictor.

BLACK SNAKE.

Common.

Coluber guttatus.

RAT SNAKE.

One killed by Woglum in May, 1906.

Coluber quadrivittatus.

STRIPED CHICKEN SNAKE.

One taken by Sherman and myself in May, 1908. It was a good-sized adult, quite dark in coloration. (Also taken by H. H. Brimley at Cape Hatteras in July, 1905.)

Heterodon simus.

HOG-NOSED SNAKE.

One brought us by Mr. Ballard in June, 1905. (Two specimens taken in Wake County, near Raleigh in October, 1907.) The spreading adder (*Heterodon platyrhinus*), so common in the interior of the State, was not observed in either year.

Haldea striatula.

BROWN SNAKE.

One specimen brought us by Mr. Ballard in June, 1905. Very young specimens of this species not infrequently have a white crossband or half collar on the nape.

Natrix fasciata.

SOUTHERN WATER SNAKE.

Two medium-sized specimens taken, one in 1906, the other in 1907, belong to this form. No specimens of *N. sipedon* were taken.

Natrix fasciata erythrogaster.

COPPERBELLY.

One a little over 1,200 mm. taken in May, 1906, and two, one 1,200, the other 1,100 mm., in May, 1907. These Copperbellies, as they are called in North Carolina, are uniform rusty red above, and yellowish red below. This form also occurs at Raleigh, where *sipedon* and not *fasciata* is the prevailing form.

Natrix taxispilota.*

PIED WATER SNAKE.

This snake seemed to be not uncommon in the region, though but three specimens were actually secured, one in each year. The 1907 specimen was the longest, measuring 1,340 mm. in length. Tails of two specimens were taken from the stomachs of alligators in 1906, a part of one was vomited by a young cormorant in 1905, and one or two specimens were seen alive but not secured.

Ancistrodon piscivorus.

COTTON MOUTH.

Two good-sized specimens killed in June, 1905; not seen in other years.

Ancistrodon contortrix

COPPERHEAD.

One specimen of this snake was killed by Woglum in Little Lake woods in May, 1906.

Crotalus adamanteus.

DIAMOND RATTLESNAKE.

A large skin of this species is in the State Museum at Raleigh, and was sent there from Havelock, near which place it was killed.

* A specimen of *Tantilla coronata*, our only eastern Dipsadine snake, was brought to me at Raleigh May 6, 1905, by a colored boy who said he had found it on the edge of some woods. Taken at Southern Pines, by G. M. Gray, May, 1909.

Crotalus horridus.

BANDED RATTLESNAKE.

Said to be not uncommon, and H. H. Brimley killed one near camp in May, 1908. Henry knew both the diamond and banded rattlers, but seemed to think they were merely different sexes.

Terrapene carolina.

BOX TORTOISE.

A single specimen of the highland terrapin, as it is called in the South, was seen in June, 1905.

Pseudemys scripta.

LADY TERRAPIN.

Common; specimens seen and taken in all three years, the largest weighing 8½ pounds. In 1905 many broken eggs were seen along the banks of the canal, the contents of which had been probably consumed by the raccoons that had dug them up. On May 24, 1907, on our way to camp from Havelock, I found a good-sized specimen which had been digging a hole to lay its eggs in. The hole had evidently been dug by the hind feet, as these were covered with dirt, while the fore feet were completely clean. The hole was some three or four inches deep, and just large enough to admit the animal's hind foot.

Pseudemys floridana.

FLORIDA TERRAPIN.

A shell of this species seen in 1905, and another in 1906.*

Aromochelys odoratus.

MUSK TURTLE.

One taken each year in 1905, 1907 and 1908.

Chelydra serpentina.

SNAPPING TURTLE.

Not seen, but is known to occur in Slocum's Creek.

Alligator mississippiensis.

ALLIGATOR.

Alligators were apparently common in all the lakes, but none were abroad in open water in 1906 or 1907, it being too early in the season. In 1905 a nine-foot specimen was killed by H. H. Brimley, on Great Lake, on the first day of our stay, and a number of others were seen on Great, Little, and Ellis Lakes. In May, 1906, eight specimens ranging from 5 feet 3 inches to 7 feet 11 inches were dug out of their holes and shot. In 1907 none were observed. The method adopted to secure them in 1906 was briefly as follows: The party looking for them searched around

* Three good-sized adults of this species were brought me from the vicinity of Richardson's Pond on Buffalo Creek, in Johnston County, N. C., on June 28 and 30, 1905, by Frank Lewis, who caught them while seining.

Henry informed me that a small flat terrapin with round yellow spots, which was, of course, *Chelopus guttatus*, occurred in the streams of that region.

the edge of the marsh or of an island until a place was found where it was evident from the muddy water that an alligator had gone into his hole. One man with a fish gig thereupon probed about through the surface layer of roots and grass until he found the alligator's body, when he stuck in the gig and held on. A second man with a spade then dug a hole through the marsh as near as was convenient, making sure, of course, of digging into the alligator's run. A pole was then procured and the animal prodded with it until he not only bit but held on. He was then dragged to the surface until sufficient of his head was visible to allow the man with the rifle to finish him with a bullet through the brain.

None were taken or looked for in 1907, and only one captured in 1908, no special effort being made in either year to procure specimens.



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