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19.

A Note on Eggs and Young of *Leioheterodon madagascariensis*
(Duméril & Bibron).

ROGER CONANT

Zoological Society of Philadelphia

(Plate I).

The life histories of the great majority of reptiles are so poorly known that even the most fragmentary observations may be of value. Certainly herpetology, which has made extraordinary gains in the past few decades, is still far behind other fields, especially ornithology, when the lack of details on the sizes of eggs and young, etc., is considered. While I have no particular interest in the fauna of Madagascar, and scarcely know its literature, I publish this brief note in the belief that it may help to bridge the gap in our knowledge of an interesting snake. Monsieur F. Angel, of the Paris Museum, the principal worker on the Malagasy herpetofauna, in response to an inquiry, writes under date of November 13, 1937, "Je ne connais pas de travaux particuliers traitant de reproduction des *Leioheterodon*."

A large female *Leioheterodon madagascariensis* arrived at the Philadelphia Zoological Garden on May 11, 1937, in an exchange shipment from the London Zoological Gardens. On the morning of July 18, 1937, it was discovered coiled about 13 eggs which it had laid during the night. It did not move while photographs were being taken, and only slightly shifted its position when it and the eggs, which were laid on the cage floor, were covered with damp peat moss. However, it left them and lay in the rear of the cage during the afternoon, but returned to its former position in the evening. The next morning it moved away from the eggs again and, possibly as a result of being accidentally disturbed, did not approach them for many hours. They were removed, therefore, to an aquarium and buried in a mixture of slightly damp, rotten wood and peat. In this mixture they were kept, at ordinary room temperatures, until they hatched.

The eggs were adherent to one another and grouped in a single cluster. The shells were white, parchment-like and yielded slightly to the pressure of one's fingers. Small, hard nodules, slightly raised above the surrounding surfaces of the eggs, were scattered over them.

Owing to their positions in the cluster it was impossible to measure all of the eggs. The lengths, in five of them, varied from 46.1 to 50.0 and averaged 47.8 mm.; the widths, in seven, varied from 29.9 to 34.1 and averaged 32.3 mm. Their weight, as a unit, was 376.1 grams, or an average of 28.9 grams for each egg. The female was 1,483 mm. in length and weighed 926.6 grams. (All weights and measurements recorded July 20, 1937).

The first indications of hatching were observed early during the afternoon of October 16, 1937, when it was noticed that the shell of one of the

eggs had a small slit in it. Protruding from this opening was the snout of a young snake, surrounded by a mass of bubbles resembling spittle. Two hours later snouts were found protruding from two other eggs; five heads were out early in the morning of October 17 and a total of seven were visible the evening of October 18. At this time, however, none of the young snakes had yet left their shells. They seemed very wary, and even when their heads were entirely out they withdrew them inside their shells when an observer approached. Even passing one's hand over the aquarium or turning on a photo-flood lamp caused them all to retreat back into the eggs. Masses of bubbles, such as the one described above, were seen around or near each head. Some of the eggs had two or more slits in them.

The cluster of eggs and the hatching medium were examined in detail the afternoon of October 19. Two young had escaped from the shells and buried themselves in the peat. Another was out by early evening and by the next afternoon a total of six had emerged. All were very lively, sought to burrow in the peat when they were handled and one expanded its neck in a manner very similar to that employed by *Heterodon contortrix* when alarmed. All of them strongly resembled the female in coloration and pattern except that their lighter markings were more vivid.

The last of the 13 little snakes left its shell shortly after noon, October 22, and the entire brood was weighed and measured soon afterward. The figures obtained are as follows:

Snake	Weight	Length
1.	18.2 grams	324 millimeters
2.	19.1 "	335 "
3.	18.3 "	336 "
4.	20.3 "	343 "
5.	19.0 "	337 "
6.	18.7 "	339 "
7.	16.2 "	314 "
8.	18.2 "	343 "
9.	19.4 "	348 "
10.	18.1 "	337 "
11.	19.5 "	338 "
12.	19.8 "	342 "
13.	18.0 "	334 "
Average	18.68 "	336 "

With a single exception the eyes of all of the little snakes were over-cast, indicative of an approaching moult. In the snake with clear eyes, and one of the others, egg teeth were still in place; all the rest had lost them. This was the only time during the entire hatching period that any egg teeth were observed, although the snouts protruding from all the top-most eggs were examined several times with a lens. The two young in which egg teeth were seen must have come from eggs lower in the cluster and must have been among the last to hatch. One specimen shed its skin on October 27, two on October 28, seven on October 29, two on October 30 and one on October 31.

Attempts to feed the small snakes were almost 100% unsuccessful. They consistently refused to eat the small frogs, baby mice, earthworms, insects, etc., which were put in their cage, except as indicated in the following notes: One snake seized a frog by the head but let go and lost

all interest when the frog kicked its legs. Specimens refused the legs of freshly killed frogs. Two started to swallow them when they were forced into their mouths but rejected them almost immediately thereafter. One snake chased a young mouse and caught it by the tail. It attempted to constrict it, but instead coiled around its own body. The mouse was removed, killed, returned to the cage and wiggled by the fingers. The snake constricted it and started to swallow it tail first but gave up the job before the mid-point of the body was reached. One little snake pursued a small, green frog, *Rana clamitans*, seized it, but let it go at once. Another snake caught it and swallowed it.

In contrast to the lack of interest in food displayed by the young snakes, the adult female has thrived in captivity and has accepted several kinds of animals as food. She has eaten *Rana clamitans*, *Rana pipiens*, *Rana catesbeiana*, white mice, rats and baby chicks. Small prey she seizes and swallows as it struggles; larger animals are constricted.

The several specimens of *Leioheterodon* were noticeably similar to *Heterodon* in several respects. The keeled and turned up rostral, the robust body and the habit of flattening the neck (noticed in the female and several young of the group) are all suggestive of the hog-nosed snakes. In no case, however, did the specimens of *Leioheterodon* keep their necks in the flattened position for any length of time, as is such a common habit with *Heterodon*. They returned to their normal positions almost at once. This may have been due to captivity, however, for in *Heterodon* captive specimens usually fail to perform after one or two demonstrations.

I wish to express my indebtedness to Mr. Arthur Loveridge, Dr. Howard K. Gloyd and Dr. E. R. Dunn for helpful suggestions during the preparation of this manuscript.

SUMMARY.

1. Thirteen eggs, averaging 47.8×32.3 mm. in length and width, and 28.9 grams in weight, were laid by a specimen of *Leioheterodon madagascariensis* in the Philadelphia Zoological Garden, July 18, 1937.
2. The eggs started hatching 90 days later and the last of the brood left its shell 96 days after the eggs were laid. The young snakes averaged 336 millimeters in length and 18.68 grams in weight.
3. The young snakes showed little interest in food although one ate a frog and one started to eat a mouse. The female ate frogs, rats, mice and chicks.

EXPLANATION OF THE PLATE.

PLATE I.

- Fig. 1. Female *Leioheterodon madagascariensis* coiled around her clutch of thirteen eggs a few hours after they were laid.
- Fig. 2. Eggs of *L. madagascariensis* hatching. The snouts of two of the baby snakes may be seen protruding from the shells. A third is visible beneath the slit in the shell of the right-hand egg. Photographs by Mark Mooney, Jr.

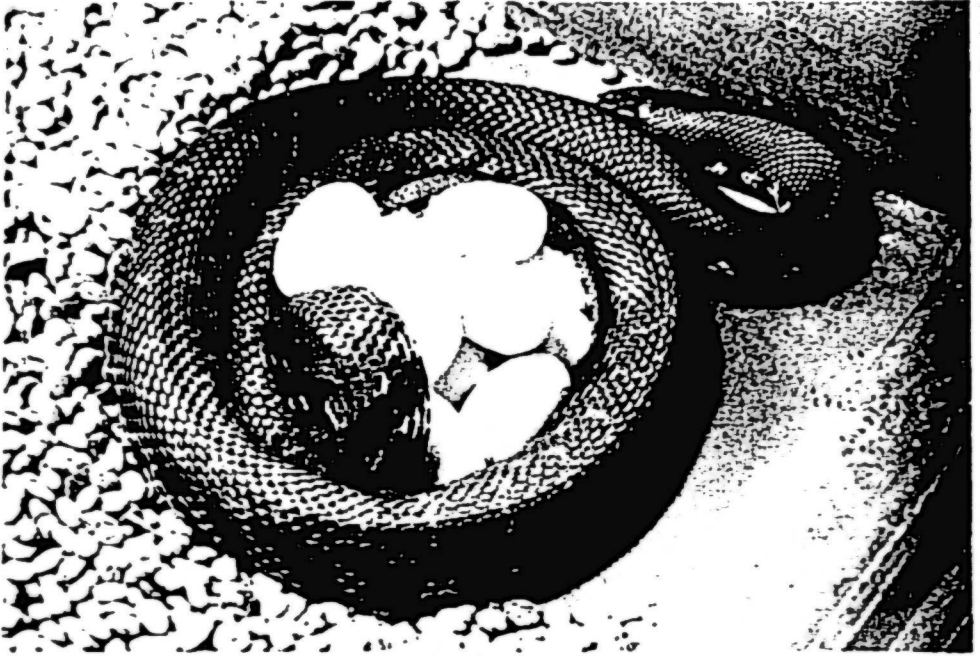


FIG. 1.



FIG. 2.

A NOTE ON EGGS AND YOUNG OF *LEIOHETERODON MADAGASCARIENSIS*
(DUMÉRIL & BIBRON)