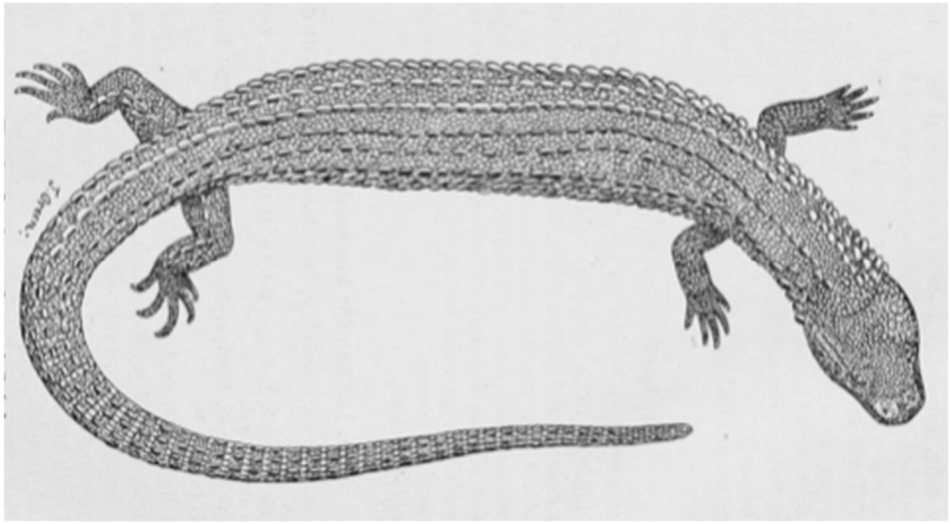
AN ANNOTATED BIBLIOGRAPHY OF THE BORNEAN EARLESS MONITOR, *LANTHANOTUS BORNEENSIS* STEINDACHNER, 1877



Robert G. Sprackland
Division of Amphibians & Reptiles
National Museum of Natural History

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The first number of the SMITHSONIAN HERPETOLOGICAL INFORMATION SERVICE series appeared in 1968. SHIS number 1 was a list of herpetological publications arising from within or through the Smithsonian Institution and its collections entity, the United States National Museum (USNM). The latter exists now as little more than the occasional title for the registration activities of the National Museum of Natural History. No. 1 was prepared and printed by J. A. Peters, then Curator-in-Charge of the Division of Amphibians & Reptiles. The availability of a NASA translation service and assorted indices encouraged him to continue the series and distribute these items on an irregular schedule.

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Cover Image: *Lanthanotus borneensis* from
De Rooij 1915. The Reptiles of the Indo-Australian Archipelago I: fig. 61

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Bibliography

The bibliography of *Lanthanotus* is a chronological listing of published references of substance to *Lanthanotus* as of June 2018. I have not included citations that are extremely peripheral (e.g., a book that includes a sentence such as "This feature is found only in some varanids and the earless monitor," and no other comment on the species).

The bibliography is arranged chronologically in order to provide a thorough history of the published knowledge on *Lanthanotus*. Each citation is followed by annotations of the content of that publication. Where possible, each annotation includes when and how many specimens were acquired, which specimens were used for the study, and when research trends occurred.

I hope the annotations assist researchers to quickly find what they need. Some references contain only an illustration, others but a single paragraph of text. Key to citation symbols: * Materials bearing one or more illustrations; ** materials with color illustrations; + reference with at least one dedicated paragraph; ++ extensive reference. Publications for which free PDFs are available have the URL for those publications included. This source information excludes most books, copyrighted materials, and papers for which I could not locate a PDF.

***++1877a. Steindachner, Franz.** Über zwei neue Eidechsen-arten aus Süd-Amerika und Borneo. *Denkschriften der Kaiserlichen Akademie der Wissenschaften, Mathematisch-Naturwissenschaftliche Classe*, XXXVIII, Bild I, Abhteilung 4: 1-5, Taf. 2, 5 Juli 1877. Preprint.

Steindachner wrote and submitted his description of *Lanthanotus borneensis* to the *Denkschriften der Kaiserlichen Akademie der Wissenschaften, Mathematisch-Naturwissenschaftliche Classe*, which was scheduled to be published in July 1877. He subsequently wrote a much shorter English abstract (1877d) which he sent to *The Annals and Magazine of Natural History*. This abstract contained two short paragraphs and lacked an accompanying figure; the generic name is also given as "*Lanthonotus*." This abstract was published before the 1878 German text, making 1877 the actual publication date of the descriptions of the new family, genus, and species; however, at the very end of the abstract, Steindachner cited the excerpt as being from the 5 July *Denkschriften*. The *Denkschriften* was not published until 1878. It is because of this discrepancy that the scientific name is often given as *Lanthanotus borneensis* Steindachner (1877) 1878. (SEE next entry.) All four Austrian papers were produced by Carl Gerold's Sohn in Vienna, the first three (Steindachner 1877a-c) likely simultaneously.

Information given in the descriptions include: terra typica, Borneo. WNM 1234567, adult, mounted as seen in holotype illustration (Steindachner 1877a, 1878, Tafel 2); 42 cm total length, tail 22 cm. *Lanthanotus* is the second of two lizards described in the paper, the other species being a South

American teiid (*Tejovaranus* [=*Callopistes*] *branickii*). There are no introductory or historical comments about where and when the specimens were collected, nor mention of habitats. In addition to giving a lengthy description, Steindachner erects a new family, the Lanthanotidae: "The species described in the subsequent text is the only known representative of a family, Lanthanotidae, which initially seems to join the Helodermidae, but the lack of an outer ear is peculiar. The scales of the back, which are similar to that of certain crocodiles (e.g. Cr. acutus [sic]), are also substantially different. The posterior jaw teeth are quite furrowed like *Heloderma*, but [the head] is missing large plate-shaped labial scales on the mouth edge." (Translation by Sprackland.)
The collecting information is sparse: "The specimen described here was brought by Mr Gröger from Sarawak and is 42 cm long, of which 22 (cm) belong to the tail."

++1877b. Steindachner, Franz. Das w. M. Herr Direktor Dr. Steindachner übersendet eine Abhandlung über zwei neue Gattungen und Arten von Eidechsen aus Südamerika und Borneo. *Anzeiger der Kaiserlichen Akademie der Wissenschaften, Mathematisch-Naturwissenshaftliche Classe*, XIV, Nr. XVII: 153-154. Juli 1877.

This publication is a summary of lectures and publications that had been produced by the *Akademie* and has two references to *Lanthanotus*: first, short introductory comments explaining that Dr. Steindachner will describe a new lizard, *Lanthonotus* [sic] *borneensis*; and second, a one-page summary of the earlier preprint. The introductory comments include a brief description of sufficient detail to serve as a type description, and the second section provides the name *Lanthanotus borneensis*.

++1877c. Steindachner, Franz. Das w. M. Herr Direktor Dr. Steindachner übersendet eine Abhandlung über zwei neue Gattungen und Arten von Eidechsen aus Südamerika und Borneo. *Sitzungsberichte der Kaiserlichen Akademie der Wissenschaften. Mathematisch-Naturwissenschaftliche Class*. Band LXXVI, erste Abtheilung 6: 67. Juli 1877.
Almost identical to Steindachner, 1877b.

++1877d. Steindachner, Franz. On two new genera and species of lizards from South America and Borneo. *Annals and Magazine of Natural History* (4) 20: 160. 13 Sept. 1877. http://lanthanotus-org.webs.com/1877-Steindachner
This is the first reference to *Lanthanotus* in English, a translation of Steindachner (1877b) without new information and including the misspelled version, *Lanthonotus* (Steindachner, 1877b-c).

1877. O'Shaughnessy, Arthur. Reptilia. *Zoological Record*, *Rept*.: 6. London.
The existence of Steindachner's preprint and its July 1877 date was reported here by O'Shaughnessy, as was the name *Lanthanotus* but without a description.

***++1878. Steindachner, Franz.** Über zwei neue Eidechsen-arten aus Süd-Amerika und Borneo. *Denkschriften der Kaiserlichen Akademie der Wissenschaften, Mathematisch-Naturwissenschaftliche Classe*, XXXVIII, Bild I, Abhteilung 4 (1878): 93-96, Tafel 2. http://lanthanotus-org.webs.com/Steindachner-Lanthanotus%20type%20description%201878
This was intended to be the original type description, and only differs in pagination from the 1877a preprint.

1878. O'Shaughnessy, Arthur. Reptilia. *Zoological Record*, *Rept.*: *7*. London.
In this volume *Lanthanotus* is briefly mentioned under the heading TEIIDAE, noting the publication of Steindachner's paper in 1878.

1884. Boulenger, George. Synopsis of the families of existing Lacertilia. *Annals and Magazine of Natural History*, ser. 5, 14: 117-121.
This short paper is Boulenger's explanation of how and why he divides lizards among the several families. Though Steindachner noted similarities between *Lanthanotus* and *Heloderma*, it was Boulenger who first intimated that "…there is reason to suspect they [Lanthanotidae] will enter…" the Helodermatidae. He did not, however, make that taxonomic change.

+1885. Boulenger, George. *Catalogue of Lizards in the Collection of the British Museum (Natural History). Volume II.* London: Taylor and Francis, 561 pp. http://library.iucn-isg.org/documents/1885/Boulenger_1885.pdf?bcsi_scan_2687365ababd2c82=0andbcsi_scan_filename=Boulenger_1885
Boulenger would not have access to a specimen of *Lanthanotus* for another 14 years, so his account is a condensed version of Steindachner's description in *Catalogue* format. Boulenger decisively departs from Steindachner, though, in placing the genus within the Helodermatidae without explanation for his decision.

1895. Bartlett, Edward. The crocodiles and lizards of Borneo in the Sarawak Museum, with descriptions of supposed new species and the variation of colors in the several species during life. *Journal of the Straits Branch of the Royal Asiatic Society* 28: 73-97. http://lanthanotus-org.webs.com/XXXIII-CrocsAndLizardsofBorneo
Lanthanotus is described as "very rare," from the Rejang river and having been collected by C. A. Bampfylde (SEE next entry.)

***++1899. Boulenger, George.** On *Lanthanotus borneensis*. *Proceedings of the Zoological Society of London*, May 16, 1899: 596-597, 1 figure. http://lanthanotus-org.webs.com/Lanthanotus_mouth_Blgr_1899.pdf.

Boulenger provides a description of the mouth, teeth, and alleged venomous nature of *Lanthanotus*, and, like Steindachner, notes the grooved teeth, but differs in interpretation from his Austrian counterpart.

For Boulenger, that the teeth of *Lanthanotus* are grooved, like those of *Heloderma*, means that the species is venomous and affirms his earlier assessment that it should be contained in the family Helodermatidae. That decision would delight zoogeographers for a century.

The text contains a drawing of the widely-opened mouth of a lizard (Figure 1) and briefly describes the second known specimen, a male, as having been collected in the Rejang River District in 1891 by C. A. Bampfylde. It was this second specimen, on loan from Raja Brooke and subsequently returned to the Sarawak Museum, that Boulenger examined.

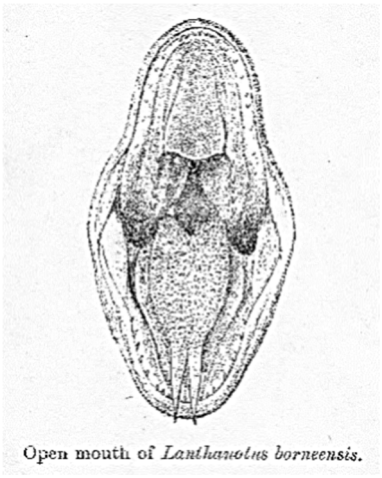

Figure 1. Boulenger's 1899 drawing of the open mouth of *Lanthanotus borneensis.*

+1901. Gadow, Hans. *Amphibia and reptiles*. The Cambridge natural history series, vol. 8, 668 pp. http://www.biodiversitylibrary.org/bibliography/31361#/summary

A paragraph-long discussion on the Lanthanotidae-Helodermatidae placement for *Lanthanotus* (Gadow accepts the Lanthanotidae as his lizard family #7) and a very superficial description. Gadow, who had no access to a specimen, wrote that "poison-glands are probably absent, and there are no osteoderms" (pp. 514. 542; SEE Fry et alia, 2006, and Maisano et al., 2002).

1901. Shelford, Robert. A list of reptiles of Borneo. *Journal of the Straits Branch of the Royal Asiatic Society* 35: 43-68. http://lanthanotus-org.webs.com/1901-Shelford_Lanth_journalofstraits_35_1901_royal

As per title, a list of taxa, with references "reduced as far as possible." *Lanthanotus* is listed (p. 52) with a slightly more detailed account of Boulenger's (1899) locality information, adding Plagus Rapids to Rejang River. Shelford also follows Boulenger (1885) by including *Lanthanotus* in the Helodermatidae.

+1908. Werner, Franz. Das Tierreich, III. Reptilien und Amphibien. G. I. Göfchen Verlagshandlung, Leipzig, 184 pp. A small (11 mm X 155 mm) general herpetological overview written in old German script. There is a very brief physical account of *Lanthanotus* (p. 72) and includes it, in error, as a genus within *Heloderma*.

+1912. Barbour, Thomas. A contribution to the zoogeography of the East Indian islands. *Memoirs of the Museum of Comparative Zoölogy at Harvard College* XLIV(1): 1-168 + 8 plates.
Barbour gives an extensive review of the herpetofauna of the East Indies that includes seven lines about *Lanthanotus* (p. 26): "*Lanthanotus [sic] restricted to Borneo, as has been so satisfactorily pointed out by Boulenger, has its nearest relatives in the two species of Heloderma [sic] occurring in southwestern United States and Mexico. This form is probably fast dying out, as its relatives have in the past died out over most of the rest of the world; the species is now so rare that we know of only two specimens, one in the museum at Kuching, Sarawak, and the other, the original type, in Vienna.*"

***1913. Barbour, Thomas.** *Report on the Reptiles and Amphibians*. In: *Annual Report of the Director of the Museum of Comparative Zoölogy at Harvard College to the President and Fellows of Harvard College for 1912-1913*. p. 7, plate 1. http://lanthanotus-org.webs.com/1913_Harvard_Lanthanotus_receipt.pdf
This document reported the donation of a large collection of vertebrates and invertebrates by Prof. Harrison W. Smith, including "Probably the specimen most worthy of note," (p. 7) the third specimen of *L. borneensis* to be reported. Barbour noted that Smith's collection was made in the Baram River District of Sarawak. Of particular note is the inclusion of the first published photograph of a *Lanthanotus* (MCZ 8305, figure 5A). It is this specimen that was examined and partially dissected some forty years later by McDowell and Bogert (1954).

***++1915. Rooij, Nelly de.** *The Reptiles of the Indo-Australian Archipelago. I. Lacertilia, Chelonia, Emydosauria*. Leiden (E.J. Brill), 384 pp., figure 61.
http://www.biodiversitylibrary.org/item/26195#page/1/mode/1up
While following Boulenger in keeping *Lanthanotus* in the Helodermatidae, de Rooij provided the most complete account since Steindachner's type description (1877). She included definitions for Helodermatidae, *Lanthanotus*, and *Lanthanotus borneensis*. De Rooij had access to two specimens that had been acquired by the British Museum (Natural History), catalogue numbers BMNH 1906.2.7.1 and BMNH 1909.3.4.1. The latter specimen served as the model used by artist J. Green for his well-executed life-sized drawing of a specimen in volume I (Figure 2B here). BMNH accession numbers that start with 1906 and 1909 indicate specimens entered the British Collection several years prior to Harvard getting its *Lanthanotus* (See Barbour, 1913).

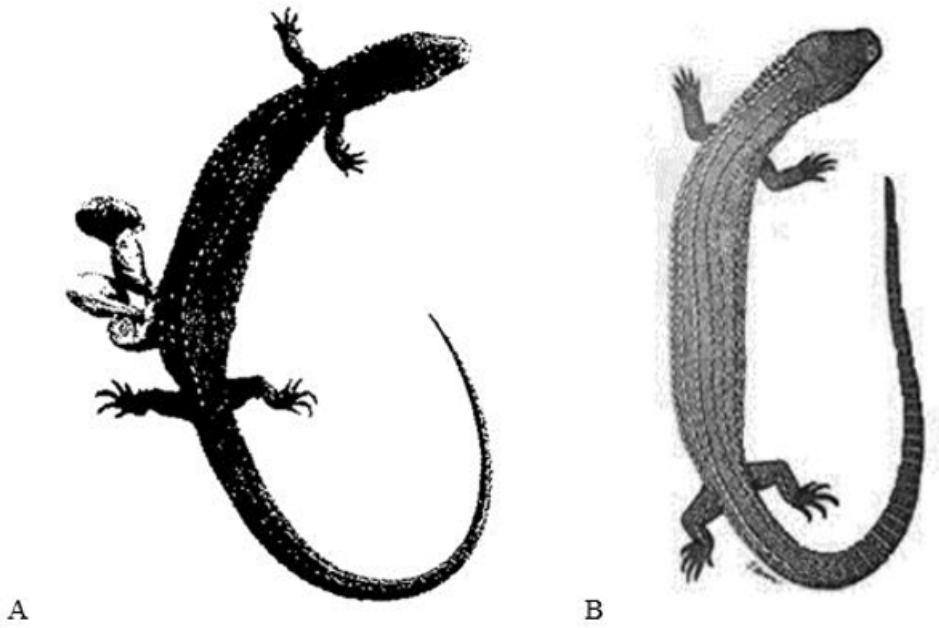

Figure 2. *Lanthanotus borneensis* as depicted in A- Barbour (1913), and B- De Rooij (1915, as drawn by J. Green).

1945. Loveridge, Arthur. *Reptiles of the Pacific World*. MacMillan, NY, 259 pp. http://lanthanotus-org.webs.com/1945-Loveridge_Lanthanotus

The first notable reference to *Lanthanotus* after de Rooij provided an extremely short description of the species ("16-inch lizard that looks more like a crocodile… ridges of raised tubercles… reddish brown…" p. 63). Loveridge states that it is only known from the Rejang River, and that a specimen "…is coveted by every museum." About half the paragraph explains that there are no known venomous lizards in the Pacific region.

This volume is part of a series that was released for the education of "those in the Armed Services in the present great war," and includes interesting, if now anachronistic, instructions for collecting and shipping specimens back to U.S. museums.

1946. Smith, Hobart M. *Handbook of lizards of the United States and of Canada*. Comstock, Ithaca, NY, 578 pp.

Despite the geographic coverage of the *Handbook*, Smith provided an extensive introduction to lizards in general and included a list of all families recognized at the time. He also makes what is, to a lay reader, a cryptic (enticing?) reference to a possible venomous lizard species from Borneo, without further comment. The popularity of this book provided minor knowledge of *Lanthanotus* to a considerable readership, possibly, as in my case, for the first time.

***++1954. McDowell, Samuel B., and Charles M. Bogert.** The systematic position of *Lanthanotus* and the affinities of the Anguinomorphan lizards. *Bulletin of the American Museum of Natural History* 105: 1-142. http://digitallibrary.amnh.org/handle/2246/1146
Here, for the first time, the vernacular name "earless monitor" is introduced. This study is an extremely important work that is the beginning of *Lanthanotus* research. It was Bogert's goal to discover whether *Lanthanotus* was a venomous lizard, and if so, what was its relationship to *Heloderma*. His collaboration with anatomist Samuel McDowell produced an exhaustive osteological review of *Lanthanotus* and returned it to its own family, the Lanthanotidae. They convincingly showed relationships among *Lanthanotus, Heloderma*, and *Varanus* (their Platynota, presently Varanoidea), and suggested its possible affinities with extinct taxa including mosasaurs, necrosaurs, and aigialiosaurs.

The monograph then tackled the relationships among most lizard families, including extinct taxa, looking for a Platynotan-Serpentes evolutionary model. Though theirs wasn't the first suggestion of that possibility, it was certainly the most thoroughly researched one. Many of their hypotheses of lacertilian relationships did not stand up to later scrutiny; however, many did. McDowell would continue to produce research on *Lanthanotus* (1967, 1972). Their plates include a reproduction of Steindachner's (1877a, 1878) lithograph, an x-ray of the lizard, and close up depictions of scalation.

+1955. Pope, Clifford H. *The reptile world*. Alfred Knopf, NY, 325 pp.
Pope noted that "the suspicion that the rare and related [to *Heloderma*] *Lanthanotus* of Borneo may be venomous would scarcely matter in the grand scheme of human-lizard interactions, because it will never constitute a threat to more than a handful" (pp. 262-263) of people. He also stated, in a quote to be used by a few later authors, that "the mere sight of one of these alive and kicking would be the fulfillment of a dream no student of herpetology has realized" (p. 263). That dream would be realized just five years later (Anon., 1961a-b).

+1956. Bogert, Charles M., and Rafael Martín del Campo. The Gila monster and its allies. *Bulletin of the American Museum of Natural History* 109(1): 1-238.
The authors very briefly compare the morphological traits of *Lanthanotus* and *Heloderma* (p. 14).

***+1957. Bellairs, Angus.** *Reptiles: life history, evolution and structure*. Harper Torchbooks, NY, 192 pp.
Though Bellairs' references to *Lanthanotus* were spread across only seven pages of his book, he provided interesting capsule information about the similarities between the Earless Monitor and snakes. Like other authors, he pointed out the difficulties in ascribing a possible ancestral role to the lizard because snake origin hypotheses had proposed that early snakes were probably aquatic or burrowers. At the time he wrote the book, nothing was known about the habits of *Lanthanotus*. By

assuming that *Lanthanotus* is a burrower, Bellairs overlooked the possibility that the lizard may be, and in fact is, both aquatic *and* fossorial. Included is a rough line drawing based on the holotype illustration (p. 140).

++1957. Schmidt, Karl P., and Robert F. Inger. *Living reptiles of the world*. Doubleday, NY, 287 pp. http://lanthanotus-org.webs.com/1957-SchmidtandInger
Probably the best, most informative single account of *Lanthanotus* to that date; the executive summary for expert and layman both. The authors explained the allure and importance of some rare species, then targeted on the dual features about *Lanthanotus*—it's possibly being venomous, and possible close relationship to ancestral snakes—that make it particularly important despite being rare. Sadly, for so excellent a work, there was no illustration of this species.

++1957. Underwood, Garth. *Lanthanotus* and the Anguinomorphan lizards: a critical review. *Copeia* 1957(1): 20-30. http://www.jstor.org/stable/1440505?seq=1andcid=pdf-reference#fndtn-page_thumbnails_tab_contents
Underwood provided a detailed critique of McDowell and Bogert (1954), focusing on what he perceived as errors in a lengthy and important manuscript. Though Underwood did not have a *Lanthanotus* to examine, he was a superb comparative anatomist with a thorough understanding of the Squamata, and correctly noted that the illustration of the skull by McDowell and Bogert lacked a palpebral bone, the presence of which was later confirmed by Maisano et al. (2002). He also stated that McDowell and Bogert did not depict orbital cartilages (rarely illustrated by convention) or orbitosphenoid bones (extremely tiny and hidden from view), questioned if there was one, two, or no interorbital septum (there are two septa), and pointed out that the stapes meets the tympanum, not the quadrate.

+1961a. Anon. A Sarawak lizard bridges an evolutionary gap. *New Scientist* 233, May 4: 232.
Four paragraphs (p. 232) announced the discovery of "A little lizard of prodigious interest to zoologists." The major points of the paper claimed that a rare lizard had been found alive, it "shows a marked indisposition to eat", is important in understanding the origin of snakes, and that lizard evolution "reached a climax" in the mosasaurs. The paper also presents the first use of the vernacular, "Bornean earless monitor [sic]."

+1961b. Anon. The brief relaxed life of the captive *Lanthanotus. New Scientist* 241, June 29: 764, 1 figure.
This three-paragraph piece is a third-person update of an earlier *New Scientist* announcement (Anon, 1961a) that a live *Lanthanotus* had been collected and kept in captivity in Sarawak. It also reviewed the material presented by Tom Harrisson (1961a) and Harrisson and Haile (1961a-b), namely a) the

species is very rare, b) the lone live specimen only lived for three months, c) it is a lethargic species, and d) McDowell and Bogert (1954) were correct in their assessment of *Lanthanotus* as a possible ancestor to snakes. There is no new information, and the small drawing on p. 764 is a very poor imitation of Steindachner's (1877a, 1878) excellent plate.

***+1961c. Anon.** Photograph and single paragraph caption, In: *Animal Kingdom* Sept.-Oct., 64(5): 144.
Many *Lanthanotus* specimens were the recipients of at least some media attention and presentation in scientific periodicals, but not the specimens kept at the Bronx Zoo (New York Zoological Society) in the 1960s. This quarter-page note in the zoo's newsletter was the only information to come out about that specimen until Mendyk et al. (2015) published departmental notes about the animal. (SEE also, McDowell, 1967). Herndon Dowling, curator of herpetology at the time, made a brief note in the zoo's annual report (SEE Dowling, 1961) that this *Lanthanotus* was "the first living specimen seen outside Borneo," and was a gift of Tom Harrisson of the Sarawak Museum. When it died, the specimen became part of the collection at the American Museum of Natural History (#87375), the second *Lanthanotus* in a U.S. museum.

***++1961. Harrisson, Barbara.** *Lanthanotus borneensis*—habits and observations. *Sarawak Museum Journal* 10(17-18 new series): 286-292. http://lanthanotus-org.webs.com/Barbara%20Harrisson%201961%20SMY%207pp
Barbara Harrisson was not a herpetologist, as this paper amply demonstrates, but she was a keen observer who went on to be a major orangutan researcher. During the time that she maintained live *Lanthanotus* specimens in Sarawak, she kept detailed notes on their behavior and preferences for food, temperature, soil, and water. However, this, her first lizard, was being kept in an air-conditioned room in an environment quite different from its natural habitat. Though her contribution would soon be overshadowed by Mertens's (1964), it remains interesting because it is the first published detailed report about the first live Earless Monitors kept in captivity.

This paper and that of Mertens (1961) were later reprinted as a German translation (SEE B. Harrisson, 1962) in *Natur und Museum*, a journal of the Senckenberg Museum, where Mertens worked.

***++1961. Harrisson, Tom.** The Earless Monitor Lizard (*Lanthanotus borneensis*). *Discovery* July: 290-293.
This is a longer, more detailed, and better illustrated version of Harrisson and Haile (1961b) that includes several fairly good photographs of a specimen of *Lanthanotus* and an account of its acquisition and subsequent care by the Harrissons. Harrisson noted that the animal was blind and extremely lethargic, perhaps from poor husbandry.

Because Tom Harrisson was central to the discovery of numerous *Lanthanotus*, I offer a short biographical sketch of him. Harrisson had been a very active British commando in Borneo during the Second World War, and subsequently went on to a career as a noted anthropologist and curator of the Sarawak Museum. He was not a zoologist, and most certainly not a herpetologist. Compared with Harrisson's adventurous and sometimes reckless life, of course he'd consider *Lanthanotus* to be lethargic. (For a more extensive biography of the extraordinary and colorful Harrisson, see "*The Most Offending Soul Alive: Tom Harrisson and his Remarkable Life,*" by Judith Heimann, 1998, University of Hawai'i Press.) His attempts at husbandry for the rare lizard included keeping it in his air-conditioned bedroom, immersing it in iced water, and frequent disturbances in trying to get the lizard to eat. The *Lanthanotus* died 3 months after collection. It has recently been suggested that his second wife, Barbara Harrisson, did most of the writing of Tom's papers on *Lanthanotus* (Dodd, 2016). (SEE also Harrisson, T., 1966.)

++1961a. Harrisson, Tom, and Nelson Haile. A rare earless monitor from Borneo. *Nature* 190, 24 June: 1213. http://lanthanotus-org.webs.com/1961-Nature_HarrissonandHaile.jpg
This is the first report published by someone involved in the collection of Earless Monitors. *Lanthanotus* research takes on an entirely new direction when members of the Sarawak Museum captured the first specimen of *Lanthanotus* that they kept alive for observation. From a lone capture in 1958, the following 15 years would see the number of specimens increase to over 100, many of which would be donated for study to museums and zoos around the world. In this paper the genus name is consistently misspelled, "*Lanthonotus*."

***++1961b. Harrisson, Tom, and Nelson Haile.** Notes on a Living Specimen of the Earless Monitor Lizard, *Lanthonotus* [sic] *borneensis*. *Journal of the Ohio Herpetological Society* 3(2), pp. 13-16, figures 1-2. http://www.jstor.org/stable/1562598?seq=1#page_scan_tab_contents
The Ohio Herpetological Society reprinted Harrisson and Haile (1961a).

+1961. Hillaby, John. A rare reptile found in Borneo: foot-long lizard regarded as "missing link." *New York Times* May 2: 23.
A short newspaper article based largely upon Anon. 1961a.

***+1961. Mertens, Robert F.** *Lanthanotus*: an important lizard in evolution. *Sarawak Museum Journal* 10 (17–18 new series): 283–285, Bild 1.
This English version is a nearly verbatim translation of a paper Mertens's contributed to *Natur und Museum* (Mertens, 1962) that would appear in 1962. Mertens obtained a live *Lanthanotus* when he was at the height of his long, impressive career. As a distinguished herpetologist, he was arguably the most qualified reptile keeper of the people who had received live specimens in the 1960s. In this

contribution, though, he didn't discuss the live animals that he had kept for a few months. Instead, he presented a detailed general account of why, because of its possibility of being the sister groups to snakes, this species is of such interest to herpetologists. In this regard he expands upon the account given by Schmidt and Inger (1957). The figure reproduces Steindachner's (1877a, 1878) plate. This paper was also printed in German (Mertens, 1989a).

+1961. Pritchard, P. C. H. A Sarawak lizard. Letters to the editor. *New Scientist* 10:407.
Pritchard wrote to correct two errors from an article (Anon., 1961a) about *Lanthanotus*, specifically that 1) no herpetologist he knew ever thought that *Lanthanotus* was extinct, and 2) that at least eight specimens, not four or five, were known to be in museum collections: the holotype in Vienna, a specimen at the Museum of Comparative Zoology, one at the Sarawak Museum (lost at the time of writing), two in the Raffles Museum, and three in the British Museum of Natural History.

1961. Dowling, Herndon. *Sixty-sixth annual report of the New York Zoological Society* 80 pp.
An extremely brief report of the first live *Lanthanotus* that was acquired by a zoo outside of Borneo.

***++1962. Harrisson, Barbara.** Beobachtungen am lebenden Taubwaran *Lanthanotus borneensis*. *Natur und Museum*, 1 February 92(2): 38-45. (In German.)
A German translation of Barbara Harrisson's 1961 paper, but unlike the earlier paper this one contains photographs. This version included five photographs (Bild 1-5) showing the capture site (Bild 1), a close-up head shot (Bild 4), and the first collected juvenile *Lanthanotus* (Bild 5). Bild 3 also appeared in T. Harrisson (1961a) and T. Harrisson and Haile (1961b). Bild 4 was reproduced in T. Harrisson (1961a), T. Harrisson and Haile (1961b), Bellairs (1972: 168), and Sprackland (1970, lower). The paper was independently translated into English again by Paul Gritis (Harrisson, B., 1989), who was unaware of Harrisson's own English version (1961). In the Gritis paper he made annotations to Harrisson's text.

***++1962. Mertens, Robert F.** *Lanthanotus*: eine stammesgeschichtlich bedeutsame Eidechse? *Natur und Museum*, 1 February 92(2): 35-37, Bild 1. (In German.)
German version of Mertens's 1961 paper written for the magazine of his home museum. Mertens and Barbara Harrisson each wrote a paper about *Lanthanotus* that was to appear in English in the *Sarawak Museum Journal* (B. Harrisson, 1961; Mertens, 1961), and in German for *Natur und Museum* (B. Harrisson, 1962; Mertens, this citation).

***++1962. Ley, Willi.** Earth's extra satellites. *Galaxy Magazine* February: 55-66, 1 figure. https://mega.nz/#!7ZAhxZ4b!C0ACjUldILcOuBfVbgpVNFP0POU-f5ww0bqVni68JzY
Willi Ley was a cryptozoologist before that term was coined and a prolific writer focusing on unknown, mysterious, or possibly "living fossil" animals, amongst other things. He had long written a column for *Galaxy Magazine*, a pulp science fiction periodical. The first part of the February 1962 column is about satellites, hence the title. The second part (pp. 61-64), however, is a well-written account of the discovery of live *Lanthanotus* and its importance to zoologists. As an "executive overview," Ley's paper contained more information than most of the papers published up to date, excepting those of Barbara Harrisson (1961, 1962), and contains a reproduction of the Steindachner (1877a, 1878) plate. That it appeared in a monthly fiction magazine explains why the article has long escaped notice.

***+1962. Inger, Robert F.** Rare lizard reaches museum. *Chicago Natural History Museum Bulletin* 33(3): 7, 1 figure. http://lanthanotus-org.webs.com/1962_ChicagoNatHistMusBull_33-3.jpg
A single column of text in the museum's members' newsletter, saying, in essence, "here's something interesting that we just got from Borneo." Contains a small black and white photo of a *Lanthanotus* that also appeared in T. Harrisson (1961a), and Sprackland (1970: upper).

***++1963a. Harrisson, Tom.** Earless monitor lizards in Borneo. *Nature*, 27 April 198(4878): 407-408, figure 1.
An important paper in that it provided details after the spectacular first finds of *Lanthanotus* between 1958 and 1960 and suggested that "the species might eventually be proved to be overlooked rather than unknown" (p. 408), a view strengthened beginning with captures made after 2009. At the time he wrote this, Harrisson's collectors had obtained 25 live specimens between 1960 and 1963. His notes extended the range of *Lanthanotus* by 150 km, provided information on habitats where lizards were taken, and recorded the first observed pair of the lizards mating on 2 February 1963, illustrated in his figure 1. This was the only published photograph of *Lanthanotus* in coitus until Tuyoshi and Bacchini (2015).

Harrisson further related how during severe flooding in 1963, a single Dyak longhouse trapped 15 specimens. But he also wrote that the specimens he had so far sent to zoos "had not survived for more than a few days." For such a short paper (the photo takes up about half a page) Harrisson provided considerable new information.

++1963b. Harrisson, Tom. *Lanthanotus borneensis* - the first 30 Live Ones. *Sarawak Museum Journal* 11(21–22): 299–301.
An important contribution in which Harrisson presented data on "the first 30 live" Earless Monitors, and where they were deposited. It is the closest to a comprehensive list of all collected specimens that has been published, though some early captures were unrecorded.[1]

***++1963. Shaw, Charles.** Boon from Borneo… three earless lizards. *Zoonooz*, May 36(5): 10-12, 2 figures.
San Diego Zoo Reptile curator Charles Shaw wrote arguably the most emotional account on this subject. He told of receiving a small box from Borneo and how he was amazed to finally see some *Lanthanotus* alive. The zoo had three specimens that survived for several years, and Shaw's account of the housing and care was the most detailed information offered to date. The article also presented the highest-quality black and white photographs published of the species, dead or alive, to date, including a two-page full-body shot and close-up of the head.

The three San Diego Zoo lizards were donated to and preserved by the San Diego Natural History Museum. From my examination of the specimens, it looks like one specimen had starved to death; the body was depressed, emaciated, and in a posture common to desiccated or starved animals. Other keepers have reported that Earless Monitors were prone to suddenly stop taking preferred food items.

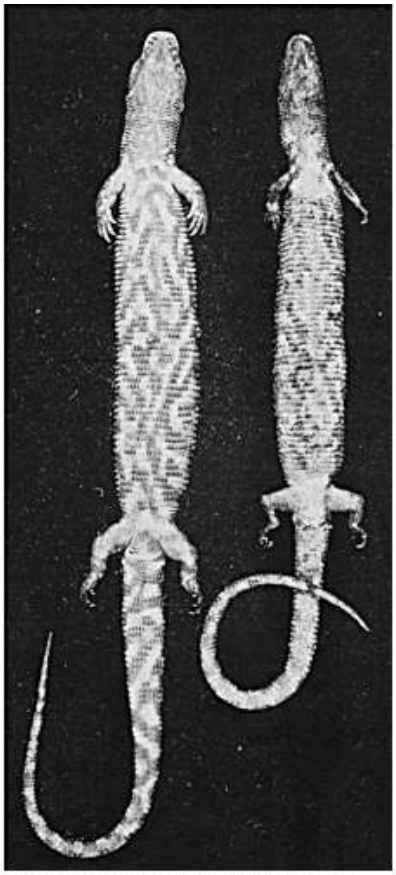

Figure 3. Robert Mertens's 1964 photo of ventral views of male (left) and female Earless Monitors. Males have a broader, almost square mental region, and broader heads and tails. Photo by E. Haupt.

***++1964. Mertens, Robert F.** Beobachtungen an Taubwarenen (*Lanthanotus borneensis*) im Terrarium. *Die Aquarien und Terrarien Zeitschrift*, Juni 17(6): 179-183. (In German.)
This article was published in the German hobbyist periodical DATZ (*Die Aquarien und Terrarien Zeitschrift*) and was one of the most familiar references to herpetologists until the 1970s. In this paper, Mertens provided observations on four live specimens sent to him by Tom Harrisson on 25 March 1963. Mertens focused more on the behavior of the lizards and his attempts to get them to accept different foods but offered little about captive care. Still, as an account of caring for the animals this paper remains informative.

[1] As of 2016 the official specimen register of the Sarawak Museum only lists eight specimens; the others, largely disbursed by Harrisson, were never catalogued before being donated.

This paper presented four new photographs, including a ventral side-by-side comparison of male and female, showing subtle dimorphism (Figure 3). These specimens were preserved in the Senckenberg Museum collections when they died, and one (SMF 66188) was dissected to extract the skull.

+1965. Harrisson, Tom. A future for Borneo's wildlife? *Oryx* 8(2): 99-104.
An interesting overview of how the union of Sarawak, Brunei and Sabah with Malaysia led to border hostilities with Indonesia, which made management and conservation issues difficult. Harrisson provided several examples and commented about how *Lanthanotus* sent to overseas zoos soon died, except for those sent to Robert Mertens, which he saw as a difficulty for conservation of the species. He also noted that Earless Monitors had been taken across a 250-mile belt "of sub-coastal plain" (p. 103) a considerable increase in the known range that was not later referenced by most authors.

***1965. Terent'ev, P. Herpetology: a manual on amphibians and reptiles.** Translated from Russian. Israeli Program for Scientific Translations, Jerusalem, 313 pp.
As a general broad introduction to herpetology in the form of keys to genera the book included scattered information and a family account on *Lanthanotus*. There is a good illustration redrawn from the one that accompanied Steindachner's (1877a, 1878) original description.

***++1966. Harrisson, Tom.** A record-size *Lanthanotus* alive. *Sarawak Museum Journal* 14(28-29 new series): 324-334.
This diary-style account reported the second largest *Lanthanotus* collected as of 1966. Named "Datu" by Harrisson, the specimen measured 30.1 cm; the holotype, however, is 42 cm (Harrisson wrote "43 cm"). Harrisson accepted the type as larger, but then suggested that "Perhaps some factor favours the capture of subadults?" (p. 324). Datu, collected on 7 November 1966, was "hiding in a *cave*" (Harrisson's emphasis) in Simunjan by "an Iban Sea Dyak".

Tom Harrisson was far less a herpetoculturist than his wife, Barbara Harrisson (1961). Upon receipt of Datu, Harrisson noted its lethargy ("dead alive state"), adding "you had to poke him hard to see that he (sex assumed) was not dead" (p. 324). There followed an hour-by-hour log of activities, or lack of such, for November 1966, and then a discussion about the observed use of senses by the lizard. Harrisson concluded that *Lanthanotus* is deaf, blind, lacks tactile senses, and is indifferent to temperature. In one astounding session, Harrisson filled the lizard's dish (in which the lizard was lying) with ice water, then tap water, and then ice water, at about 30-minute intervals.
Finally, there is information about two *Lanthanotus* collected by William Hosmer as part of the 1962-64 Borneo expeditions of the Field Museum of Natural History. They were both collected near Sungei Pesu, a stream of the Bah Kamena in Sarawak's Fourth Division. Habitat was primary hilly forest with

gravel-bedded stream and steep slopes. The photo of Datu that appeared with this paper was reproduced in Bellairs (1970, 1972).

***++1966. Mertens, Robert F.** The Keeping of Borneo Earless Monitors (*Lanthanotus borneensis*). *Sarawak Museum Journal* 14(28-29 new series): 320–322.
Mertens's 1964 paper was condensed and translated into English for the *Sarawak Museum Journal*. He gave a good account of his early work with live *Lanthanotus*, including the hit-and-miss of providing an environment in which his lizards flourished. Two of his four specimens, which lived over seven years, made Mertens the person who has longest cared for live specimens.

***+1966. Miller, Malcolm R.** The cochlear ducts of *Lanthanotus* and *Anelytropsis*, with remarks on the familial relationship between *Anelytropsis* and *Dibamus*. *Occasional Papers of the California Academy of Sciences* 60: 1-15, plate II.
A short paper that compared the cochlear ducts of two rare lizard species with their putatively related families. Miller corroborated the *Heloderma, Varanus, Lanthanotus* kinship, and proposed that *Heloderma* is the sister group to *Varanus-Lanthanotus*.

***+1967. McDowell, Samuel B.** The extracolumella and tympanic cavity of the "earless" monitor lizard, *Lanthanotus borneensis*. *Copeia* 1967(1): 154-158, figures 1-3.
http://lanthanotus-org.webs.com/1967_McDowell-Copeia
McDowell's use of quotes around the word earless in his title was appropriate, for he presented the results of a detailed dissection of the right ear of a specimen at the American Museum of Natural History (AMNH 87375, that had been received from the New York Zoological Society on September 26, 1961). He demonstrated that *Lanthanotus* lacks a tympanic membrane but has a shallow tympanic cavity. The extracolumella is discoidal and resembles that of mosasaurs, from which "the snake ear can be easily derived" (p. 154).

***+1967. Hoffstetter, Robert J., and Jean-Pierre Gasc.** Observations sur le squelette cervical et spécialement sur les hypapophyses des sauriens Varanoides actuels et fossiles. *Bulletin de Muséum National D'Histoire Naturelle*, 2^{e} Série 39(6): 1028-1043. (In French.)
A detailed description of post-cranial bones of *Lanthanotus* (see also Hoffstetter and Gasc, 1969, for a review in English). The structure of the cervical vertebrae was described and compared with those of *Varanus, Heloderma*, and, more briefly, other anguimorphs.

++1969. Mertens, Robert F. Sarawak's earless monitor. *Animals*, Feb. 11(10): 436-437.
This magazine published the first color photo of *Lanthanotus*, a two-page spread of a pair of live specimens. The short article itself is largely a paraphrasing of earlier general works on the Earless Monitor (e.g., Harrisson, B., 1961; Harrisson, T., 1961; Mertens, R., 1961).

1969. Minton, Sherman A, and Madge Rutherford Minton. *Venomous Reptiles*. Scribner's, NY, 308 pp.
Only ten lines in this book (pp. 129-130) refer to *Lanthanotus*, but the passage is interesting for two reasons. First, despite earlier use of the common name "earless monitor" (Schmidt and Inger, 1957; Harrisson and Haile, 1961; Harrisson, 1961, 1963; Mertens, 1966) the Mintons referred to the species as "the very rare crocodile lizard." Second, the authors write that the discovery of the non-venomous status of *Lanthanotus* came about "when living specimens of this odd reptile became available for study." In fact, the major anatomical work by McDowell and Bogert (1954) that firmly removed *Lanthanotus* from its presumed affinity to *Heloderma* was based on dissection of a single museum specimen that predated the availability of live specimens by some six years.

***+1969. Hoffstetter, Robert J., and Jean-Pierre Gasc.** Vertebrae and ribs. In: C. Gans, and T. Parsons (eds.). *Biology of the Reptilia*, volume 1: 201-310.
Following up on their 1967 work in French, the authors presented a comparison of vertebrae and ribs from a variety of reptiles, including *Lanthanotus*, in English. Further descriptions were later published by Rieppel (1980a, 1980b).

++1969. Peters, Günther. *Sonderdruck aus dem Urania Tierreich. Klasse Reptilia-Kriechtiere***.** Urania-Verlag, Leipzig, 535 pp.
This is a general-audience book about reptiles produced in East Germany. There is an account that covered the possible lizard-snake relationship with *Lanthanotus,* and a discussion of the lizard as a "living fossil." Peters also provided a review of husbandry techniques and details about behavior.

***1970. Bellairs, Angus.** *The Life of Reptiles (The Universe Natural History Series, Volume I).* Pp. 32-33, plate 3. Universe Books, NY, 304 pp.
Bellairs introduced *Lanthanotus* via a synopsis of the conclusions of McDowell and Bogert (1954), showing how the lizard possesses features that are interpreted as being snake-like. He also relates that the lizards were both swimmers and burrowers, noting that burrows were excavated "by thrusting its head into the ground" (p. 32). Bellairs concludes that "it is therefore quite probable that the ancestor of snakes belonged to some unknown group of early Mesozoic lizards…" (p. 33). Bellairs's plate 3 consists of two photographs of *Lanthanotus*: the upper of "Datu" (Harrisson, T., 1966), the lower of

the first live specimen collected in 1960 (and illustrated in Harrisson, T., 1961a; Harrisson and Haile, 1961b; Harrisson, B., 1962; Sprackland, 1970).

****+1970. Burton, Maurice.** Earless monitor. In: *Cavendish Animal Life Encyclopedia*, 6: 678; 12: 1638. http://lanthanotus-org.webs.com/1973-Cavendish-encyclopaedia
The second published color photo of *Lanthanotus* is of poor quality and depicts one of the San Diego Zoo specimens. This one-page article paraphrased earlier general Earless Monitor accounts (e.g., Harrisson, B., 1961; Harrisson, T., 1961; Mertens, R., 1961). The author stated that the longest recorded observed submergence of *Lanthanotus* was 36 minutes (subsequently greatly exceeded; pers. obs.).

++1970. Mertens, Robert F. Zum Ernahrungsproblem das Taubwaranes, *Lanthanotus borneensis*. *Salamandra*, 133-134. (In German.)
http://lanthanotus-org.webs.com/1970-Mertens_Zum_Ernahrungsproblem_Das_Taubwaranes
Mertens, after keeping *Lanthanotus* alive in a terrarium in Frankfurt for several years, described dietary preferences. The primary food that they consumed had been earthworms, but when these were refused was able to get them to accept them strips of plaice, a European marine flatfish, a prey item they could not possibly acquire in their native Borneo. An English translation by Gritis was published as Mertens, 1989b.

+1970. Porter, Kenneth.** *Herpetology.** W.B. Saunders Co., Philadelphia, 524 pp.
This is a college textbook aimed at seniors and graduate students. As a general broad introduction to herpetology it included scattered information and a family account of *Lanthanotus*.

***++1970. Sprackland, Robert G.** Further notes on *Lanthanotus*. *Sarawak Museum Journal* 18(36-37): 412-413, plate 30. http://lanthanotus-org.webs.com/Further%20Notes%20on%20Lanthanotus%201970b
Based on study of a preserved specimen (AMNH 87375), discussions with Samuel McDowell, and correspondence with personnel of the Sarawak Museum, this short paper presented my views on correlations between morphology and field collecting data, and also advanced a hypothesis of the habits and habitats of *Lanthanotus*. Some views were changed in later publications (Sprackland, 1972, 1999).

***+1972. McDowell, Samuel B.** The evolution of the tongue of snakes, and its bearing on snake origins. In: *Evolutionary Biology*, 6: 191-273, T. Dobzhanasky, M. Hecht, and W. Steere (eds.). Appleton-Centurt-Crofts, NY.
In a partial departure from his earlier views (McDowell and Bogert, 1954; McDowell, 1967) and based upon detailed comparisons of the tongue and hyoid structures of lizards, McDowell concluded that the

Varanidae cannot be ancestral to snakes. *Lanthanotus*, though, is not rejected as related to such an ancestor. Snake-like factors that support his assertion include the presence of a row of papillae on the lateral margin of the tongue, thin constrictor colli muscles, lack of enlarged choanal openings, and the presence of interdigitated slips of the intermandibularis. McDowell also stated his belief that *Lanthanotus* should be moved to the extinct lizard family Dolichosauridae.

***++1972. Bellairs, Angus d'.** Comments on evolution and affinities of snakes. In: Joysey, Ken, and Tom S. Kemp, *Studies in vertebrate evolution*, pp. 157-172, Oliver and Boyd, Edinburgh.
http://lanthanotus-org.webs.com/Bellairs%20in%20Joisey
The origin of snakes is examined on the basis of morphological evidence. *Lanthanotus* is discussed for two and one-third pages wherein Bellairs considered the validity of the hypotheses of McDowell & Bogert (1954) and Underwood (1957). He concluded that Earless Monitors are a likely member of the group that led to snakes. There is an enlarged photograph (p. 168) of the first known juvenile *Lanthanotus*.

***++1972. Sprackland, Robert G.** A summary of observations of the earless monitor, *Lanthanotus borneensis*. *Sarawak Museum Journal* 24(40-41 new series): 323-328, plates XXII-XXIV.
http://lanthanotus-org.webs.com/1972-A%20summary%20of%20observations%20of%20the%20earless%20monitor%20Lanthanotus%20borneensis
Expanding on Sprackland's earlier review (1970), this paper examined the suite of features known for live Earless Monitors, modified a prior hypothesis and argued that the lizards are likely both aquatic and fossorial. Plate XXII is a close-up of the head of a juvenile *Lanthanotus* taken by Hymen Marx; Plate XXIV that of an adult, a color version of which is published in Sprackland (1977). Plate XXIII is a close-up of scalation of the hips and tail. The latter two were photographed by Joseph Collins.

***++1973. Haas, George.** Muscles of the jaws and associated structures in the Rhynchocephalia and Squamata. In: Carl Gans and Thomas Parsons (eds). *Biology of the Reptilia, Volume 4, Morphology D,* pp. 285-490, Academic Press, NY. http://carlgans.org/bor-view/?borv=4andborpage=285
This is a thorough comparison of muscles innervated by the trigeminal and facial nerves in squamates. Haas noted that "*Lanthanotus*, which has not previously been described, is considered in especial detail" (p. 315) and provided 15 anatomical illustrations (Figures 112-126) of *Lanthanotus*, making this a major morphological work about *Lanthanotus* musculature.

+1974. Kochva, Elazar. Glandes spécialisées de la machoire inférieur chez les anguimorphes. In: L. Arvy, *Recherches biologiques contemporaines*, pp. 281-286. Wagner, Nancy.
Kochva described a serio-mucous "gland of Gabe" in the lower jaw of *Lanthanotus*. He considered them non-venom-producing analogs to glands known in *Varanus*. However, see Fry et al., 2006.

+1975. **Gans, Carl. *Reptiles of the world*. Grosset and Dunlap, NY, 159 pp., 1 figure.
In this small paperback book, aimed at a general readership, Gans described *Lanthanotus* a bit more formally than other authors as the "Bornean Earless Monitor" (p.91). He presented another very brief account of the species without adding anything new. However, he published a color photograph by Hymen Marx of the only live juvenile *Lanthanotus* seen outside of Sarawak. That juvenile, in the Field Museum of Natural History, became the subject of an osteological description by Rieppel (1992). The specimen (FMNH 130981) is now cleared and stained in the museum's herpetology collection. It was also depicted in Sprackland (1972: pl. XXII).

++1975. **Klemmer, Konrad. Family: earless monitors. Pp. 331-337. In: Grzimek, Bernhard (ed.). *Grzimek's animal life encyclopedia, volume 6 reptiles*. Van Nostrand Reinhold, 588 pp.
Excellent overview that included a brief history of *Lanthanotus*. Written for a general adult audience, the description reads very much like one of the catalogue accounts from Boulenger (1885). Klemmer specifically wrote, "During the subsequent eighty years, six earless monitors came into museum collections" (p. 331), though there were at least eight (SEE Pritchard, 1961). He may have been the first to note that this species "takes earthworms when it is underwater," but he does not specify if "takes" means "captures," "consumes," or both.

+1977. **Sprackland, Robert G. *All about lizards***.** TFH Publications, Neptune, NJ, 128 pp., pp. 112-113, 3 figures.
In this general introduction for lay readers, the Earless Monitor's defining characteristics are briefly described along with comments about its natural history. There are two black-and-white photographs (pp. 112-113) and a close-up color photograph of the head (p. 85).

*++1978. **Proud, K.** Some notes on a captive earless monitor lizard, *Lanthanotus borneensis*. *Sarawak Museum Journal* 26 (47): 235–242, plates XXIX-XXXII.
This report was the first field observation since 1966 and included information on the habits of *Lanthanotus* and confirmed some of Sprackland's hypothesis (1970; 1972) that the tail is prehensile and aids the lizard in climbing. Proud's specimen measured 43.8 cm, the largest recorded to that time, including the 42 cm holotype (SEE T. Harrisson, 1966). It was collected in September 1976 "from Kampong Emplas, Sg. Simunjam, 1st Division," and was found with 5 eggs of sizes that match known *Lanthanotus* egg dimensions. No increase in length occurred after 2 ½ years in captivity. Proud reported that ground temperatures on the forest floor range from 20.5˚ C to 27˚ C, not higher. Of note, both Mertens's and Proud's lizards only shed once within a two-year period.

***++1980a. Rieppel, Olivier.** The phylogeny of anguinomorph lizards**.** *Denkschriften* der *Schweizerischen Naturforschenden Gesellschaft* 94: 1-86. http://www.springer.com/us/book/9783764312244?wt_mc=GoogleBooks.GoogleBooks.3.ENandtoken=gbgen#otherversion=9783034893725.
This monograph is the most extensive morphological review of both *Lanthanotus* and the Anguimorpha since the McDowell and Bogert study (1954) and supports many earlier findings. As with the earlier work, this study deals primarily with the skull. Rieppel's study also included a detailed study of cranial musculature including the neck and expands the jaw muscle data of Haas (1973). It is an extremely important contribution for squamate morphology and systematics. The *Lanthanotus* skull used was FMNH 134711. Despite original advertisements and some citations, this monograph does not contain a color plate.

***++1980b. Rieppel, Olivier.** The postcranial skeleton of *Lanthanotus borneensis* (Reptilia, Lacertilia). *Amphibia-Reptilia* 1: 95-112, figures 1-11.
In Rieppel's sequel to his earlier research (1980a), he provided evidence for the *Lanthanotus*-*Varanus* sister group hypothesis, based largely on tarsal morphology of *Lanthanotus borneensis* (FMNH 134711).

***++1981. Rieppel, Olivier.** The hyobranchial skeleton in some little known [sic] lizards and snakes. *Journal of Herpetology* 15(4): 433-440, figures 1-4.
The hyobranchial skeleton is compared among several burrowing lizards, including *Lanthanotus*, to search for convergence. The scincoids examined, *Acontophiops* and *Typhlosaurus*, approach the snake condition, wheras the hyobranchial structure in *Lanthanotus* is quite different.

+1982. Branch, W. Hemipenial morphology of platynotan lizards. *Journal of Herpetology* 16(1): 16–38, figures 1-9. http://www.jstor.org/stable/pdf/1563902
Heloderma, *Lanthanotus,* and *Varanus* (20 species) were examined and compared. Branch lacked access to *Lanthanotus*, so he provided extensive notes and an illustration from the unpublished work of Samuel McDowell. Though the hemipenial morphologies show considerable similarities among the genera, *Lanthanotus* and *Varanus* share possession of "paired horns that are extensions of the main retractor muscle, pierce the dorsal apical tissues of the hemipenis, and lie in the central lumen of the retracted organ" as a synapomorphy. Branch concurs with Rieppel (1980a, 1980b) that *Heloderma* and *Varanus* form a sister group to *Lanthanotus*.

1982. Kron, Aiken, and Michael Kavanagh. Species conservation priorities in the tropical forests of Sarawak, Malaysia. In: Mittermeier, Russell, and William Konstant (eds.). *Species conservation priorities in the tropical forests of southeastern Asia*. *Occasional Papers of the IUCN Species Survival Commission* 1: 17-22; photograph only. https://portals.iucn.org/library/sites/library/files/documents/SSC-OP-001

***+1982. Sprackland, Robert G.** Feeding and nutrition of monitor lizards in captivity and in the wild. *Bulletin of the Kansas Herpetological Society* 47: 15-18, 1 figure.
First description of soft anatomy of *Lanthanotus*, particularly of the gut, and comments about possible diet. Soft anatomy depicted in drawing.

***++1983. Rieppel, Olivier.** A comparison of the skull of *Lanthanotus borneensis* (Reptilia: Varanoidea) with the skull of primitive snakes. *Zeitschrift für Zoologische Systematik und Evolutionsforschung* 21(1983): 142-153. https://eurekamag.com/pdf.php?pdf=004565022
The skulls of *Lanthanotus* and "primitive" snakes were compared and showed no special features that warrant the hypothesis of *Lanthanotus* as a close relative to early snakes. This breaks with the traditional view that states the opposite. Specimens examined were MCZ 8305, SMF 66188 and FMNH 134711.

***++1984. Borsuk-Bialynika, Magdelena.** Anguimorphans and related lizards from the late Cretaceous of the Gobi Desert, Mongolia. *Palaeontologia Polonica* 46: 5–105.
http://www.palaeontologia.pan.pl/Archive/1984_46_5-105_1-13.pdf?bcsi_scan_2687365ababd2c82=0andbcsi_scan_filename=1984_46_5-105_1-13
A putative fossil lanthanotid is described, together with numerous other lizards from Mongolia. The lanthanotid, the only addition to the family since *Lanthanotus borneensis* was described, was named *Cherminotus*, and though similar to *Lanthanotus*, its relationships were later questioned (SEE Gao and Norell, 2000; Norell, Gao and Conrad, 2007).

+**1984. Obst, J, K. Richter, and U. Jacob.** *Lexicon der Terraristik und Herpetologie*. Landbuch-Verlag, Hannover, 466 pp.
Short dictionary account of *Lanthanotus* in German on p. 244. No illustration.

1986. Gotch, Arthur Frederick. *Reptiles—their Latin names explained*. Blandford Press, Poole, 176 pp.
A half-page etymological account of the family, genus, and trivial names Lanthanotidae, *Lanthanotus*, and *borneensis* (p. 117).

++1986. Pregill, Gregory K., Jacques Gauthier and Harry W. Greene. The evolution of helodermatid squamates, with description of a new taxon and an overview of Varanoidea. *Transactions of the* San *Diego Natural History Museum* 21:167-202. 59.
http://www.biodiversitylibrary.org/page/4287323#page/187/mode/1up
The first cladistic analysis of the Varanoidea, resulting, in part, in the consolidation of *Lanthanotus* into the Varanidae for the first time. That status remained until Pyron et al. (2013), resurrected the Lanthanotidae.

***++1989a. Mertens, Robert F.** *Lanthanotus*: an evolutionarily important lizard. Translation of Mertens (1962; SEE Mertens, 1961, for history of the three versions of this paper) by Paul Gritis. *Bulletin of the Chicago Herpetological Society* 24(10): 184-185.

++1989b. Mertens, Robert F. On the captive feeding of the earless monitor, *Lanthanotus borneensis*. Translation of Mertens (1970) by Paul Gritis. In: *Bulletin of the Chicago Herpetological Society* 24(10): 189, Fig. 1.

***++1989. Harrisson, Barbara.** Observations on living earless monitors (*Lanthanotus borneensis*). Annotated translation of Harrisson, B. (1962; see for history of the three versions of this paper) by Paul Gritis. In: *Bulletin of the Chicago Herpetological Society* 24(10): 185-188, Figures 1-5).
This version's figures are about equal in quality to those in the 1962 original paper. Unlike his translations of Mertens (1989a-b) in the same issue, Gritis annotated the translation of Harrisson.

+1990 Kabasch, Klaus. *Wörterbuch der Herpetologie***.** Gustav Fischer Verlag, Jena, 478 pp.
There is a brief dictionary-style account for Lanthanotidae in German (p.262). Longevity for captive *Lanthanotus* is given as 6 years in Tabelle 6 (p. 199).

****+1991. Eigener, Wilhem.** *Enzyklopädie der Tiere*. Weltbild Verlag, Hamburg, 544 pp. (In German.)
http://lanthanotus-org.webs.com/Das%20Tier
This single volume presented an excellent overview of the diversity of Earth's animal life for a general lay readership, with illustrations and brief text. A half-page devoted to *Lanthanotus* is included (p. 460, plus drawing), although there is no new information.

***+1992. Carroll, Robert L., and Michael Debraga.** Aigialosaurs: mid-Cretaceous varanoid lizards. *Journal of Vertebrate Paleontology* 12(1): 66-86.
Aigialosaur fossils were compared with mosasaurs and the Varanoidea, including *Lanthanotus*. The authors concluded that aigialiosaurs and *Varanus* are more similar to each other than either is to *Lanthanotus* or *Heloderma*.

***++1992. Rieppel, Olivier.** The skeleton of a juvenile *Lanthanotus* (Varanoidea). *Amphibia-Reptilia* 13: 27-34. http://lanthanotus-org.webs.com/1992-Rieppel_Juvenile_Lanthanotus_skull
Rieppel used the cleared and stained juvenile specimen mentioned earlier (Gans, 1975) in the collection of the Field Museum (FMNH 130981), Chicago, for this study.

****1994. Indonesian Reptile Society.** *Lanthanotus* from West Kalimantan (poster by Alain Compost). SEE Yaap et al. (2012).
Though Yaap et al. (2012) claimed the first record for *Lanthanotus* in Indonesia, the Indonesian Reptile Society issued a poster of a specimen from Kalimantan as part of the new group's membership campaign (figure 4a). In correspondence with three members of the group, I was informed that the depicted lizard was one of several that had been collected in Indonesian Borneo. (SEE also Sprackland, 1999.) That photo and another allegedly later one were attributed to French photographer Alain Compost.

****+1997. Lamar, William W.** *The world's most spectacular reptiles and amphibians*. P. 90. World Publications, Malaysia, 208 pp.
This book is an exhibition of stunning photographs of amphibians and reptiles, many species of which are rarely seen. A photograph and brief caption of *Lanthanotus* (p. 90) is included.

1997. Lee, Michael. The phylogeny of varanoid lizards and the affinities of snakes. *Philosophical Transactions of the Royal Society of London, B* 352: 54-91.
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1691912/pdf/GE6BG2WAXLJ4WPVD_352_53
Using 144 osteological characters, Lee presented a cladistic model that focused on putative relationships of varanoids that included mosasaurids. Mosasaurs share 40 derived characters with snakes, forming a mosasaur-snake clade (Pythonomorpha), whereas varanids, helodermatids, and *Lanthanotus* form a sister group, thus removing *Lanthanotus* as an ancestral snake relative. Lee pointed out that most characters uniting mosasaurs and snakes are unrelated to small size or limblessness.

****+1997. Manthey. Ulrich and Wolfgang Grossman.** *Amphibien and Reptilien Südostasiens.* Natur und Tier-Verlag, Berlin, 512 pp. Pp. 251-2. (In German.)
This field guide account is particularly interesting because it was the first time that the distribution of *Lanthanotus* was given as "Borneo/ Sarawak, Kalimantan?" Includes one color photograph by R. Sprackland (p. 251) and the lithograph from Steindachner (1877a, 1878).

***+1997. Norrel, Mark and Gao Keqin.** Braincase and phylogenetic relationships of *Estesia mongoliensis* from the Late Cretaceous of the Gobi Desert and the recognition of a new clade of lizards. *American Museum Novitates* 3211, 25 pp.
In their reevaluation of the phylogenetic relationships of *Estesia*, the authors reported the results of their extensive examination of *Heloderma, Lanthanotus* and *Varanus*. They removed *Estesia* as the sister-group of *Varanus* and allied it with *Heloderma* in a new taxon, Monstersauria. Though no revision of *Lanthanotus* was included, extensive comparisons were made between *Lanthanotus* and the other genera studied.

****+1997. Ziegler, Thomas and Wolfgang Böhme.** Genitalstrukturen und Paarungsbiologie bei squamatan Reptilien, speziell den Platynota, mit Bemerkungen zur Systematik. *Mertensiella* 8: 1-207. (In German with English summary.) http://feldherpetologie.de/die-buchreihe-mertensiella/mertensiella-8-paarungsbiologie-reptilien/
This work is a thorough review of lizard genitalia. It standardized morphological terminology of hemipenial structures and expanded the earlier work of Böhme. The authors provided the first formal description of both the hemipenis and hemiclitoris of two *Lanthanotus* specimens (pp. 38-40). Although they disputed some of Branch's (1982) intra-varanid relationships, they retained *Lanthanotus* as the sister group to *Varanus*.

+1998. Fuller, Susan, Peter Baverstock, and Dennis King. Biogeographic origins of Goannas (Varanidae): a molecular perspective. *Molecular Phylogenetics and Evolution* 9(2): 294-307.
This study aimed to clarify the phylogenetic relationships with the Varanidae, using *Lanthanotus* and *Heloderma* as outgroups. As in prior studies, *Lanthanotus* is the sister group to *Varanus*. Their specimen was an uncatalogued preserved animal from the Cincinnati Zoo, which holds numerous preserved *Lanthanotus*.

+1998. Keqin, Gao, and Mark Norell. Taxonomic revision of *Carusia* (Reptilia: Squamata) from the Late Cretaceous of the Gobi Desert and phylogenetic relationships of anguimorphan lizards. *American Museum Novitates* 3230: 1-51.
Lanthanotus had a minor place in this paper, but its traditional position among Anguimorpha and within Varanoidea was strongly supported, as was the *Lanthanotus – Cherminotus* sister-group relationship.

++1999. Sprackland, Robert G. Sarawak's earless monitor lizard (*Lanthanotus borneensis*). *Reptiles* March: 72-79, illustrated. http://lanthanotus-org.webs.com/1999-Lanthanotus%20Sarawak's_earless_monitor
This article is an overview of what was known about *Lanthanotus* to 1999, including its ecology, behavior, distribution, physiology, reproduction, and importance to evolutionary studies. A photograph of the Vienna holotype is included.

+2000. Keqin, Gao, and Mark Norell. Taxonomic composition and systematics of Late Cretaceous lizard assemblages from Ukhaa Tolgod and adjacent localities, Mongolian Gobi Desert. *Bulletin of the American Museum of Natural History* 249: 1-118. http://digitallibrary.amnh.org/handle/2246/1596
Examination of newly found specimens of *Cherminotus longifrons*, identified subsequent to its description as a close relative of *Lanthanotus*, led the authors to conclude that uniting *Lanthanotus* and *Cherminotus* is not unequivocally supported by available evidence (but SEE Norell, Keqin, and Conrad, 2007).

2001. Ast, Jennifer C. Mitochondrial DNA evidence and evolution in Varanoidea (Squamata*).* *Cladistics* 17: 211-226. https://deepblue.lib.umich.edu/bitstream/handle/2027.42/72302/j.1096-0031.2001.tb00118.x.pdf?sequence=1
Various hypotheses were advanced of varanoid evolutionary relationships based on mtDNA sampling across 48 species of *Varanus* plus five outgroup taxa including *Lanthanotus*. *Lanthanotus* falls outside the defined varanid regional groups (African, Indo-Asian A, Indo-Asian B, and Indo-Australian), although it is sister to the *Varanus* group clade.

+2001. Zug, G., L. Vitt, and J. Caldwell. Herpetology: an introductory biology of amphibians and reptiles. Second edition. Academic Press, New York, 630 pp., pp. 499, 501.
This is a college textbook aimed at seniors and graduate students. As a general broad introduction to herpetology it included scattered information and a family account on *Lanthanotus*, plus a color photograph of the animal attributed to L. Porras (p. 499).

++2002. Halladay, Tim, and Kraig Adler (eds.). *Firefly encyclopedia of reptiles and amphibians*. Pp 167-8, figure p. 167. Firefly, Buffalo, NY, 240 pp.
Produced for a general readership, this book includes a brief account and a poor color illustration of the Earless Monitor.

++2002. **Maisano, Jessica, Christopher J. Bell, Jacques Gauthier, and Timothy Rowe. The osteoderms and palpebral bones in *Lanthanotus borneensis* (Squamate: Anguimorpha). *Journal of Herpetology* 36(4): 678-682, figures 1-3.
http://www.geo.utexas.edu/faculty/rowe/Publications/pdf/034%20Maisano%20et%20al%202002
A specimen of *Lanthanotus* in the Peabody Museum collection (YPM 6057) was scanned via high-resolution X-ray computed tomography, allowing the mapping of osteoderms and revealing the presence of palpebral bones. Prior to this study, palpebral bones had not been reported for *Lanthanotus*, though the likelihood that they must be present was raised by Underwood (1957). Osteoderms are much more widespread and numerous in *Lanthanotus* than reported by McDowell and Bogert (1954), who had relied on conventional X-ray examination.

+2002. **O'Shea, Mark and Tim Halliday. *Smithsonian handbooks: reptiles and amphibians*. Dorling Kindersley, London, 256 pp.
This general readership book contains a color photograph and short paragraph about Earless Monitors (p. 95).

++2003. **Pianka, Eric. Monitors, goannas, and earless monitors (Varanidae). Pp. 359-368. In: Hutchins, Michael (ed.). *Grzimek's animal life encyclopedia, second edition, volume 7, reptiles.* Thompson Gale, 593 pp.
This large book contains a short general account on Earless Monitors for lay audiences (p. 365). It contains some outdated information, e.g., "shed their skin in one piece" (not always, maybe not typically), and that "these are sluggish lizards." There is one mediocre color drawing.

*+2003. **Pianka, Eric and Laurie Vitt.** *Lizards: Windows to the evolution of diversity.* University of California Press, Berkeley, 348 pp.
This book has a very good 2-page overview of *Lanthanotus* based on what was known at the time. Their information that *Lanthanotus* shed its "skin in one piece, like snakes" (p. 240) is not always true, and among captives doesn't seem to be the norm. They were perhaps the first to note that the lizards "seem to prefer relatively low ambient temperatures" (p. 241), which has been borne out by many later observers. The color photo (p.240) was taken by Alain Compost (SEE Yaap et al., 2012.)

+2004. **Das, Indraneil. *Lizards of Borneo*. Natural History Publications, Kota Kinabalu, Borneo, 89 pp.
This small book was intended in part to be a field guide for a general audience but serves more as an introduction to the diversity of lizards on Borneo. There is an illustrated one-page account for *Lanthanotus* (p. 53) that includes the observation that *Lanthanotus* is "known only from isolated localities in Sarawak and Kalimantan."

****McKay, George (ed.).** The encyclopedia of animals: a complete visual guide. University of California Press, Berkeley, 608 pp. P. 392, figure.
This is a picture book for a very broad audience and includes a color drawing of *Lanthanotus* (p. 392).

***++2004. Pianka, Eric.** *Lanthanotus borneensis*, pp. 535–538. In: Eric Pianka and Dennis King (eds). *Varanoid Lizards of the World*. Indiana University Press, Bloomington, IN, USA. 588pp.
An almost verbatim version of Pianka's (2003) account.

2004. Townsend, Ted, Alan Larson, Edward Louis, and Jonathan Macey. Molecular phylogenetics of Squamata: The position of snakes, amphisbaenians, and dibamids, and the root of the squamate tree. *Systematic Biology* 54(5): 735-757.
Sixty-nine squamate species were represented in both nDNA and mtDNA analyses to identify the root for all squamates. The position of snakes amongst squamates remained unresolved although the analysis provided substantial evidence against a specific anguimorph ancestry. The long-standing monophyly of Varanoidea (Helodermatidae and *Varanus* + *Lanthanotus*) was contested; the Helodermatidae was sister to Anguidae, and *Xenosaurus*. *Lanthanotus* was returned to the Varanidae which is sister to the Shinisauridae,

****++2005. Davies, Valerie and Chris Mattison.** *Amphibians and reptiles: Lizards 3*. In: *World of animals, 46*: 100-101. Grolier/Scholastic, Danbury, CT, 128 pp.
This is a book for a young general audience. The two-page section about *Lanthanotus* provides a good overview for the lay reader.

+2006. Fry Bryan G., Nicolas Vidal, Janette A. Norman, Freek J. Vonk, Holger Scheib, S. F. Ryan Ramjan, Sanjaya Kuruppu, Kim Fung, S. Blair Hedges, Michael K. Richardson, Wayne. C. Hodgson, Vera Ignjatovic, Robyn Summerhayes and Elazar Kochva. Early evolution of the venom system in lizards and snakes. *Nature* 439: 584–588. PMID: 16292255.
https://pdfs.semanticscholar.org/c076/0df33843c445e848e91cfcc75397bec562d3.pdf?_ga=1.84573913.1157139285.1488313433
In this far-reaching study, putative venom glands and associated structures were described for the first time in several lizard groups, including Iguania, *Varanus*, and *Lanthanotus*. A new higher taxonomic category, Toxicofera, includes all those species possessing such glands.
***++2007. Norell, Mark, Kequin Gao, and Jack Conrad.** A new platynotan lizard (Diapsida: Squamata) from the Late Cretaceous Gobi Desert (*Ömnögov*), Mongolia. *American Museum Novitates* 3605: 1-22.

An important overview of evolution and relationships of basal varanids, with important updates on the authors' study of *Cherminotus* in which, *contra* to their 2000 paper, they returned it to a sister taxon status with *Lanthanotus*. They also showed that the extinct *Aiolosaurus oriens* might be part of a *Cherminotus-Lanthanotus* clade.

2008. Bauer, Aaron and Todd Jackman. Global diversity of lizards in freshwater (Reptilia: Lacertilia). *Hydrobiologica* 595: 581-586.
This is a summary of lizards that spend considerable time in the water. Data are provided about preferred aquatic habitats, geographic distribution, and points of similarity.

2008. Conrad, Jack. Phylogeny and systematics of Squamata (Reptilia) based on morphology. *Bulletin of the American Museum of Natural History* 310: 1-182.
http://digitallibrary.amnh.org/handle/2246/5915
Conrad used morphology to redistribute the clades of, among others, the Anguimorpha. *Varanus* + *Saniwa ensidens* are sister to *Lanthanotus*, whereas *Cherminotus* + *Aiolosaurus* is sister to *Varanus* + *Saniwa ensidens* + *Lanthanotus*. (SEE Conrad et al., 2011.)

***++2008. Evans, Susan E.** The skull of lizards and tuatara. In: Gans, C., A. Gaunt, and K. Adler (eds.) *Biology of the Reptilia,* 20: 1-347, Society for the Study of Amphibians and Reptiles.
http://carlgans.org/bor-view/?borv=20andborpage=1
An exhaustive review of the skulls of lizards including *Lanthanotus* and one or more representatives of all lizard families.

****+2008. Mattison, Chris (ed.).** *Firefly encyclopedia of reptiles and amphibians*. Second edition. Firefly, Buffalo, NY, 240 pp.
Produced for a general readership, this book includes a brief account and illustration of the Earless Monitor.

****+2010. Das, Indraneil.** *A field guide to the reptiles of south-east Asia.* New Holland, London, 376 pp., pp. 72-73, 226, pl. 28.
A concise field guide account of the species *Lanthanotus borneensis*.

+2010. Sprackland, Robert G. *Pocket Expert Guide to Lizards: More Than 300 Essential-to-Know Species (Pocket Professional Guide Series)*. TFH Publications, Neptune, NJ, 352 pp., p. 263.
In this handbook, species were grouped into geographical regions. *Lanthanotus* is included in a one-page account in the Southeast Asia section.

*+2011. Conrad, Jack, Jennifer C. Ast, Shaena Montanari, and Mark Norell. A combined evidence analysis of Anguimorpha (Reptilia: Squamata). *Cladistics* 27: 230-277.
An ambitious analysis of 175 species of extant and extinct anguimorphs that used 2,281 parsimony-informative characters, combining morphological and molecular data. There were numerous new results. Regarding *Lanthanotus*, it was combined with *Cherminotus* and another fossil taxon, *Ovoo gurvel*, and placed in the subfamily Lanthanotinae, whereas *Aiolosaurus* was removed from the clade that includes *Lanthanotus*.

+2011. Das, Indraneil. *A Photographic guide to snakes and other reptiles of Borneo*. London: New Holland, 144 pp.
General guide for tourists and casual wildlife watchers, including photos and brief species accounts. *Lanthanotus* is included.

++2012. Anon. Discovered, the rarest species in the world!! *Herp Life* 23:6-7. (In Japanese.)
A dramatic close-up photo of *Lanthanotus borneensis* appeared on the cover of this magazine, as did a life-sized full body spread on pp. 6-7. The text claims that they (unclear who) had "discovered the rarest species in the world!!" Beyond that hyperbole came notice that the spring 2013 issue of *Herp Life* would carry more extensive articles and more photographs (Anon., 2013a). The specimen to which the author(s) referred was obtained by Japan's iZoo, which issued several of its own press releases.

+2012. Gauthier, Jacques, Maureen Kearney, Jenifer Maisano, Olivier Rieppel, and A. Behike. Assembling the Squamate Tree of Life: perspectives from the phenotype and the fossil record. *Bulletin of the Peabody Museum of Natural History* 2012; 53: 3–308.
http://people.earth.yale.edu/sites/default/files/files/Gauthier/Gauthier
This exhaustive review of putative relationships among all squamates, including fossil taxa, had a great many new revelations. The *Lanthanotus*-*Cherminotus* clade was again supported and determined to be a sister group to the *Varanus*-*Saniwa* clade. The split between the *Lanthanotus*-*Cherminotus* clade and the Varanids occurred around the Cretaceous-Tertiary boundary, possibly well before, but not later than the early Eocene. The paper contains over 350 excellent illustrations/CT scans, and there are more data available online.

++2012. **Kamihata Fish Industries. Possibility to be an ancestral type of snake. (In Japanese.)
http://www.kamihata.com/jp/story/borneo/bor01.html
This anonymous report provided an extensive history of the discovery and collection of *Lanthanotus* in Kalimantan (Indonesian Borneo). There is an account of putative *Lanthanotus*-snake relationships, focusing on the importance of the lizard to further research. It is well illustrated and informative, but the Google-provided translation is poor.

++2012. **Yaap, B., G. Paoli, A. Angki, P. Wells, D. Wahyudi, and M. Auliya. First record of the Borneo Earless Monitor *Lanthanotus borneensis* (Steindachner, 1877) (Reptilia: Lanthanotidae) in West Kalimantan (Indonesian Borneo). *Journal of Threatened Taxa* 4(11): 3067-3074.
http://researchonline.jcu.edu.au/24711/ http://threatenedtaxa.org/index.php/JoTT/article/view/805/1445
The authors recorded the alleged first record for *Lanthanotus* outside of Sarawak, having found the species in Indonesian Borneo, Kalimantan. In 1994 and 1995, however, the Indonesian Reptile Society issued poster-sized photographs of live Earless Monitors taken in Indonesia by French photographer Alain Compost. The claim was confirmed in emails between members of the Indonesian Reptile Society and me, although I know of no voucher specimen from Indonesia taken at that time.

This article described the circumstances of the discovery, characteristics of the individual and microhabitat structure in which it was found, provided results from local community interviews about the local distribution of the species, suggested it is found more broadly in the Landak District and possibly elsewhere, and placed this information in a broader context of current knowledge and high conservation value of *Lanthanotus borneensis*.

+2013a. **Anon. *Herp Life* Spring issue: 6-7. (In Japanese.)
This was a magazine aimed at how to "Make a living with creatures." It is significant, because it is a short publicity article noting the year (2012) and place of capture (Kalimantan) of one of the earliest live specimens of *Lanthanotus borneensis* to appear in four decades. The animal photographed and described in the article became a specimen at Japan's iZoo (SEE. Hoshi, 2013; Tuyoshi and Bacchini, 2015).

+2013b. **Anon. About our cover: *Lanthanotus borneensis*. *Herpetological Review* 44(4): 533.
http://ir.unimas.my/11722/1/Lanthanotus%20borneensis_intro
There is a color photograph by Indraneil Das and single page overview of *Lanthanotus* and its putative relationships that expanded on systematic studies subsequent to 1997. The natural history notes included a broad overview similar to those given by Harrisson (1961), but again with additional information gleaned since the mid-1990s.

+2013. Hoshi, Katsumi.** The most famous "super-rare" species, *Lanthanotus borneensis*. *Creeper* 66: 2-4; 112. (In Japanese.)
An account about, perhaps, the first living *Lanthanotus* to be exhibited in a zoo in nearly 45 years. The color photos, first released on the Internet, show the lizard in its early days at iZoo in Japan. The story of how it was acquired and early observations on the lizard comprise the three-page text. The claim that *Lanthanotus* is "the most famous "super-rare" species" is hyperbole.

2013. Pyron, Alex, Frank Burbrink and John Wiens. A phylogeny and revised classification of Squamata, including 4161 species of lizards and snakes. *BMC Evolutionary Biology,* 13: 93. doi: 10.1186/1471-2148-13-93 PMID: 23627680. https://www.scienceopen.com/document_file/6582cbf9-0d19-4f82-8edc-327792543d0e/PubMedCentral/6582cbf9-0d19-4f82-8edc-327792543d0e
Following on earlier huge data set studies (Conrad et al., 2011; Gauthier et al., 2012; Townsend et al., 2004) of higher-level squamate phylogeny, Pyron et al. used an unprecedented 4,161 extant species for their investigation. They presented a new phylogeny and a revised classification of squamates at the family and subfamily levels. Among many other conclusions, the authors supported the return of *Lanthanotus* to its own family.

++2013a. Shirawa, Tuyoshi.** *Vivarium Guide* 61: 26-27. (In Japanese.)
The director of iZoo presented a two-page color spread with some details about the live *Lanthanotus* displayed by iZoo. These were the specimens that allegedly mated and laid eggs in captivity (Tuyoshi and Bacchini, 2015), although it is possible that the female was gravid when she arrived at the zoo. Primarily a public relations notice.

+2013b. Shirawa, Tuyoshi.** *Vivarium Guide* 62: 78-82. (In Japanese.)
More detailed than Shirawa's 2013a account, this article included useful information on the husbandry practices that iZoo used to care for its *Lanthanotus* collection. There were also details about the zoo enclosure and responses by visitors. Contains excellent photographs of live lizards.

++2013. Vergner, I.** První nález varanovce bornejského ve Východním Kalimantanu a další setkání se vzácným ještěrem. Živa 3: 131-133. (In Czech.) www.ziva.avcr.cz
A three-page update on the alleged first finding of the Borneo Earless Monitor in East Kalimantan and what had been learned about the captive life of the lizards. Color photos of a live specimen are those from Japan's iZoo.

2014. Altherr, Sandra. *Stolen Wildlife – Why the EU needs to tackle smuggling of nationally protected species*. *Pro Wildlife*, Munich, Germany.
https://www.prowildlife.de/wp-content/uploads/2016/02/2014_Stolen-Wildlife-Report.
In this article, the author made an argument for the European Union to be more cooperative and consistent in enforcing its commitment to CITES and similar international agreements. *Lanthanotus borneensis* was used as an example of a newly found and exploited species.

****2014a. Anon.** Untitled half-page article and color photo of *Lanthanotus*, In: TRAFFIC. *The Wildlife Professional*, Winter: 16.
This was a letter from the editor, in which *Lanthanotus borneensis* was used as an example of an exploited endangered species, though it had not been categorized as endangered elsewhere.

****2014b. Anon.** Guide and picture book to the reptiles and amphibians at iZoo. San-Ei Shobo Publishing, Japan. 114 pp. (In Japanese.)
A standard guidebook for zoo visitors, the book contains photographs of *Lanthanotus* and the story behind the specimen at iZoo. Probably written by iZoo director Takashi Shirawa, along with several other Japanese papers (Anon., 2012, 2013a-b, 2014c, 2015b).

****++2014c. Anon.** A fruitful reproductive success in Mimi pear and lizard zoologic zoo "iZoo." (In Japanese.) https://aquaturtlium.com/izoo-succeed-breeding-of-earless-monitor-lizard/
This is a detailed month-by-month account on possibly the first captive breeding of *Lanthanotus*. Though their first hatchling was stillborn, the next four were all healthy. Probably written by iZoo director Takashi Shirawa.

****+2014. Bethge, Philip.** Reibach für „kruff kruff.“ *Der Spiegel* 46: 130-131. (In German.)
http://magazin.spiegel.de/EpubDelivery/spiegel/pdf/130223382
Bethge’s article was the first in a series of similar articles that focused on the possible exploitation of *Lanthanotus borneensis* as it entered commercial trade. Excepting Bethge, who put emphasis on the reptile trade in Germany, all these articles repeated identical information. The articles by Brooke (2015) and CITES (2015) also focus on the potential commercial exploitation of this species.

+2014. Conrad, Jack, Jason Head, and Matthew Carrano. Unusual soft-tissue preservation of a crocodile lizard (Squamata, Shinisauria) from the Green River Formation (Eocene) and shinisaur relationships. *The Anatomical Record* 297: 545-559.
http://onlinelibrary.wiley.com/doi/10.1002/ar.22868/full
Four genera of shinisaurs, including a remarkably preserved skin, were compared with *Xenosaurus* and *Lanthanotus*. The results unambiguously separated shinisaurs from an affinity with *Xenosaurus* and demonstrate a sister-group relationship with *Lanthanotus*.

2014. Hance, Jeremy. Bizarre lizard newest victim of reptile pet trade. Monga Bay News.
http://news.mongabay.com/2014/09/bizarre-lizard-newest-victim-of-reptile-pet-trade/
One of the many general readership pieces that briefly introduced *Lanthanotus* to the public, then expresses concern on the recent commercial trade in this lizard.

****+2014. Nijman, Vincent and Sarah Stoner.** *Keeping an ear to the ground: monitoring the trade in Earless Monitor Lizards, A Rapid Assessment*. A Traffic Report, 17 pp, illustrated. TRAFFIC, Petaling Jaya, Selangor, Malaysia.
http://www.trafficj.org/publication/14_Keeping_an_Ear_to_the_Ground
The first semi-official examination of the recent rediscovery and commercialization of Earless Monitors, the report included a brief review of what has been published about *Lanthanotus borneensis*. Some of the authors' conclusions are not based on their evidence. Overall, a good review of *Lanthanotus borneensis*.

****++2014. Sprackland, Robert G.** *Lanthanotus borneensis* website. www.lanthanotus-org.webs.com
An open access internet site for information about *Lanthanotus* biology generally, including evolution, anatomy, behavior, ecology, history, and terrarium care. Includes extensive links to papers of relevance that are available as PDFs.

2014. Stokstad, Erik. Pet trade threatens unusual lizard. *Science*, 10 September, online.
http://www.sciencemag.org/news/2014/09/pet-trade-threatens-unusual-lizard.
Very similar to Bethge (2014) and Hance (2014).

****+2014. TRAFFIC.** International smuggling threatens the "Holy Grail" of the reptile world. Media release of 10 September 2014. http://www.traffic.org/home/2014/9/8/international-smuggling-threatens-borneos-remarkable-earless.html
Very similar to Bethge (2014), Hance (2014), and Stokstad (2014).

***+2015a. Anon.** Malaysia goes to battle for Godzilla-like lizard.
http://www.todayonline.com/world/asia/malaysia-goes-battle-godzilla-lizard
An introduction to the interest and trade in Earless Monitors, and the efforts being taken by Malaysia to regulate its collection.

****+2015b. Anon.** *Vivarium Guide* No. 68: 8-9; 49. (In Japanese.)
https://www.terapeak.com/worth/vivarium-guide-no68-feb-2-2015-japanese-magazine-reptiles-lizard-snake-japan/281916866487/
This report contained he first known published photographs of a *Lanthanotus* emerging from its egg at iZoo, and the neonate once it was free. There was also a one-page update on the adults exhibited at iZoo in Japan. The photos were first published on various Internet sites.

****+2015. Brooke, Carly.** Elusive Earless Monitor's Viral Social Status Proves Deadly for Species.
https://featuredcreature.com/elusive-earless-monitors-viral-social-status-proves-deadly-for-species/
Very similar to Hance (2014, q.v.).

2015. CITES (Convention on International Trade in Endangered Species). Proposal to list *Lanthanotus borneensis* in Appendix I in Malaysia. Interpretation and implementation of the Convention Species trade and conservation: Proposals for possible consideration at CoP17.
http://lanthanotus-org.webs.com/Lanthanotus_CITES_proposal
Malaysia introduced a proposal to list *L. borneensis (*Earless Monitor Lizard) (AC28 Doc.22.5) on Appendix I, noting that while the species' population size is not currently known, the impact of trade is inferred to be great. They added that it is the only species of monitor lizard not listed on a CITES appendix.

****++2015. Mendyk, Robert, Avishai Shuter, and Andrew Kathriner.** Historical notes on a living specimen of *Lanthanotus borneensis* (Squamata: Sauria: Lanthanotidae) maintained at the Bronx Zoo from 1968 to 1976. *Biawak* 9(2): 44-49. http://www.varanidae.org/9_2_low.
Valuable because this is the only presentation of the husbandry of Earless Monitors at the Bronx Zoo, one of only two institutions that managed, in the 1960s, to keep specimens alive for more than two years. After they died, these lizards became part of the preserved herpetological collection of the American Museum of Natural History. SEE also Anon., 1961c.

2015. Neslen, Arthur. Lizard traffickers exploit legal loopholes to trade at world's biggest fair. *The Guardian* online, https://www.theguardian.com/environment/2015/nov/11/lizard-traffickers-exploit-legal-loopholes-to-trade-at-worlds-biggest-fair
Similar to Bethge (2014), Brooke (2015), and Hance (2014),.

2015. Reeder, Tod, Ted Townsend, Daniel Mulcahy, Brice Noonan, Perry Wood, Jr., Jack Sites, Jr., and John Wiens. Integrated analyses resolve conflicts over squamate reptile phylogeny and reveal unexpected placements for fossil taxa. *PLoS ONE* 10(3): 1-22. e0118e0118199.doi:10.1371/journal.pone.0118199
An ambitious study that used 691 morphological characters and 46 genes from 161 living and 49 fossil taxa, including a new set of 81 morphological characters and the addition of two new genes to perform integrated analyses. Snakes were shown to be only distantly related to the Anguimorpha, including *Lanthanotus*. SEE Streicher and Wiens (2017).

***2015. Shura. Dragons** [sic] **sad song – Borneo fangs. Blog site.** (In Japanese.) http://blog.xuite.net/shura/twblog/323245894.
A personal Internet blog that includes photos of Earless Monitors and restates reasons for putting a total ban on any collecting. Not well researched but frequently appears in general searches for *Lanthanotus*.

****++2015. Stoner, Sarah, and Vincent Nijman.** The case for CITES Appendix I-listing of earless monitor lizards, *Lanthanotus borneensis*. *TRAFFIC Bulletin* 27(2): 55-58. http://www.traffic.org/bulletin/
The authors recapitulated their argument for giving *Lanthanotus* CITES Appendix I status (SEE also Nijman and Stoner, 2014). The positive arguments involving unknown total range, distribution, and population dynamics were offset by the lack of data about those and other biological topics. The main objective is to assure prohibition of commercial trade in the species.

****+2015. Tsuru.** Extra rare scoop!! That mimi naughty lizard attacks Osaka! What? (In Japanese.) http://repbuddy.net/?p=16
An unusual but well-illustrated online account that provided limited observations based on a specimen in a Japanese pet shop. It is accompanied by two videos of live *Lanthanotus*. This web news item demonstrates the increasing commercial exploitation of this species.

****++2015. Tuyoshi, Shirawa, and Sam Bacchini.** Captive maintenance and the first reproduction of Borneo Earless Monitors. *Herp Nation* 18: 6-20. http://herpnation.com/hnm18-8-20/
Details of how a Japan's iZoo maintained and then bred *Lanthanotus* are provided in detail. The many color photographs depict the lizards exploring, mating, feeding, and hatching. At various times the zoo has uploaded videos on those topics. There are some factual errors in the text regarding natural history, but the paper is valuable for the husbandry information.

+2016. Anon. The Malaysian Government proposes suspension of trading of rare lizards. (In Japanese.) https://www.nikkei.com/article/DGXLASDG25H1O_V20C16A7000000/
This account came from Malaysia and explained the preparations to list *Lanthanotus borneensis* on a CITES appendix.

****+2016. Arida, Evy.** How are the Bornean lizards, *Lanthanotus borneensis*? *Warta Herpetofauna* VIII(3): 26-29. (In Indonesian.) https://issuu.com/herpetologiindonesia/docs/warta_februari_2016
Warta Herpetofauna is an Indonesian herpetological magazine (http://perhimpunan-herpetologi-indonesia.or.id/category/publikasi/warta-herpetofauna/), and this article specifically discussed the recent collection and trade in *Lanthanotus borneensis* from one of it's native countries. Similar to Anon. (2016) and Shura (2015).

+2016. Bucklitsch, Y., W. Böhme, and A. Koch. Scale morphology and micro-structure of monitor lizards (Squamata: Varanidae: *Varanus* spp.) and their allies: implications for systematics, ecology, and conservation. *Zootaxa* 4153(1): 1-192. P. 47.
McDowell and Bogert (1954) described and illustrated the scales of *Lanthanotus borneensis*, but no more detailed examination occurred until this paper. Twenty-four electron micrographs at magnification to 2500x were presented, and the presence of sensory pits noted. The pits were deemed apomorphic in Lanthanotus, and its absence in other varanoids led the researchers to state that their results did "not coincide with the well-supported sister group relationship between varanids and *L. borneensis*." There are two paragraphs about *Lanthanotus*.

2016a. CITES (Convention on International Trade in Endangered Species). Consideration of proposals for Amendment of Appendices I and II. CoP17 Prop XXX.
https://cites.org/sites/default/files/eng/cop/17/prop/MY_Lanthanotidae
Very similar to Bethge (2014), Hance (2014), Stokstad (2014), and TRAFFIC (2014).

****++2016b. CITES (Convention on International Trade in Endangered Species).** Consideration of proposals for Amendment of Appendices I and II. CoP17 Prop XXX: 1-10.
A more extensive document than CITES (2016a), giving 10 pages of background about and justification for giving *Lanthanotus* CITES Appendix status. There are a few factual errors and omissions. The report is well illustrated with photos of *Lanthanotus* and a range map of Kalimantan collecting localities.

2016c. CITES (Convention on International Trade in Endangered Species). Notification to the parties: Amendments to Appendices I and II of the Convention. https://cites.org/sites/default/files/notif/E-Notif-2016-063
This is the official first published notice that *Lanthanotus borneensis* has been placed on CITES Appendix II but prohibits any trade in the species. In practice, *Lanthanotus* is to be treated as if it were on Appendix I.

2016d. CITES (Convention on International Trade in Endangered Species). Final decisions made at CoP17 on the proposals to amend CITES Appendices; p. 5.
http://lanthanotus-org.webs.com/2016-CITES_decisions-on-amendment-proposals
Very similar to CITES 2016b.

2016. Dodd, C. Kenneth. A force to be reckoned with in Borneo: Tom Harrisson and his herpetological legacy. *Journal of the history and bibliography of herpetology* 12(1 and 2): 6-17.
http://www.t-ad.net/ishbh/
Very little to do with *Lanthanotus* except for noting Tom Harrisson's involvement with the first live specimens obtained for captive study, and that Barbara Harrisson authored most of the papers on the lizards. Interesting as a historical account of zoology in Sarawak in the 1950s through 1970.

****+2016. Lai, Fanny, and Bjorn Olesen.** *A Visual Celebration of Borneo's Wildlife*. Periplus Editions (HK) Ltd, 468 pp.
A colorful, well-produced general readership book that lavishly illustrates the fauna and flora of Borneo, generally. *Lanthanotus* is briefly covered in text and color photos.

****++2016. Norwegian Scientific Committee for Food Safety.** *Assessment of listing proposals for CITES CoP17*. Scientific Opinion on the Panel on Alien Organisms and Trade in Endangered Species (CITES). Pp. 61-62. Opinion of the Norwegian Scientific Committee for Food Safety, Oslo, Norway. ISBN: 978-82-8259-228-4, www.vkm.no/dav/6fce8d08cf
This document included a complete list of species proposed for CITES (Convention on International Trade in Endangered Species) Appendix listing or change in listing at the 17th Conference of the Parties. The *Lanthanotus borneensis* account was short but covered a wide range of concerns—population numbers, habitat, threat to habitat, threat to animals, and such—for which there are limited data.

++2016. Old Meng University.** It is amazing! Successful breeding of rare species Mimi pear lizard in iZoo. http://tokagemodokinoshippo.net/archives/417.
The author, who is not a staff member of Japan's iZoo, provided information shared with him by staff regarding the successful breeding and hatching of *Lanthanotus borneensis* at the zoo. Four hatchlings were produced and are illustrated.

++2017. Langner, Christian.** Hidden in the heart of Borneo-shedding light on some mysteries of an enigmatic lizard: First records of habitat use, behavior, and food items of *Lanthanotus borneensis* Steindachner, 1878 in its natural habitat. *Russian Journal of Herpetology* 24(1): 1-10.
http://rjh.folium.ru/index.php/rjh/article/view/1143
The title covers the scope of the paper, which includes excellent color photographs of live lizards. Langner's study (duration not stated) commenced in April 2014. The information on the natural diet is new (freshwater shrimps of the genus *Macrobrachium* and small catfish, *Clarias* cf. *tejsmanni*), based solely on the regurgitated contents from three specimens. There is an extensive description of habitat, including water *p*H and flow, ambient and body temperatures, and vegetation along the streams. There are some factual errors regarding the literature (e.g., date of description and details of when lizards were collected: p. 1) and prior research ("…only phylogenetic research was undertaken," despite immediately citing important morphological studies: p. 1), and several typographical/grammatical errors (e.g. "…highest protection category 'A' of…" CITES, instead of Appendix I: p.4; and "…the subsequent decades revealed no further knowledge on the species and it remained untraceable for the scientific world": p. 4), but these do not devalue the importance of the paper.

2017. Streicher, Jeffrey, and John Wiens. Phylogenomic analyses of more than 4000 nuclear loci resolve the origin of snakes among lizard families. *Royal Society Biology Letters* 13: 20170393
http://dx.doi.org/10.1098/rsbl.2017.0393
A major systematic study in which the authors used targeted sequence capture to obtain data from 4,178 nuclear loci from ultra-conserved elements from 32 squamate taxa plus five outgroups including representatives of all the major squamate families or suborders. The analyses strongly resolve the placement of snakes within squamates, showing that they are not derived from the Anguimorpha.

++2018a. Nuwer, Rachel.** *Poached: Inside the Dark World of Wildlife Trafficking*. Da Capo Press, 384 pp.
Nuwer as journalist provides first-hand experiences of meeting poachers and wildlife officers to expose the workings of wildlife trafficking. There is a lengthy section about *Lanthanotu*s, centered mainly on the work of Tuyoshi (Tuyoshi, 2013a-b; Tuyoshi and Bacchini, 2015).

++2018b. Nuwer, Rachel. How a reclusive lizard became a prize find for wildlife smugglers. *WIRED* 12.26.18 online at https://www.wired.com/story/wildlife-smugglers-poached-rachel-nuwer-reclusive-lizard/
This is the *Lanthanotus* excerpt from her book (Nuwer, 2018a).

+2018. Simões, T., M. Caldwell, M. Talanda, M. Bernardi, A. Palci, O. Vernygora, F. Bernardini, L. Mancini, and R. Nydam. The origin of squamates revealed by a Middle Triassic lizard from the Italian Alps. *Nature Online* 557: 706-709, plus 6 pp. additional information. *Lanthanotus* in figures 3 and 4 in additional data. https://www.nature.com/articles/s41586-018-0093-3
This paper establishes a squamate origin, represented by the fossil lizard, *Megachirella wachtleri*, 75 million years earlier than previous data showed. They also show morphological and molecular data that agree regarding the evolution of early squamates, with geckoes—and not iguanians—as the earliest crown clade squamates. In their resulting phylogenetic trees, neither *Lanthanotus* nor *Varanus* are depicted as particularly closely related to snakes. *Lanthanotus* is included in the extended data, figures 3 and 4.

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Endnote – Contributions to the history of the Division of Amphibians & Reptiles – USNM

As one grows older, there comes a desire to record one's past experiences and also the history of one's workplace. None of us in the USNM Division of Amphibians and Reptiles has expressed a desire to write a divisional history for the past half-century. As an alternative, I am encouraging colleagues who have been associated with the division to create autobiographical sketches. Although such sketches will not provide a detailed history of divisional activities, each offers a unique perspective of past divisional activities and insights into each author's contribution to the division and, of course, a window into the author's personality.

The SHIS series is an obvious outlet. SHIS has been a facet of the division's contribution of research information to the herpetological community since its establishment in 1968 by James A. Peters. 2019Dec18 GRZ

Previously published contributions to divisional history

SHIS 1. A list of the herpetological publications of the United States National Museum, 1853-1965. James A. Peters 1965 [revised 1968].

SHIS 42. A revised list of the herpetological publications of the National Museum of Natural History (USNM) 1853-1978. Ronald I. Crombie 1979.

SHIS 51. Biography and bibliography of James A. Peters. Frances J. Irish & George R. Zug 1982.

SHIS 101. Herpetological publications of the National Museum of Natural History (USNM), 1853-1994. Ronald I. Crombie 1994.

SHIS 147. Biographical sketch and bibliography of W. Ronald Heyer. W. Ronald Heyer & Miriam H. Heyer 2016.

SHIS 148. Biographical sketch and bibliography of James B. Murphy. James B. Murphy 2016.

SHIS 149. Biographical sketch and bibliography of C. Kenneth Dodd, Jr. C. Kenneth Dodd, Jr. 2016.

SHIS 150. Biographical sketch and bibliography of Carl H. Ernst. Carl H. Ernst 2016.

SHIS 151. Biographical sketch and bibliography of Richard Highton. Richard Highton 2017.

SHIS 152. Biographical sketch and bibliography of Robert P. Reynolds. Robert P. Reynolds 2017.

SHIS 153. Biographical sketch and bibliography of Jeffrey E. Lovich. Jeffrey E. Lovich 2018.

SHIS 154. Biographical sketch and bibliography of Steven D. Busack. Steven D. Busack 2018.

SHIS 155. Biographical sketch and bibliography of Joseph C. Mitchell. Joseph C. Mitchell 2019.

SHIS 156. Biographical sketch and bibliography of J. Whitfield Gibbons. J. Whitfield Gibbons 2019.