Transactions of the Royal Society of South Africa

Publication details, including instructions for authors and subscription information:
http://www.tandfonline.com/loi/ttrs20

ON SOME DINOSAUR REMAINS FROM BUSHMANLAND

S. H. Haughton B.A., F.G.S.

Version of record first published: 26 Mar 2010

To cite this article: S. H. Haughton B.A., F.G.S. (1915): ON SOME DINOSAUR REMAINS FROM BUSHMANLAND, Transactions of the Royal Society of South Africa, 5:1, 259-264

To link to this article: http://dx.doi.org/10.1080/00359191509519723

ON SOME DINOSAUR REMAINS FROM BUSHMANLAND.

By S. H. Haughton, B.A., F.G.S.

(Read May 19, 1915.)

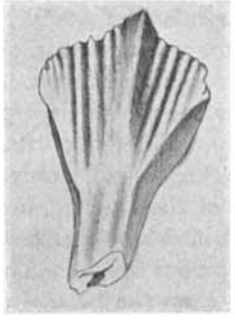
According to the nature of their fossilization the fossils collected by Dr. Rogers on the farm Kangnas, Bushmanland, Cape Province, can be divided into three groups. The first group comprises a single tooth lacking the end of the root, and an almost complete femur. These are highly calcified, but are weathered clean out of the original matrix, and have highly polished brown external surfaces. The femur has suffered a certain amount of superficial crushing. The second group comprises portions of other femora and of other bones of the hind leg, together with two vertebrae. These bones are highly calcified and compact, and were for the most part enclosed in a variable calcareous conglomerate which, in its harder parts, came away with difficulty from the bone surface. The third group consists of a number of fragments of vertebrae and bones of the foot, which are highly porous and cancellous in structure, and superficially appear to be from a different deposit from the bones of the other groups. All the remains, however, are Dinosaurian in character. Judging from their relative sizes, the bones of the first two groups belong to a single species of the Ornithopoda, which I propose to name *Kangnasaurus coetzeei*, n.g. et sp., after Mr. Coetzee, the owner of the farm Kangnas, by whom the remains were first brought to Dr. Rogers.

To avoid confusion the tooth to be described is taken as the type of this new form.

Kangnasaurus coetzeei, n.g. et sp.

The only tooth obtained is a maxillary tooth of the right side (S.A.M. Cat., No. 2732). It has the crown partially worn down in an oblique manner so that the outer border of the worn surface forms a sharp crenulated cutting edge, and it lacks the extremity of the root. The root

is cylindrical and tapers gradually from the base of the crown. It was supplied with a well-defined pulp-cavity, oval in cross-section. The outer surface of the crown is ornamented by a series of ridges. Two outer ridges and an approximately median ridge are much stronger than the others, and extend in a less well-defined manner along the outer surface of the root. The "median" ridge divides the outer crown surface into two unequal areas, of which the smaller is probably the posterior, as in *Camptosaurus*. The outer ridges do not form the anterior and posterior limits of the crown. They start from points approximately midway between the "median" ridge and these borders, and pass from the cingulum to the limiting edges of the crown, as shown in Fig. 1. In the areas lying between the "median" and outer ridges are a number of lesser ridges which do not pass on to the surface of the root. The smaller area carries



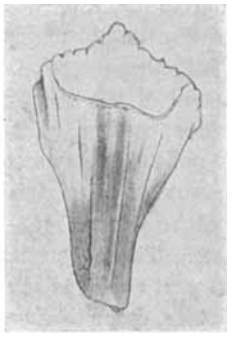


FIG. 1. FIG. 2.

MAXILLARY TOOTH OF *Kangnasaurus coetzeei*. × 2·5.

FIG. 1.—Outer View.
FIG. 2.—Inner View.

7 ridges of various sizes, and the larger 8. The arrangement of these subsidiary ridges can best be understood from the figure. The majority of them pass on to the "median" ridge or the strong lateral ridges. The tooth is longitudinally curved. The inner surface of the crown is gently convex, and is supplied with a few slight longitudinal ridges, which cause the inner edge of the worn surface to be slightly sinuous.

While agreeing in the possession of the strong median ridge and lateral ridges with the teeth of *Camptosaurus*, *Hypsilophodon*, and *Mochlodon*, this tooth shows many differences from those genera. In *Mochlodon* and *Camptosaurus* the area between the median ridge and the outer ridge is U-shaped; and while in *Hypsilophodon* there is a slight angle at the

base of the area, it is by no means so marked as in this new form, and the outer ridge is much more nearly parallel to the median ridge. In *Mochlodon* the secondary ridges are all parallel to the median ridge.

Limb-bones and Vertebrae.—Of the other parts of the skeleton the best-preserved are a nearly perfect right femur (2731), the proximal (2731*a*), and distal (2731*b*) portions of another right femur of almost the same size, the proximal end (2731*d*) of another and slightly larger

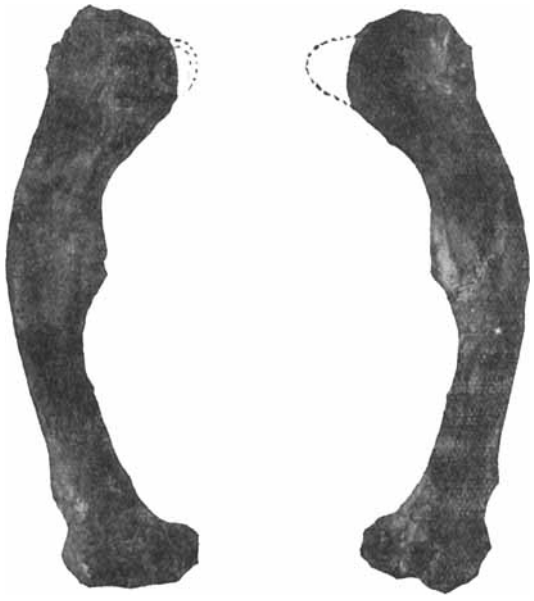


FIG. 3. FIG. 4.

RIGHT FEMUR OF *Kangnasaurus coetzeei*. × $\frac{1}{5}$ NEARLY.

FIG. 3.—Anterior View.
FIG. 4.—Posterior View.

right femur, the distal end (2731*c*) of a somewhat smaller left femur, the distal end of a left femur with the proximal end of a left tibia and what is probably part of the fibula (2731*e*), the distal end of a tibia and part of the tarsus and metatarsus (2731*j*), and some vertebrae (2731*f*). (The numbers in brackets refer to those in the South African Museum Catalogue.) Although no one femur is complete, a study of the remains enables one to restore the whole bone save for the inner trochanter. The bone on which the description is chiefly based is that numbered 2731.

The femur has a strongly curved shaft. The inner trochanter lies wholly on the proximal half of the shaft, and is compressed. Unfortunately it is incomplete, so that it is impossible to say whether it was of the pendent type characteristic of *Camptosaurus* or of the type seen in *Iguanodon*. The slender evidence available leads to the belief that it was not of the pendent type. Just in front of the trochanter on the inner side of the bone is a shallow depression with a rugose surface. The head is well developed and globular, and well seen in specimens 2731*a* and 2731*d*. Between the head and the remainder of the articular surface is a well-marked shallow groove. A lesser trochanter rises on the antero-external surface of the shaft, nearly to the height of the greater trochanter. It is compressed transversely, and, in all the specimens, owing to crushing, it is compressed on to the shaft. Before compression it must have been separated from the shaft posteriorly by a deep and narrow cleft. In the posterior upper surface of the shaft are two concave depressions, separated above by a prominent wide ridge. The inner of the grooves is just behind the head. The distal end shows the usual two condyles. The inner condyle is more robust than the other. Both have rugose articular surfaces. The anterior intercondylar groove is wide and shallow as in *Camptosaurus*. The posterior groove is deep and fairly wide, its shape being best understood from the outline figure given. The femoral remains show the presence of at least three, and possibly four, distinct individuals, but there is no doubt that they are all of the same species.

Only the proximal and distal ends of a tibia are present, so that it is impossible to give the relative lengths of the femur and tibia. The proximal end is very robust. The two condyles project posteriorly and are separated by an intercondylar groove. Of the two, the inner one is the larger and projects further back. The cnemial crest is very large and projects outwards in front of the external condyle from the top of the shaft. The broken end shows the proximal portion of the shaft to have been oval in cross-section, the longer diameter running in an antero-posterior direction. The distal end (2731*j*) of what is probably the same left tibia shows the usual malleoli, the outer being more slender and longer than the inner. They are separated on the anterior surface of the bone by a wide and shallow depression.

The astragalus, calcaneum, one tarsal, and the proximal ends of three metatarsals are all present in the specimen 2731*j*, but as far as displayed call for no special comment.

Specimen 2731*f* shows two posterior caudal vertebrae and portions of two others. The neural spines pass back behind the level of the front of the next succeeding centrum. The anterior zygapophyses are finger-like processes which pass forward along the base of the neural spine of the preceding vertebra. No chevrons are displayed.

The following table gives some of the chief measurements :—

Greatest length of femur (2731)	396 mm.
Greatest diameter of proximal end of femur (2731*d*) ...	100 ,,
Greatest diameter of distal end of femur	107 ,,
Greatest diameter of proximal end of tibia (2731*e*).....	106 ,,
Greatest diameter of distal end of tibia (2731*j*)	65 ,,
Greatest length of caudal vertebra	47 ,,
Greatest width of caudal vertebra.....	30 ,,
Greatest height of caudal vertebra	50 ,,

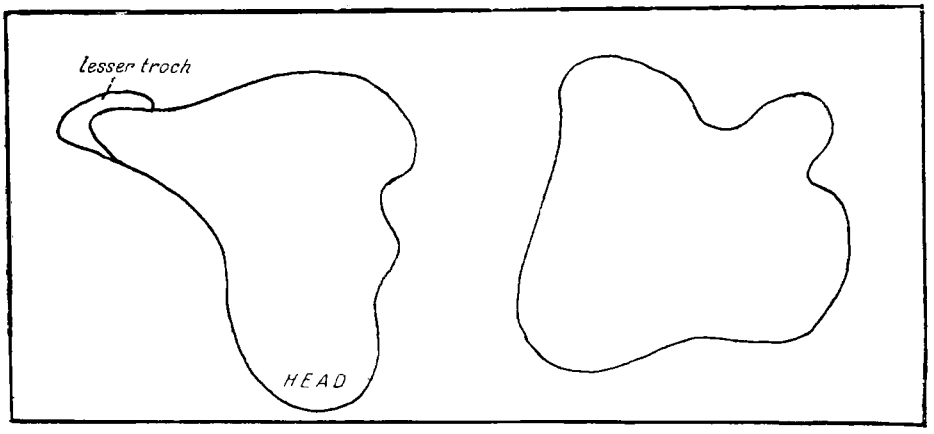


Fig. 5. Fig. 6.

Kangnasaurus coetzeei. × 0·44.

Fig. 5.—Outline of proximal end of femur.
Fig. 6.—Outline of distal end of femur.

Affinities.—The genera with which this form shows the most points of agreement are *Camptosaurus* and its allies of the American forms, and *Hypsilophodon* and *Mochlodon* of the European forms. Of these *Camptosaurus* is from the Upper Jurassic, *Hypsilophodon* from the Wealden, and *Mochlodon* from the Upper Cretaceous.

In the description given of the tooth, the chief peculiarities have already been described. Nopsca, in his discussion of *Mochlodon*, considers that a portion of the Ornithopoda, including the genera *Hypsilophodon, Mochlodon,* and *Camptosaurus*, have carried out a specialization of the teeth through the introduction of secondary ridges and simple and double notches. Comparing the teeth of *Mochlodon* and of *Camptosaurus* it seems that the former may be considered to be the more highly specialized in that all the secondary ridges are parallel to the

median ridge and are continuous down the whole of the crown, thus providing a serrated cutting edge with a constant number of serrations throughout the life of the tooth. *Kangnasaurus* appears to occupy an intermediate place between *Mochlodon* and *Camptosaurus*. Some of the ridges continue to the base of the crown, while others die out by being joined to the median ridge. These latter, however, seem longer and more prominent than the shorter ridges in *Camptosaurus*.

The chief features of the femur are its curvature and the comparative smallness of the inner trochanter, which lies wholly on the proximal half of the shaft. In the position of the trochanter it agrees with *Camptosaurus leedsi*, *Dryosaurus*, and *Hypsilophodon*, and differs from the other species of *Camptosaurus*. The anterior intercondylar notch is wide and shallow, and agrees with that of *Camptosaurus* and *Hypsilophodon*. Nopsca considers that the more complex development of the tooth runs hand in hand with the diminution in size of the fourth trochanter. Unfortunately, the femur of *Mochlodon* is unknown.

Such facts as are at our disposal point to the conclusion that this form is a later type than *Camptosaurus*, but without further evidence speculation as to the exact age of the remains would be very premature. It must be remembered that Gilmore has described a new form closely allied to *Camptosaurus* from the Lance Formation of Wyoming—a deposit placed by some workers in the Upper Cretaceous and by others in the Lower Tertiary—and that Dinosaurs are also said to have been obtained *in situ* in the Eocene beds of Patagonia and of Colorado.* On the other hand, an Ornithopodous Dinosaur allied to *Laosaurus* and *Hypsilophodon*, and whose femur is about three-quarters the size of the one here described, has been found in the beds of Tendaguru, in German East Africa, which are undoubtedly of Cretaceous age.

* Matthew (Bull. Geol. Soc., America, 25, p. 401) points out that there is no *a priori* improbability in the survival of Dinosaurs in South America into Tertiary times, and after their extinction in the Northern Hemisphere, but adds that the evidence that they did so seems open to very serious question.