

## Fossil Vertebrates of Nigeria. Part IV (concluded)

by Beverly Halstead and Jennifer Middleton

### 5. CRETACEOUS VERTEBRATES

#### 5.1 Marine Crocodile: *Sokotosuchus ianwilsoni* Halstead 1975

Since the appearance of Part III in 1976, Dr. Eric Buffetaut (1979) has published the definitive account of *Sokotosuchus* and has concluded that this genus was the most primitive form of the dyrosaurid crocodiles and that it seems that the major part of their evolution probably took place in Africa.

#### 5.2 Mosasaur lizard: *Goronyosaurus nigeriensis* (Swinton 1930) (Figs. 11-15)

Lectotype (here selected); Two associated dorsal vertebrae, R5674, housed in British Museum (Natural History), London, figured by Swinton 1930, pl. 10, figs. 2a-c.

Type horizon and locality: Cretaceous, Maestrichtian, Dukamaje Formation, gypsiferous shale member, south of village of Gilbedi, Sokoto State.

Dr. W. E. Swinton (1930) originally described a collection of vertebrae and limb bones belonging to a giant marine mosasaur lizard, which he identified as a *Mosasaurus*, placing it in the new species *M. nigeriensis*.

During December 1969 and January 1970 an expedition with the sole aim of finding fossil vertebrates from the Upper Cretaceous beds of the Sokoto region was organised by the Institute of Geology and Palaeontology of the University of Florence, Italy, with logistic support from the Geological Survey of Nigeria. In rocks exposed on the hills overlooking the village of Taloka, near Goronyo, part of a crushed mosasaur skull was discovered, including the frontal region, the tip of the snout and the pterygoid bones of the braincase (de Giuli, Ficarelli and Torre 1970). The following year in February-March 1971 a second expedition, led by Professor A. Azzaroli, took place and missing fragments of the same skull were recovered so that the gap between the previous finds of the frontals and tip of snout could be filled. A preliminary description of this skull (Azzaroli, de Giuli, Ficarelli and Torre, 1972) suggested that it represented a new genus to which the name *Goronyosaurus* was given. A detailed description of the new material was later published by Professor Azzaroli and his colleagues (Azzaroli *et al.* 1975). The collection was examined by us in 1974 in Florence and again by one of us in 1976 in Kaduna where it is now on display in the Museum of the Geological Survey of Nigeria. Azzaroli *et al.* (1972, 1975) claim that *Goronyosaurus* shows highly aberrant features in its skull, which distinguish it from all other mosasaurs. The most dramatic being the claim that the ascending ramus of the jugal which borders the posterior margin of the orbit and the lower temporal opening is expanded posteriorly into broad bony plate. In normal mosasaurs the jugal has a narrow ascending ramus and indeed no reptile is known where the jugal is expanded posteriorly in the manner postulated by Azzaroli *et al.* The major difficulty in interpreting this specimen is the considerable amount of post-mortem distortion due to

crushing. It transpires that the upper margin of the ascending ramus of the jugal can, in fact, be observed protruding from the left orbit, which suggests that this bone is of typical mosasaur proportions. The bone at the posterior margin of the orbit is the postorbitofrontal and the bone beneath it, interpreted as the jugal, is more likely to be the squamosal. There is also the possibility that this part of the fossil may be the coronoid and adjacent surangular bones of the lower jaws that have been displaced upwards as the skull was crushed. In any event the supposed unique features of the jugal cannot be taken as unequivocal evidence for the erection of a new genus. Nevertheless, some of the other characteristics do suffice to distinguish the material from other genera such as the posterior extension of the maxillae, the closed canal within the frontals for housing the olfactory lobes, and, in the toothbearing pterygoid bone, the ectopteryoid process projects anteriorly, whereas in *Mosasaurus* proper it is at right angles (see Russell 1967).

### 5.3 Marine turtles

(Figs. 16-19)

#### 5.3.1 *Sokotochelys umarumohammedi* Halstead 1979b

(Fig. 16)

Holotype: skull, SOSG Pal. Coll. no. 1, housed in Sokoto State Government Collection, figured by Halstead 1979a, figs. 26, 27. Walker 1979, fig. 5.

Type horizon and locality: Cretaceous, Maestrichtian, Dukamaje Formation, gypsiferous shale member; northern face of Benbow Hill, to south-east of village of Gilbedi, Sokoto State, Nigeria.

#### 5.3.2 *Sokotochelys lawanbungudui* Halstead 1979b

(Fig. 17)

Holotype: partial skull, SOSG Pal. Coll. no. 2, figured by Walker 1979, fig. 6.

Type horizon and locality: Cretaceous, Maestrichtian, Dukamaje Formation, gypsiferous shale member; northern face of Benbow Hill, to south-east of village of Gilbedi, Sokoto State, Nigeria.

#### 5.3.3 Pelomedusidae gen. et sp. indet.

(Figs. 18, 19)

Fragments of carapace and limb and girdle bones figured by Swinton 1930, pl. 14, fig. 2; Halstead 1979a, figs. 22, 25, 28; Walker 1979, figs. 1, 3, 4.

#### 5.3.4 *Trionyx* sp. indet.

Fragment of carapace figured by Walker 1979, fig. 2.

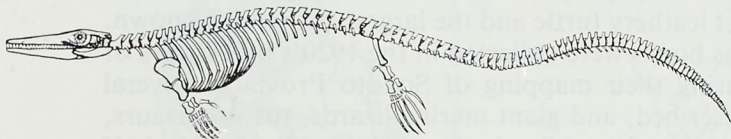
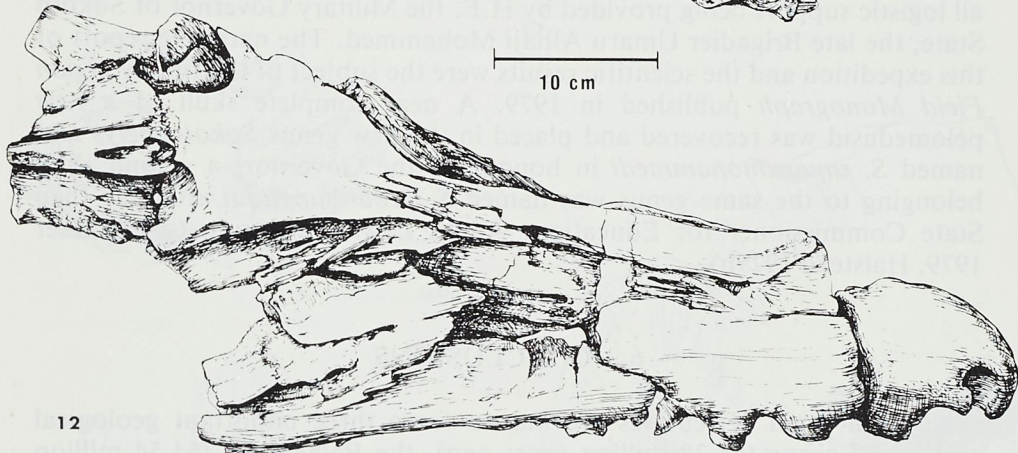
In the 'contents' at the beginning of Part I of this series the Cretaceous chelonians were listed under "Giant tortoise: ?*Testudo* sp. indet." on the basis of the enormous thickness of the bone of the carapace, as noted on specimens described by Swinton (1930) which were housed in the British Museum (Natural History), London. Subsequent to the preparation of Parts I-III, during the summer of 1976 Dr. L. B. Halstead led a second expedition to the Sokoto region, this time from Ahmadu Bello University, Zaria, and located a complete albeit fragmented giant turtle carapace. This discovery

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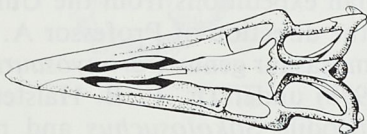


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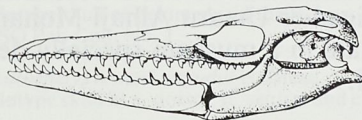
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- Fig. 11. *Goronyosaurus nigeriensis* (Swinton)  
Crushed skull showing dentition and orbital region. N.M.G. No. 1.
- Fig. 12. *Goronyosaurus nigeriensis* (Swinton)  
Opposite surface of crushed skull showing parietals, orbits, frontals and details of snout.  
N.M.G. No. 1.
- Fig. 13. Reconstruction of mosasaur skull in dorsal and lateral views.
- Fig. 14. Reconstruction of mosasaur skeleton.
- Fig. 15. Life restoration of mosasaur.

established the identity of the giant chelonians as belonging to the Pelomedusidae—a major family of the Pleurodira or “side-necked” turtles, and not as had at first been suspected of giant tortoises. The finding of the articular (acetabulum) region of the pelvic girdle provided the conclusive proof of the presence of the pelomedusids (Walker 1979). The other important find was the discovery of fragments of the freshwater pond turtle *Trionyx*, which represents the earliest African record of this genus.

In January 1978 a third expedition, led by Dr. L. B. Halstead, took place under the direct auspices of the Sokoto State Government, with vehicles and all logistic support being provided by H.E. the Military Governor of Sokoto State, the late Brigadier Umaru Alhaji Mohammed. The narrative report of this expedition and the scientific results were the subject of the first *Nigerian Field Monograph* published in 1979. A near complete skull of a new pelomedusid was recovered and placed in the new genus *Sokotochelys* and named *S. umarumohammedi* in honour of the Governor; a second skull belonging to the same genus was named *S. lawanbungudui* after the then State Commissioner for Education, Alhaji Lawan Bungudu (see Walker 1979, Halstead 1979b).

## 6. CONCLUSIONS

Nigerian fossil vertebrates are known from three important geological ages, the Eocene (54-38 million years ago), the Palaeocene (64-54 million years ago) and the Upper Cretaceous, which ended approximately 64 million years ago. In the Eocene, major discoveries were made in the district of Ameki, during the construction of the Port Harcourt Railway, and included the earliest whales, the first leathery turtle and the largest flying bird known. Palaeocene and Cretaceous bones were collected in the 1920's by officers of the Geological Survey during their mapping of Sokoto Province. Several types of crocodile were described, and giant marine lizards, the mosasaurs, were recognised for the first time from Nigeria. It was not until a further half century had passed before and expeditions were mounted specifically to search for fossil vertebrates: the Italian expeditions from the University of Florence in 1969-70 and 1971 under the direction of Professor A. Azzaroli, which recovered the skull of the new mosasaur genus *Goronyosaurus* and the three expeditions (1971, 1976 and 1978) under Dr. L. B. Halstead, which produced the skulls of the new crocodile *Sokotosuchus* and new turtle *Sokotochelys*. There would seem to be every aspect of building up a major palaeontological collection of Nigerian vertebrates and it is greatly to be hoped that the wishes of the late Brigadier Umaru Alhaji Mohammed that this should be achieved in Sokoto State in a museum specially designed for the purpose will eventually be realised.

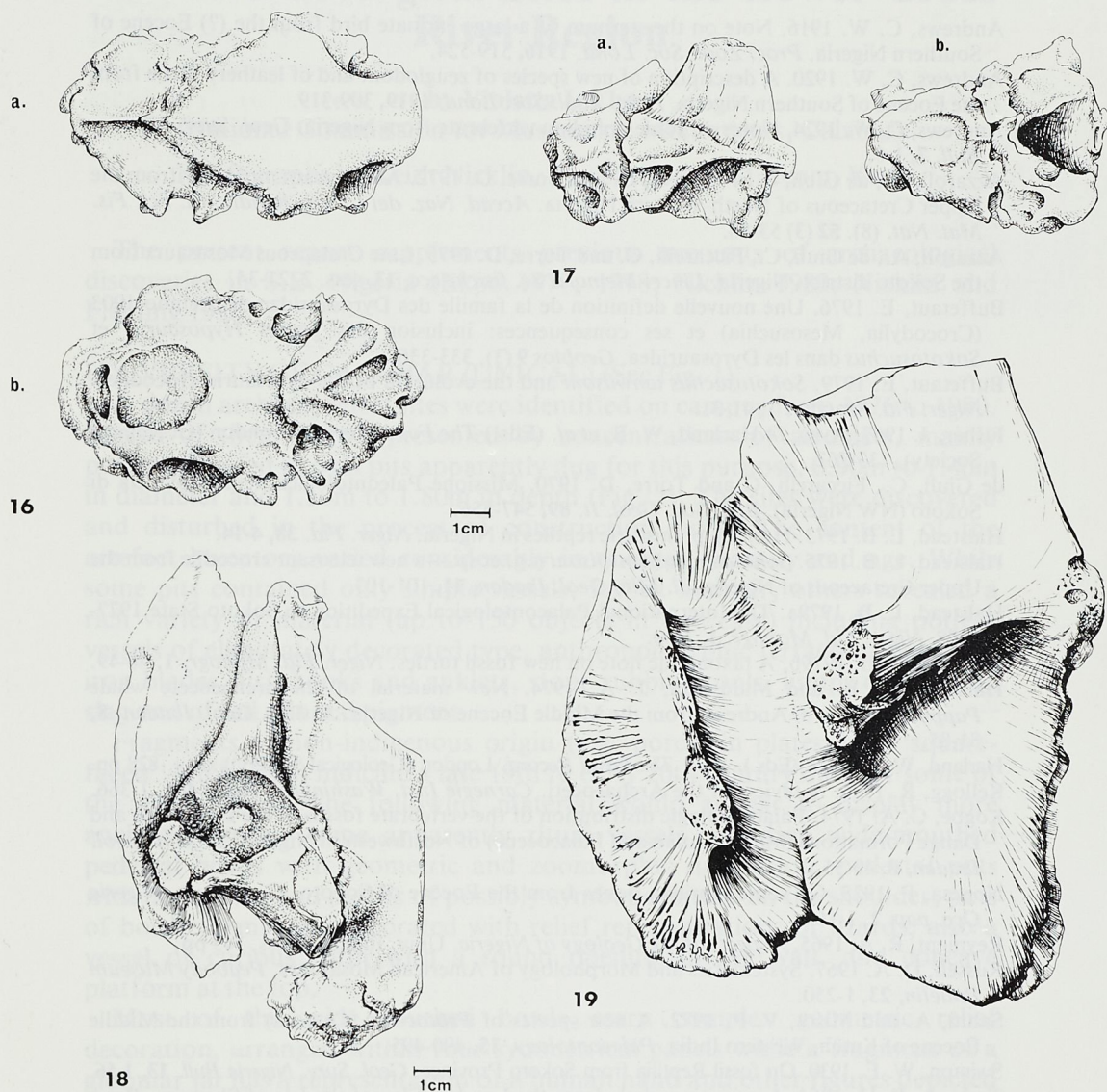


Fig. 16. *Sokotochelys umarumohammedi* Halstead  
Holotype skull of pelomedusid turtle, in a. dorsal, b. ventral, c. lateral and d. posterior views.  
SOSG Pal. Coll. No. 1.

Fig. 17. *Sokotochelys lawanbungudui* Halstead  
Holotype skull in a. dorsal, b. ventral and c. lateral views. SOSG Pal. Coll. No. 2.

Fig. 18. Pelvic girdle of pelomedusid turtle.

Fig. 19. Fragment of chelonian carapace, BMNH.

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