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A NEW SMALL THECODONT FROM THE RED BEDS OF THE STORMBERG SERIES

By A. S. Brink

ABSTRACT

This paper describes a new form of Thecodont, apparently Ornithosuchid, from the Stormberg series of the Karroo system of South Africa. The description is based on the anterior two thirds of a very small skull, the total length being approximately 30 mm. Preservation is not satisfactory enough to permit an accurate evaluation of its true relationship. It is recognised as a new genus and species: *Clarencea gracilis*.

In October 1957, I discovered in the Red beds of the Stormberg series, in a road cutting at Golden Gate, south of Clarence, Orange Free State, a very small skull in a loose block on the slope where the excavated material had been dumped. As the specimen was found it showed clearly the ventral margins of the lower jaw, some teeth on one side and a transverse section through the posterior region of the skull. It could immediately be recognised as the anterior two thirds of a skull, the portion preserved measuring about 20 mm. in length, and that it could represent some form of Thecodont. It was also appreciated that this specimen might turn out to be an interesting new type and a thorough endeavour was made to trace the rest of the specimen. However, the site should be seen to realise how futile this endeavour was. Not only were thousands of tons of material moved during the road-building operation, but this material was partly used to support the road, while the balance was scattered down a considerable and steep slope into a river far below, where a portion could have been carried away by floods.

Nevertheless, it was considered that while the lump of material containing this skull was discovered in a superficial position near the edge of the road, the matrix containing the balance of the specimen could be lying only a short distance away. A thorough search was made by turning over as many of the loose blocks of rock in the vicinity, to an extent where the danger developed that the road could be undermined, but with no results other than that some additional traces of fossiliferous material of a different kind turned up.

It should be mentioned, too, that the vast area of the section on the other side of the road was equally minutely investigated for any trace that might indicate that the balance of the specimen was still in situ.

On preparation, the specimen turned out to be, as expected, a rather interesting new form of Thecodont, but the characteristics that could be exposed are too insufficient to permit an accurate identification of its true relationship. It is certainly quite distinct from any form thus far described and represents at least a new genus.

Although the posterior portion of the skull is missing, enough is preserved to indicate an apparently normal diapsid temporal region, while there is a distinct pre-orbital vacuity and the teeth are thecodont. The palate was cleaned to some reasonable extent and, although the differences are very substantial, it is fairly comparable with the palate of *Ornithosuchus*. The specimen is therefore provisionally

identified as being a member of the family *Ornithosuchidae,* so that its nearest allies should be *Browniella, Euparkeria, Ornithosuchus* and *Parringtonia.*

The specimen is riddled with a fine mosaic of cracks which makes structural interpretation virtually impossible. In addition, the bone is as soft as wax compared with the extremely hard matrix, so that preparation could not be carried as far as would otherwise have been possible. The palate was exposed to an extent where the danger developed that even with the finest and most delicate tools, the specimen could shatter with the slightest slip.

The accompanying figures give the outlines of the skull as accurately as is possible when drawing eight times natural size (the figures are reproduced here at four times natural size). As far as structural details are concerned, some reserve should be exercised. However, it will be indicated in the subsequent description which of my interpretations can be accepted as substantial.

Subclass Archosauria
Order Thecodontia
Suborder Pseudosuchia
Family Ornithosuchidae?

Clarencea gracilis gen. et sp. nov.

(Figs. 47, 48 and 49)

Type: Anterior two thirds of a very small skull, No. 288 in the collection of the Bernard Price Institute, from the Red beds of the Stormberg series in the "Golden Gate" south of Clarence, Orange Free State, Union of South Africa.

Diagnosis: Snout slender, skull expanded posteriorly. Eleven undifferentiated thecodont teeth on either side in the upper jaw. Dentaries and maxillaries very small. External nares situated far anteriorly. Antorbital vacuities of medium size, elongated antero-posteriorly, the maxillaries apparently not forming their ventral borders. Postorbitals large, temporal arches apparently very slender. Palate broad and flat in the area of the pterygoids, ectopterygoids and palatines, with no palatal or infra-orbital vacuities. Lower jaw symphysis long and massive. Parietal region broad and flat.

A peculiar characteristic of this new specimen is the relatively small size of both the dentaries and the maxillaries. The dentaries form less than one third of the lateral surfaces of the lower jaw and they extend back to the level of the last maxillary teeth as thin tapering processes. Anteriorly they form a rather substantial symphysis and the impression is created that this symphysial union is a more important function of the dentaries than the carrying of teeth. The symphysis is 6 mm. in length, including 1.5 mm. formed by the splenials as two small triangles wedged between the rami posteriorly. The splenials evidently extended farther back on the inside of the rami but the exact distance and their nature cannot be ascertained.

The symphysial region is rather broad and flat ventrally, in proportion to the delicate rami. This surface also extends fairly straight antero-posteriorly; it does not curve substantially upward at the most anterior part of the alveolar border. Although no lower teeth can be seen, the impression is created that at least the

first tooth on either side extended virtually straight forward, thus unlike the condition in *Euparkeria*.

There is a vague indication of a mental foramen in the lower jaw, in the same position as that of *Euparkeria*.

The maxillaries cover in normal fashion the lateral faces of the snout and extend backward as delicate processes also to a level not much beyond the last teeth. This level is a substantial distance in front of the anterior borders of the orbits, unlike the

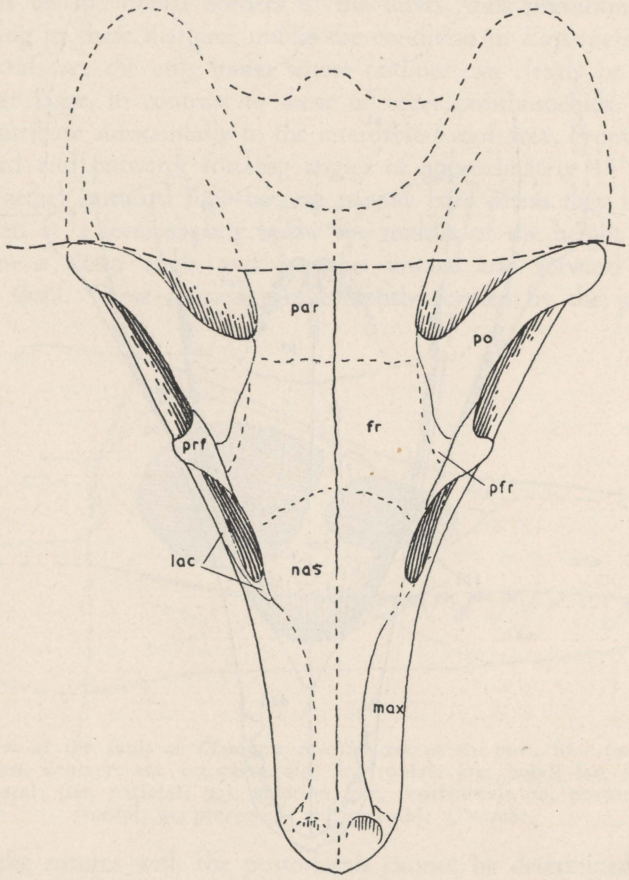


Fig. 47—Dorsal view of the skull of *Clarencia gracilis* gen. et sp. nov., four times natural size. For abbreviations see figure 49.

condition in *Ornithosuchus* and *Euparkeria,* where the maxillaries extend backward ventrally to the orbits. Another peculiarity is that the maxillaries apparently do not contribute to the ventral margins of the antorbital vacuities, these being formed by delicate extensions of the lachrymals.

Only the left premaxillary is well enough preserved to show that it is a very small bone. It is not clear whether the portion forming the lateral border to the external

naris can be identified as a septomaxillary. Enough of this border is preserved to indicate the relative position of the external nares. These were small and clearly situated far anteriorly, virtually terminal, and facing forward, unlike those of *Ornithosuchus* or *Euparkeria*. It appears that only two of the group of four anterior teeth on each side can be considered as belonging to the premaxillaries.

The nasals are badly damaged and their extent cannot be determined. It appears

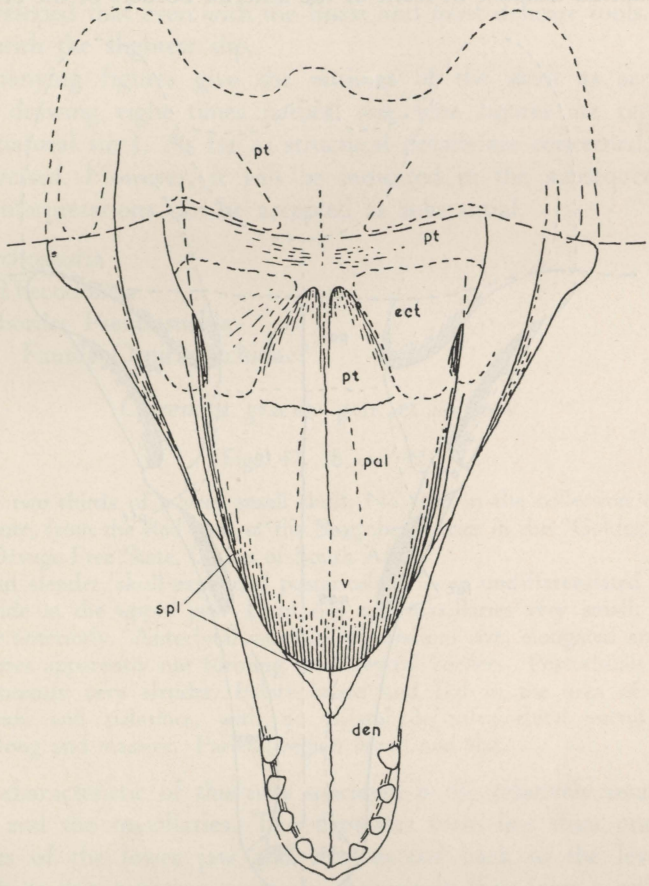


Fig. 48—Ventral view of the skull of *Clarencia gracilis* gen. et sp. nov., four times natural size. For abbreviations see figure 49.

that their contacts with the frontals are at the level of the middle of the length of the antorbital vacuities, and that they contribute for a short distance to the antero-dorsal borders. On the anterior border of the vacuity of the right side there is a small triangular bone which appears to be the front extremity of the lachrymal.

The frontals are completely indefinable. It could be that they contribute slightly to the dorsal margins of the antorbital vacuities. This is not clear because the

extent of the postfrontals can also not be determined. The latter bones appear to be narrow wedges lodged between the frontals and postorbitals.

The prefrontals are not well preserved. On both sides there are only traces of these bones, indicating that they form delicate rods between the orbits and the antorbital vacuities. Ventrally they must communicate with the lachrymals, but the nature of this articulation is also indistinct.

It is nevertheless fairly clear that the prefrontals communicate with the postfrontals and postorbitals on the dorsal borders of the orbits, thus preventing the frontals from contributing to these margins, unlike the condition in *Euparkeria*.

The postorbitals are the only bones whose outlines can clearly be traced. These bones are rather large, in contrast to those of other ornithosuchids. Dorsally they expand and contribute substantially to the interorbital roof area. From this area they extend backward and outward, forming angles of approximately 45° with the axis of the skull. Farther outward they become narrow bars where they begin to curve downward. Then at a level slightly below the middle of the height of the orbits, these bars form a sharp angle and continue inward and forward down to the margin of the skull. These portions are evidently formed by the jugals, but the

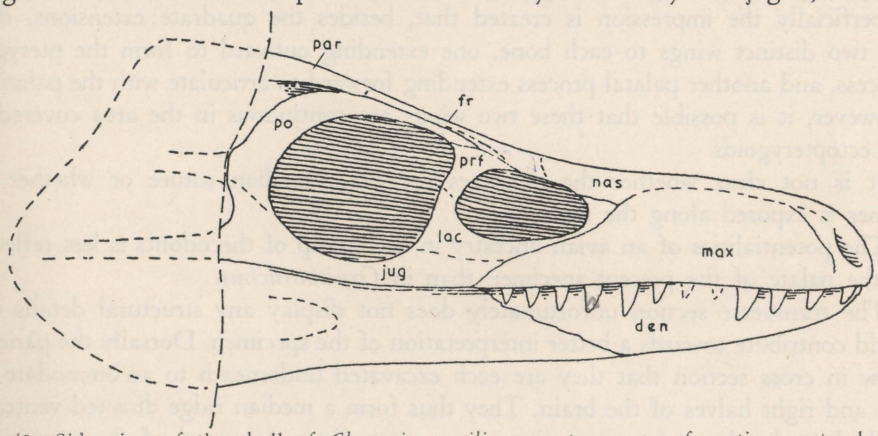


Fig. 49—Side view of the skull of *Clarencia gracilis* gen. et sp. nov., four times natural size. Abbreviations: **den,** dentary; **ect,** ectopterygoid; **fr,** frontal; **jug,** jugal; **lac,** lachrymal; **max,** maxillary; **nas,** nasal; **par,** parietal; **pal,** palatine; **pfr,** postfrontal; **po,** postorbital; **prf,** prefrontal; **pt,** pterygoid; **spl,** splenial; **v,** vomer.

exact level of the sutures with the postorbitals cannot be determined. It is rather clear that the peculiar angles in these postorbital bars mark the levels where the upper temporal arches diverged.

Although the posterior portion of the skull from the level of the postorbital bars is missing, it does appear that both the upper and lower arches were extremely delicate. It is also clear that the upper temporal fossa was substantially larger than the lower, at least as far as their transverse measurements are concerned. However, if the lower fossa should prove to be considerably longer antero-posteriorly than the upper, their relative sizes could be more similar.

The extremely delicate nature of the postorbital arch in the area where it was

joined by the upper arch creates the impression that the latter could not have been substantial. In fact, it is just possible that this arch may prove to have been incomplete, a circumstance which would mark this specimen as a more likely direct ancestor to birds than any of its contemporaries thus far discovered. It is with this idea in mind that we are anxious to revisit the locality and to make every endeavour to locate the posterior portion of the skull.

The parietal region is broad and flat. The portion of this area preserved in the specimen does not extend far enough back to allow for the conclusion to be arrived at that there was no pineal foramen. However, this region is not long in allied forms, so that the portion preserved may represent a substantial part of the total intertemporal region and it is likely that if a pineal foramen had been present, it would have shown on the specimen.

The palate is broad and flat, and has no vacuities in the area that could be cleaned. Posteriorly the fracture passes through the pterygoid processes. The nature of the portions of the pterygoids extending to the quadrates can, therefore, not be established. The distance between the pterygoid processes is considerable. The ectopterygoids are large and appear to cover substantial areas of the pterygoids. Superficially the impression is created that, besides the quadrate extensions, there are two distinct wings to each bone, one extending outward to form the pterygoid process, and another palatal process extending forward to articulate with the palatines. However, it is possible that these two wings are continuous in the area covered by the ectopterygoids.

It is not clear whether the palatines formed a median suture or whether the vomer is exposed along the midline.

The potentialities of an avian ancestry in this group of thecodonts is less reflected in the palate of the present specimen than in *Ornithosuchus*.

The transverse section unfortunately does not display any structural details that could contribute towards a better interpretation of the specimen. Dorsally the parietals show in cross section that they are each excavated underneath to accommodate the left and right halves of the brain. They thus form a median ridge directed ventrally, while lateral ridges of greater size occur, some distance inward of the margins of the upper temporal fossae.

A small trace of bone on the midline immediately above the pterygoids, some 3 mm. high, marks the presence of the basisphenoid rostrum. There is no indication of any median ossification between this bone and the parietals above.

The pterygoids show some thickness laterally, but details are obscured by a slight degree of weathering and the presence of the jugals and lower jaw bones showing in section in the same small areas.

In this transverse section the postorbitals show some bulging at the levels where the upper temporal arches were inserted.

While the author prepared this paper, Mr. Kitching revisited the locality in the Golden Gate and found what appeared superficially like a second skull and some of the skeleton of a similar, somewhat larger specimen. On cleaning this new speci-

men it turned out to be, as expected, a similar form, but unfortunately the skull is crushed beyond recognition and the skeletal portion is only one hind limb. Some teeth and the peculiar symphysial region (which disintegrated during preparation) were enough to suggest that both specimens could belong to the same species, but the second is about a third larger.

The femur is 35 mm. long. It was very severely damaged during preparation and no detail can be made out both proximally and distally. The shaft is delicate and the marrow cavity extremely large.

The tibia and fibula are also long (32 mm.) and slender, with large marrow cavities. The general impression is that these bones are very bird-like, in structure rather than shape.

The tarsal bones appear to be reptile-like and the metatarsals (there are impressions of four, the longest measuring 11 mm.) are also well elongated and slender. Evidently the animal was digitigrade rather than plantigrade and it is most likely a light, agile, bipedal form.