

NEW FOSSIL REPTILE GENERA FROM THE BERNARD PRICE COLLECTION

By R. BROOM, F.R.S.

(With 7 Text-figures)

AMONG the fossils, recently collected by Ben Kitching for the Bernard Price Institute, are four very interesting new genera, which are here described.

Homodontosaurus kitchingi gen. et sp.nov. (Text-fig.1)

The type of this new genus is a little skull found by Ben Kitching at Osfontein, in the Graaff-Reinet District. Probably it has come from the lower part of the Cistecephalus zone.

The skull is one of the smallest of our Carnivorous Reptiles. It is badly preserved and very few sutures can be traced. The jaws and most of the teeth are, however, fairly well preserved.

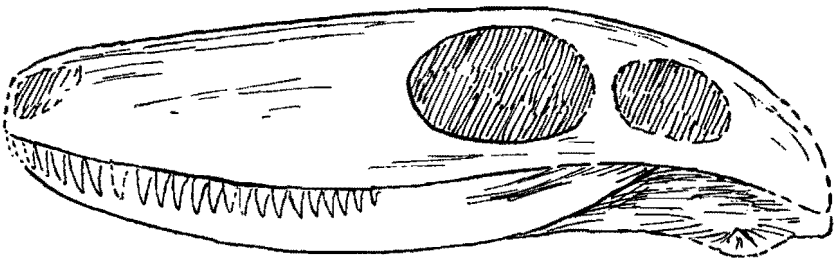


Fig. 1. Side view of skull of *Homodontosaurus kitchingi* gen. et sp.nov. $\times 2$.

In length the skull is probably about 55 mm. As the skull is crushed the width is uncertain, but perhaps the greatest width was about 20 mm. From the front of the snout to the front of the orbit is about 27 mm. The orbit is about 12 mm. in length and behind it is a well-developed postorbital, but whether this forms a complete postorbital arch cannot be made out. The temporal opening is only about half the size of the orbit.

From the front of the snout to the back of the temporal opening the measurement is about 47 mm. The back part of the skull though nearly complete is badly crushed and the structure cannot be satisfactorily made out. But it is moderately certain there must be a large quadratojugal or squamosal or both.

The front of the snout is fairly well preserved and seems to be as I have restored it.

Most of the upper teeth are preserved on both sides. There are most probably six incisors, and fifteen teeth in the maxilla. There is no enlarged canine, but there is a gap between the last large incisor and the first preserved maxillary tooth. Possibly there is a small 7th incisor and perhaps a lost small anterior maxillary tooth. All the teeth are long, rounded and pointed.

Much of the lower jaw is preserved. The dentary is long and very slender. A considerable part of the angular is also present, and it seems to have an outer plate as in Therapsids.

It is regrettable that this very important little skull is so imperfect that there may arise doubts as to its affinity. It is clearly not a typical Therapsid; and it shows a number of characters that suggest that it is more allied to the Pelycosaurs. *Secodontosaurus*, one of the Lower Permian forms from Texas, has a skull that has a very distinct resemblance to that of our new South African form. We know a South African primitive Pelycosaur *Elliotsmithia* that also seems to have some affinity with this new type. Unfortunately *Elliotsmithia* is only known by the posterior half of the skull.

On the evidence we have, which is not as convincing as we should like, this new South African type, which I am calling *Homodontosaurus kitchingi*, appears to be a Pelycosaur. It is much later than either of the two South African Pelycosaurs we had previously known, viz. *Anningia megalops* and *Elliotsmithia longiceps*.

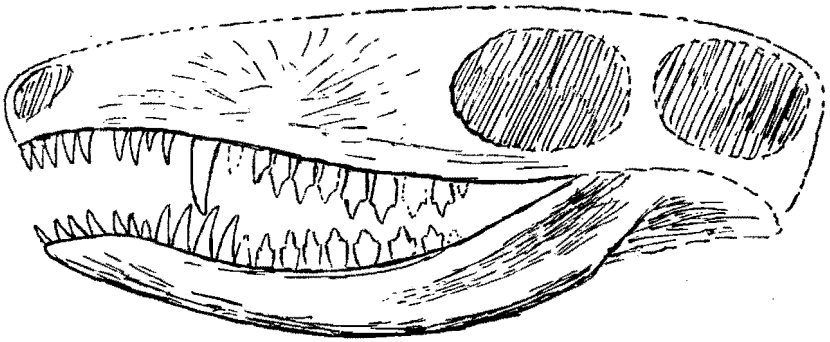


Fig. 2. Side view of skull of *Silphedestes polyodon* gen. et sp. nov. $\times 3$.

***Silphedestes polyodon* gen. et sp. nov. (Text-figs. 2 and 7B)**

The type of this new genus and species is a very small skull, found by James Kitching at Hoekplaas, about 15 miles south of Murraysburg.

The skull is so badly crushed that no very satisfactory view of the upper side can be given; but fortunately much of both maxillae are preserved with the greater part of each mandible, and we are able to give an account of almost the complete dentition.

The skull is one of the smallest carnivorous Therapsids so far discovered. Though the back of the skull is lost we have the right mandible nearly complete and, as its length is about 33 mm., we may assume that the total length of the skull was not more than 35 mm. And the greatest width was probably about 18 mm.

The top of the skull is so badly crushed that it is impossible to say whether there was a complete postorbital arch, but it seems probable that the parietal region was wide and that there was a postorbital arch. There appears to be little doubt that the prefrontal is large and that it met the postorbital, thus shutting out the frontal from the orbit.

The maxilla is long and slender, and the premaxilla is feebly developed. In the premaxilla there are certainly four, and there were probably six slender incisors. The four preserved occupy 3 mm.

In the maxilla there are in front four slender pointed canines, the 1st of which

is 1.4 mm. behind the last incisor. The four together measure 1.9 mm. About 1 mm. behind the 4th small canine is a moderately developed canine. The crown is about 3 mm. in height, and the anteroposterior width of the base is about 1 mm. Behind the canine is a diastema of 1.5 mm., followed by nine post-canine teeth, which together measure 10 mm. Probably all of these teeth have a main cusp and a small anterior and a small posterior cusp, except perhaps the last, which is very small. Just possibly there may have been a tenth molar between the large canine and the 1st preserved molar.

The lower jaw is long and very slender, and is mainly made up of the dentary. There is certainly a moderate-sized angular behind it, but this is very badly preserved.

Probably the complete dentition is preserved, except perhaps for a small posterior molar. It is impossible to differentiate the incisors from the canines or the canines from the anterior molar. Probably there are four lower incisors and three small anterior canines and four larger canines. This would leave certainly eight and possibly nine post-canine teeth. If this be so, the dental formula would be:

$$i \frac{5 (? 6)}{4} c \frac{5}{7} pc \frac{9}{8 (? 9)}.$$

For this remarkable little carnivore I propose the name *Silphedestes polyodon*: It is not closely related to any hitherto known form. The fact, that the post-canine teeth are nearly all tricuspid, seems to place it definitely among the Cynodontoid Therocephalians. In the Cistecephalus zone period a group of Scaloposaurids appeared, some of which had very numerous teeth such as *Scaloposuchus*, *Icticephalus* and others, and in the Lystrosaurus zone period we find some small allied forms, such as *Eriaciolacerta* and *Cyrbasiodon*, with cusped molars. Possibly from some member of this group the Cynodonts, such as *Procynosuchus* arose, but the group is so extremely varied that it is at present quite impossible to arrange it phylogenetically, and new types are being found every few months.

Lemurosaurus pricei gen. et sp. nov. (Text-figs. 3, 4 and 7C)

The skull of this interesting new genus and species was found by James Kitching at Dorsfontein, about 20 miles north-west of Graaff-Reinet.

The skull is fairly complete but the occipital region is imperfect and badly crushed, and the matrix is not in a satisfactory condition to show sutures. Still, the general shape and structure of the skull can be seen and most of the teeth are preserved.

When complete the skull probably measured in greatest length about 86 mm., and the greatest breadth was about 33 mm. From the front of the snout to the pineal foramen is about 78.5 mm., and the interorbital measurement is 28 mm.

The snout is deep and remarkably narrow, but it does not appear that the narrowness is due to crushing. In the region of the canine teeth the width as preserved is only 16.5 mm.

At the back end of the nasal region the skull is moderately flat, but a little behind the plane of the front of the orbit, very prominent thickened ridges are developed on the orbital margins, and these pass backwards for a distance of 22 mm., and spread outwards to form thick outward developments on the upper part of the postorbital arches. I have figured these upper orbital bony developments as they are present in the specimen. As they are similar on the two sides they are probably not much distorted.

Between these two bony ridges there is, in the middle line, a median ridge

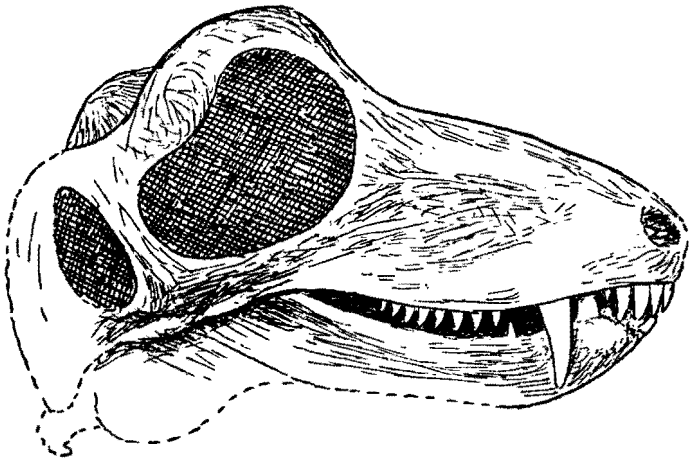


Fig. 3. Side view of skull of *Lemurosaurus pricei* gen. et sp.nov. Natural size.

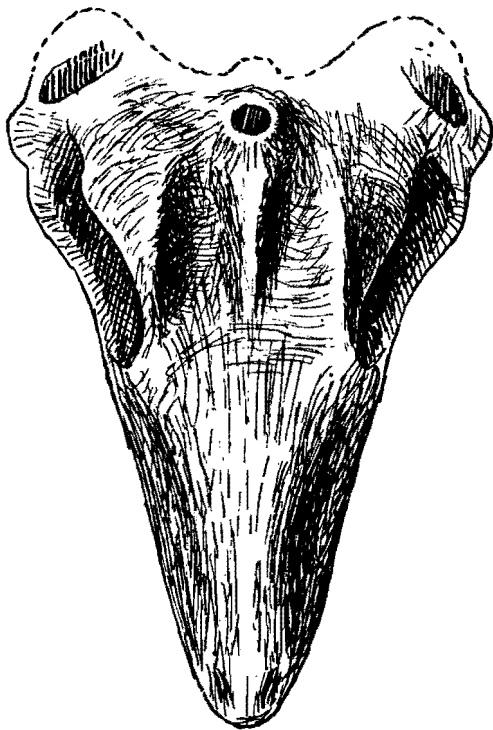


Fig. 4. Upper view of skull of *Lemurosaurus pricei* gen. et sp.nov. Natural size.

apparently formed by the preparietal. Immediately behind, what may be probably the back of the frontal region, the parietal region is bent down at about 45° , and probably between the two parietals is a well-developed pineal foramen in the middle of a prominent rounded elevation.

Most of the postorbital and occipital regions of the left side are lost, and on the right side they are not very well preserved. Still, it is possible to make a restoration that is probably nearly correct.

The post-temporal arch is rather slender and fully preserved on the right side. The temporal fossa must be narrow, and behind it the suspensorium, though descending, must be relatively small.

The jugal arch is fairly well developed and, near the lower end of the postorbital arch, there is a little outwardly directed process.

The premaxilla is relatively small and carries five incisors, which together measure 10 mm. The incisors have no serrations so far as they can be examined. Behind the 5th incisor is a diastema of 4 mm., followed by a fairly developed canine. At the base of the crown the canine measures 4.1 mm. by about 1.8 mm. It is thus seen to be remarkably flat. The height of the crown is about 10.3 mm. The outer surface is smooth, and the anterior border rounded and non-serrated. The posterior border is coarsely serrated, there being about five serrations to the millimetre. Behind the canine is a diastema of 3.8 mm. on one side and 5.2 mm. on the other. This is followed by eight molars which together measure 17.2 mm.

The molars are most remarkable. All are relatively small pointed teeth, and all, except apparently the last, are very coarsely serrated posteriorly. The serrations are so coarse that they might be described as a row of small cusps.

The right mandible is nearly complete and much of the left dentary is preserved. But the back part of the jaw is too imperfect to justify any description. A number of mandibular teeth are preserved. There are four lower incisors which together measure 8.7 mm. The canine is apparently a little smaller than the upper. The only molars that can be examined are coarsely serrated like the upper teeth.

This little fossil reptile is almost certainly a Gorgonopsian, and it has only two known allies, *Ictidorhinus martinsi* and *Hipposaurus boonstrai*.

Ictidorhinus was found by me at Wilgebosch, near New Bethesda, in 1912. It is only known by one skull which is now in the American Museum, New York. It is a small skull comparable in size to that now being described, and it resembles this new form considerably in structure. It has the narrow snout, the broad parietal region, the pineal in the middle of an elevated little cone, and the low temporal region. It differs, however, in only having four incisors and four molars. The molars are slender, but it is not recorded whether they are serrated. Possibly they are not well enough preserved to show. Pretty manifestly this new type which I am calling *Lemurosaurus pricei* belongs to the same family as *Ictidorhinus*—the Ictidorhinidae.

Hipposaurus boonstrai was described by Houghton in 1929. The type-skull is much weathered. Houghton considers there are five upper incisors, one canine and three molars. As I am inclined to think there are seven molars, the unsatisfactory condition of the specimen may be realized. Also, my restoration differs so markedly from Houghton's, that it is hard to believe that we have been examining the same skull.

In 1940, I described a new form under the name *Hipposaurus rubidgei*. This also has the broad parietal region, with the pineal foramen far back and in the middle of an elevation. The temporal region is also low. The dental formula is $i\ 4\ (?5),\ c\ 1,\ m\ 6\ (?7)$. This skull is about twice as large as that of *Ictidorhinus martinsi*, and is much less specialized, but apparently belongs to the same family.

The new type has clearly a dental formula of $i\ 5,\ c\ 1,\ m\ 8$, and thus, even in

dental formula, differs from any forms previously known, but the resemblance to *Ictidorhinus* is much greater than to *Hipposaurus*.

The peculiar type of molars found in *Lemurosaurus* are unknown in any other Gorgonopsian, but of course it must be remembered that in very many, perhaps the majority of, species described the molars are imperfect. And it may be that when perfect specimens of molars are found some other species may be found with these coarsely serrated. At present the type of molars is not only unique among the Gorgonopsians, but apparently unique among reptiles.

***Protocynodon pricei* gen. et sp.nov. (Text-figs. 5, 6 and 7 A)**

The type of this new genus and species is a little skull found by Ben Kitching at Elim, Burghersdorp district.

The skull is nearly complete, but very badly crushed. Still, except for the occipital region, it can be quite satisfactorily restored. Fortunately the teeth are almost perfect.

The total length of the skull is about 55 mm. and the greatest breadth is about 32 mm. The width of the orbits is about 15·7 mm. and the anteroposterior measurement of the orbit is about 8 mm. but, as each postorbital arch is imperfect, this is doubtful. The eye, however, is relatively small.

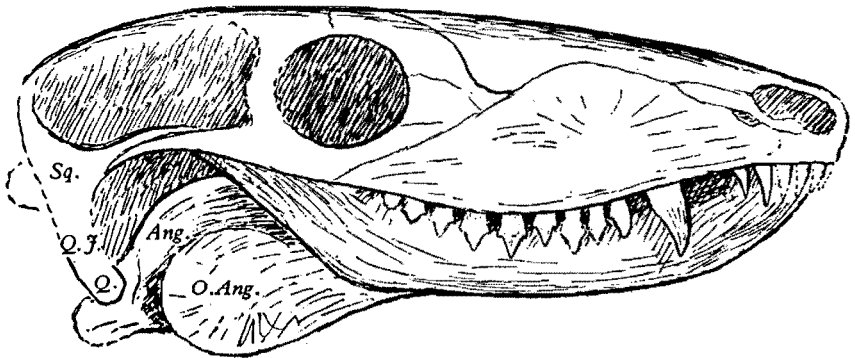


Fig. 5. Side view of skull of *Protocynodon pricei* gen. et sp.nov. $\times 2$. *Ang.* = angular; *O.Ang.* = outer plate of angular; *Q* = quadrate; *Q.J.* = quadratojugal; *Sq.* = squamosal.

The frontal bone is nearly three times as long as broad and it is shut off from the orbit by the meeting of the prefrontal and the postorbital. There is no post-frontal. The postorbital is large and forms much of the cranial roof.

The parietals are fairly wide and there is a large pineal foramen. The exact size of the temporal fossa is uncertain as the postorbital arch is imperfect and the back part of the fossa damaged; but it is probably as restored in the figures given. The occiput is badly damaged.

The prefrontal is almost as long as the frontal, and it forms much of the upper orbital margin. The lacrimal is relatively small.

The nasal is long and, as in typical Cynodonts, wide behind and narrow in front. There is a long narrow septomaxillary.

The premaxillary is imperfect, but it appears to carry six incisors which probably measure about 7·5 mm. Between the last incisor and the canine there is a diastema of 3·6 mm. There is no small anterior canine.

The canine measures 2·5 mm. in anteroposterior length, and the height of the crown is about 4·8 mm. There are no serrations on the point of the crown, but

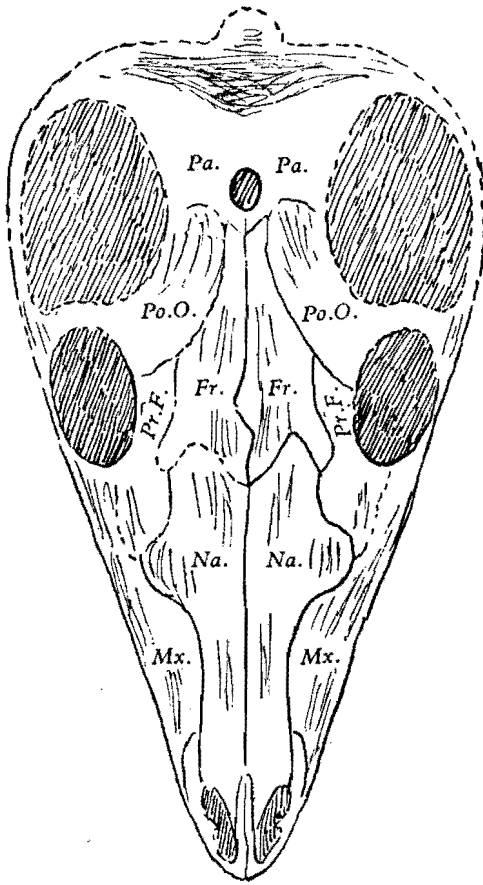


Fig. 6. Upper view of skull of *Protocynodon pricei* gen. et sp.nov. $\times 2$. *Fr.* = frontal; *Mx.* = maxilla; *Na.* = nasal; *Pa.* = parietal; *Pr.F.* = prefrontal; *Po.F.* = postfrontal.

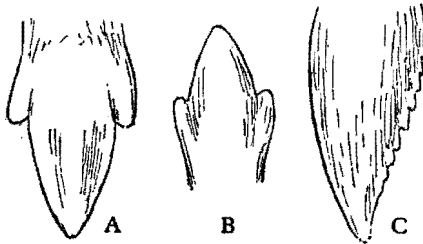


Fig. 7. Teeth of various Therapsids. A, right 5th upper molar of *Protocynodon* gen. et sp.nov.; B, right 3rd last lower molar of *Silphedestes polydon* gen. et sp.nov.; C, left 1st upper molar of *Lemurosaurus pricei* gen. et sp.nov. (All ten times natural size.)

towards the base, there are a few coarse serrations on the posterior side. There are five feeble ridges running down the side of the tooth.

Behind the canine is a small diastema of 1.7 mm. and this is followed by nine postcanine teeth, which together measure 16.6 mm. The 1st tooth has a main cusp and a small posterior cusp. All the other postcanine teeth appear to have three cusps. The main cusp is well developed and has a sharp point, and this main part of the tooth has a series of small grooves running down towards the point. The base of the crown is thickened and it might almost be said to have a cingulum. A small, but very distinct, cusp is developed on the front of the tooth and a similar small cusp is on the posterior edge.

The jugal is feeble and the temporal arch slender. The squamosal descends much below the level of the temporal arch, and forms, doubtless with the quadratojugal, a low suspensorium. The quadrate is small.

Though both mandibles are fairly well preserved it is impossible to see most teeth owing to the crushing. The dentary is well developed, but it is impossible to say how large is the coronoid without damaging the specimen. The angular forms about a third of the outer side of the jaw. It is of the usual Therapsid type, there being an oval thin outer plate, which is rather large, and thus more like the usual Therocephalian type than the Cynodont.

This new type of mammal-like reptile is manifestly a primitive Cynodont. Its nearest allies are some of the early Cynodonts from the Cistecephalus zone, such as *Nanictosaurus*, *Paracynosuchus*, and *Nanictosuchus*; but it differs from all of these in the much deeper suspensorium and in the more Therocephalian type of angular.