1972. A summary of observations of the earless monitor, *Lanthanotus borneensis*. *SARAWAK MUSEUM JOURNAL*, 1972: 323-327.

A Summary of Observations of the Earless Monitor, *Lanthanotus borneensis*

by

ROBERT G. SPRACKLAND, JR.

Research conducted with the Platynotan lizard *Lanthanotus borneensis* has been, until recently, largely taxonomic in nature. McDowell and Bogert have culminated all such work in a joint paper published in 1954. Underwood made some useful, and necessary, critisisms in 1957. Before these works, the earless monitor was often placed in the family Helodermatidae, containing the only poisonous lizards, but the idea that it *might* be a monotypic family itself was suggested by the discoverer of the species, Steindachner.

It is not lack of interest that has prevented detailed study of living *Lanthanotus*, but the fact that it has been a very scarce species. When McDowell and Bogert did their paper, based on a single preserved specimen, it was the only specimen in the United States at the time. At the time of this writing, about fifty individuals have been found, and a fair number kept in captivity. In this paper, I will attempt to summarize the observations of captive *Lanthanotus*, and set forth a few working ideas as to the natural life of the lizard.

Examination of live earless monitors began with the lone specimen of Mr. Tom Harrisson (1961, 1961b), then of the Sarawak Museum. His specimen immediately impressed its keeper with the fact *Lanthanotus* is not a very active creature. Since then, this character has been universal among captives. In 1963, Sarawak was victim to some severe flooding, which resulted in an unequalled collection of these lizards. Then, in 1964, four specimens of this rare prize were sent to Dr. Robert Mertens in Germany, who contributed a great deal by his observations (Mertens, 1964, 1966, 1971). The fact that one of specimens is alive today shows that the animal has a fairly long life span.

Feeding these captives was the first major obstacle in caring for them. Harrisson fed his specimens the yolk of sea turtle eggs. Not being to easily procured in Germany, and the United States, where specimens were sent, another food had to be found. As it turned out, the common sole, *Pleuronectes*, of the cold Northern Atlantic became a reliable food. Since then, Mertens (1971) has induced his specimen to eat earthworms. While we don't yet know what the diet of this

animal is in its home, McDowell (1972) comments that the palate indicates that the animal consumes an easily swallowed, soft type of foodstuff.

Another feature which adds onto the fact that the lizard is lethargic, it can reduce its metabolic functions to a minimum, causing a stupor in which it goes limp and becomes oblivious to its surroundings. Even if handled, a lizard in this state will ignore it.

The papers of Harrisson and Mertens show that even when the lizard is active, it moves neither quickly or far. The front legs are primarily used to steer the animal while the hindlimbs and body combine to push the animal along. The result is a snake-like progression, as the body is not lifted from the ground. While active, *Lanthanotus* may utilize its bifid tongue as a snake would, but does not fllicker this member; rather, it leaves the tongue extended for a few seconds and then retracts it (McDowell, 1972).

All captives have demonstrated nocturnal activity. Mertens (1966) mentions that his specimens would repose in a dark box by day and move about by night. Harrisson, studying his "Datu" (1966) also reported nocturnal wandering.

Lanthanotus is known as a semi-fossorial lizard. Captives have been kept in soil filled boxes, and would promptly "dig in". Mertens lizards even tried to secrete themselves beneath a water dish. Yet for all the time spent in the soil, so too does the lizard enjoy a small pool of water, in which it may repose for days. It is an accomplished swimmer, but the extent of its aquatic habits has not been thoroughly investigated. While none have reproduced in captivity, it is interesting to note that the one case of mating was done in the water. About the only resemblance to the true monitors is in the long, muscular neck. While burrowing or swimming, the powerful neck is essential to progreeion.

The tail of this animal lacks the power of autotomy, found in so many other lizard groups. The tail is at least to some degree prehensile, but whether the animal uses it for propulsion or balance is uncertain. It may be used for swimming, as did its extinct relatives, or it may be a reserve of fat to carry it through times when food is scarce. As the animal is not as surefooted as some of its saurian relatives, the tail may simply aid it maintain a grip on irregular surfaces.

In view of what is known about this lizard, and considering that we have yet to examine one in the wild, I am going to present some ideas of mine in the direction of establishing the natural history of *Lanthanotus*.

Lanthanotus is at home in the water. It spends days there, it may feed there, it mates there. It is well equipped for an aquatic habitat, a fact which leads me to believe that the earless monitor is predominantly an aquatic lizard. While one may recall that in captivity the Gila monster (*Heloderma suspectum*) is quite fond of water, it *lives* in the desert; *Lanthanotus* lives in the jungle, in moist earth or in water. The lower eyelid of *Lanthanotus* is provided with a clear scale, which allows the lizards to see with its eyes closed. It is also a feature common to many aquatic vertebrates, including the crocodilians. This eyelid is almost always used by the lizard. While it is argued that the lizard is primarily a burrowing form by some, I doubt that this is the case. Those species well adapted for burrowing, such as *Anelytropsis Dibamus, Feylinia* and *Typhlosaurus*, all have the eye concealed by skin, making the organ useless. *Anniella* has functional eyes and eyelids, but the latter is not provided with a clear "window".

One feature that *Lanthanotus* shares with the burrowing lizards is the lack of an external ear opening. This may be an adaptation for its aquatic nature, but it seems more likely to be a trait adapted for burrowing. Nevertheless, one is remined that crocodilians close their ear from the outside when underwater, and they don't burrow when they come ashore. McDowell examined the ear of *Lanthanotus*, and showed it to be well developed beneath the skin.

A feature that marks *Lanthanotus* as well suited for a watery world is the arrangement of the nostrils. These lie facing up and slightly back, and repose upon a pair of raised mounds. This feature is similar to the crocodiles, as well as *Dracaena, Neusticurus and Amblyrhynchus*, except that the last three named lack the mound and the nostril is situated just slightly laterally. Nevertheless, this is quite different from the low, lateral nostrils of the burrowing genera mentioned above.

At one point, I began to suspect that because of the tail's prehensility, *Lanthanotus* might occasionally climb (Sprackland, 1970). However, in view of the other aquatic adaptation I feel its primary use is to aid in swimming. However, because a stream, as those the lizard inhabits, are liable to be swift-running, the tail may act as an anchor, something like one would find in the seahorses. In this way, the animal could remain secure in one spot while foraging, or whatever.

Here, one is again questioning "well, why does it burrow?", to which I would say it is a function of homeostasis. *Lanthanotus* is known to exist in cool surroundings, such as a stream, or Harrisson's air-conditioned bedroom. In the first report by him, Harrisson said

that the lizard had to have water often, or it would desicate. Now, if a beast that were nocturnal would come on land at night to forage for whatever it eats, the cool night air would be a minor problem after the cool stream. But, as in the case of the first specimen, suppose the animal wandered a good way from the water. Not being a quick animal, it may find itself about to be landlocked by day, where the heat would kill it. Still moist, it muse therefore burrow into the soil, rock in clay, where it is. In this enclosed recess, it would be safe from dessicating until nightfall, when it could return safely towards the water.

However good this may sound, we are still left with the problem of metabolic reduction. The marine iguana, *Amblyrhynchus cristatus* of the Galapagos Islands, is capable of reducing its bodily functions in a similar way, a device which probably helps it survive the change of temperature from the hot rocks on land, to the much cooler sea where it forages for food. Similarly, the metabolic mechanism in *Lanthanotus* is probably a device to allow save adjustment from one temperature extreme to another.

I see no reason to assume that *Lanthanotus* is not an aquatic form by nature. The modern platynotans are known to be able to swim quite well; some *Varanus* have been spotted at sea miles from the nearest land. And, too, it is from this stock of the Sauria that the great marine reptiles of the past came.

Material examined

The specimens from the following collections were used: American Museum of Natural History (AMNH); Field Museum of Natural History (CNHM); the author's collection (RGSPPC); and the University of Kansas Museum of Natural History (KU).

AMNH 87375; CNHM 134698-99, 1346711 151714, 130981, and 148589; RGSPPC 36: KU 93274.

Acknowledgements

I wish to gratefully acknowledge the help of Drs William E. Duellman, Hymen Marx and Richard G. Zweifel, who allowed me free access to their valuable charges, and to Dr. Samuel B. McDowell whose conversations greatly influenced my ideas. I am indebted to Mr. Joseph T. Collins for his excellant photographic work on my behalf, and Mr. Hymen Marx for the illustrations of a juvenile *Lanthanotus*. My sincerest thanks go to Mr. Russell Rak, my long time friend at the American Museum of Natural History library, without whose help my work would have been much hindered; to Mr. Benedict Sandin for his continued help and support; and most of all my parents, whose help

has come in many ways. To all my thanks. Any mistakes or over-assumptions are solely my fault.

Literature Cited

HARRISSON, H. "The Earless Monitor Lizard, *Lanthanotus borneensis Discovery*," vol. 22, July, 1961.

—— "A Record Size *Lanthanotus* Alive" *Sarawak Museum Journal* 1966, pp.323-333.

—— "Earless Monitor Lizard in Borneo" *Nature*, April, 1961

MC DOWELL, S.B., "The Extracollumella and Tympanic Cavity of the Earless Monitor Lizard, *Lanthanotus borneensis*" Copeia, 1967(1) p.154.

—— "The Evolution of the Tongue in Snakes "in Evolutionary Biology, 1972

—— & C.M. Bogert "The Systematic Position of *Lanthanotus* and the affinities of the Anguinomorphan lizards" Bull. Amer. Mus. Nat. Hist. 105(1) 1954.

MERTENS, R.F. "Beobachtungen an Taubwaranen (*Lanthanotus borneensis*1 in Terrarium" *Datz*, July, 1964, pp.179-183.

—— "Sarawak's Earless Monitor" *Animals*, 11(10), pp.436-437.

—— "Zum Ernahrungsproblem Das Taubwarans *Lanthanotus*", *Salamandra*, 1970, pp. 133-134.

SPRACKLAND, R.G., "Further Notes on *Lanthanotus*," Sarawak Museum Journal, 1970, pp.412-413.

UNDERWOOD, G. "Lanthanotus, a Critical Review" *Copeia*, 1957, 1, pp.20-30.

R.D. 1, Box, Jackson, New Jersey, 08527, U.S.A.

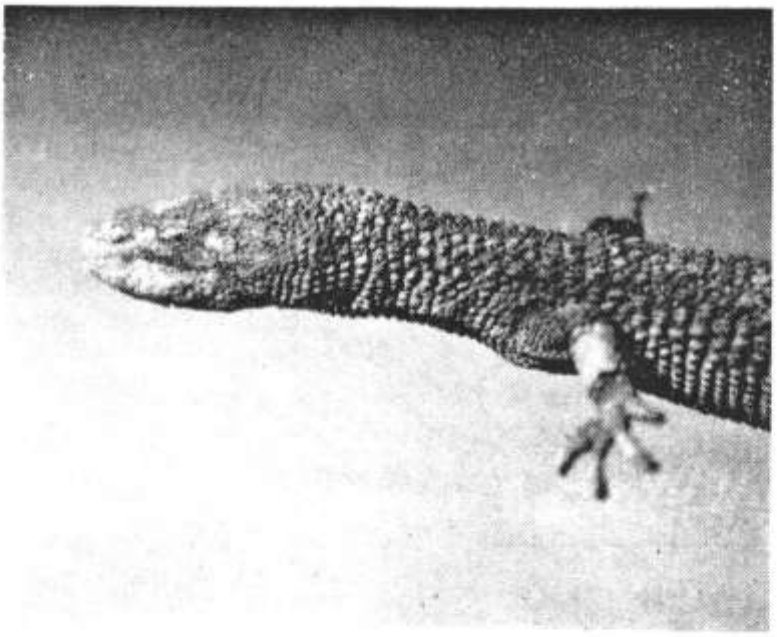

PLATE XXII: A live juvenile *Lanthanotus*, courtesy of Hymen Marx.

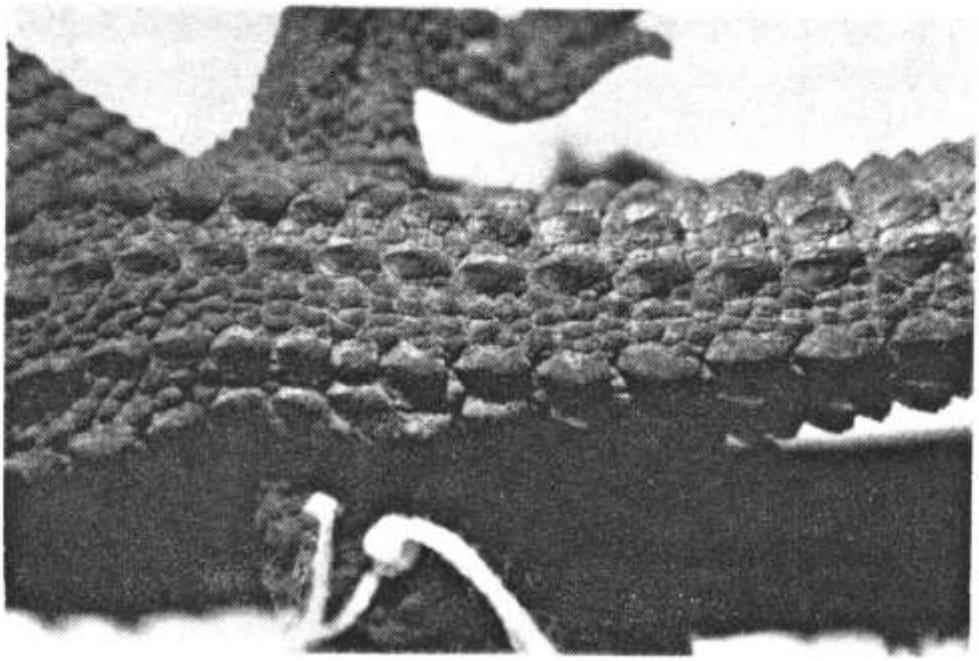

Plate XXIII: Close-up of thigh showing segment-like arrangement of caudal scales. Photo courtesy Joseph T. Collins.

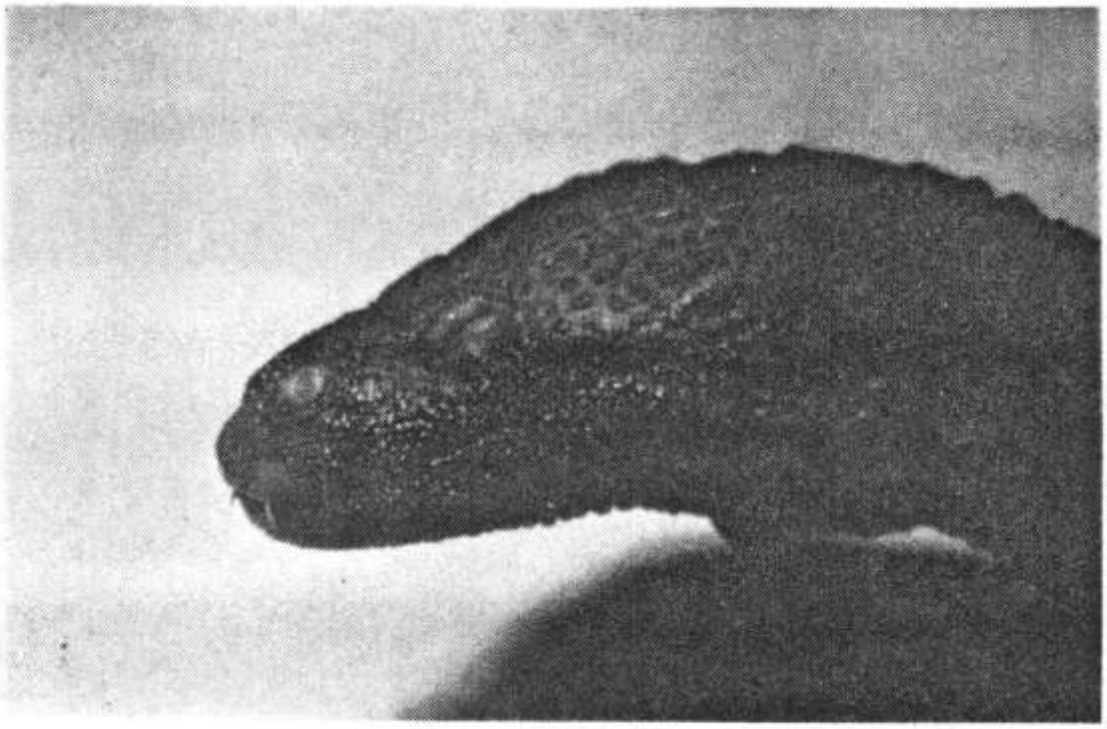

Plate XXIV: Close-up of head of *Lanthanotus*, showing raised position of nostrils, and clear lower eyelid. Courtesy J. T. Collins.