On Saurodesmus robertsoni (Seeley), a crocodilian reptile from the Rhaetic of Linksfield, in Elgin / by H.G. Seeley.

24.

[*From the* Quarterly Journal *of the* Geological Society *for* *May* 1891, Vol. xlvii.]

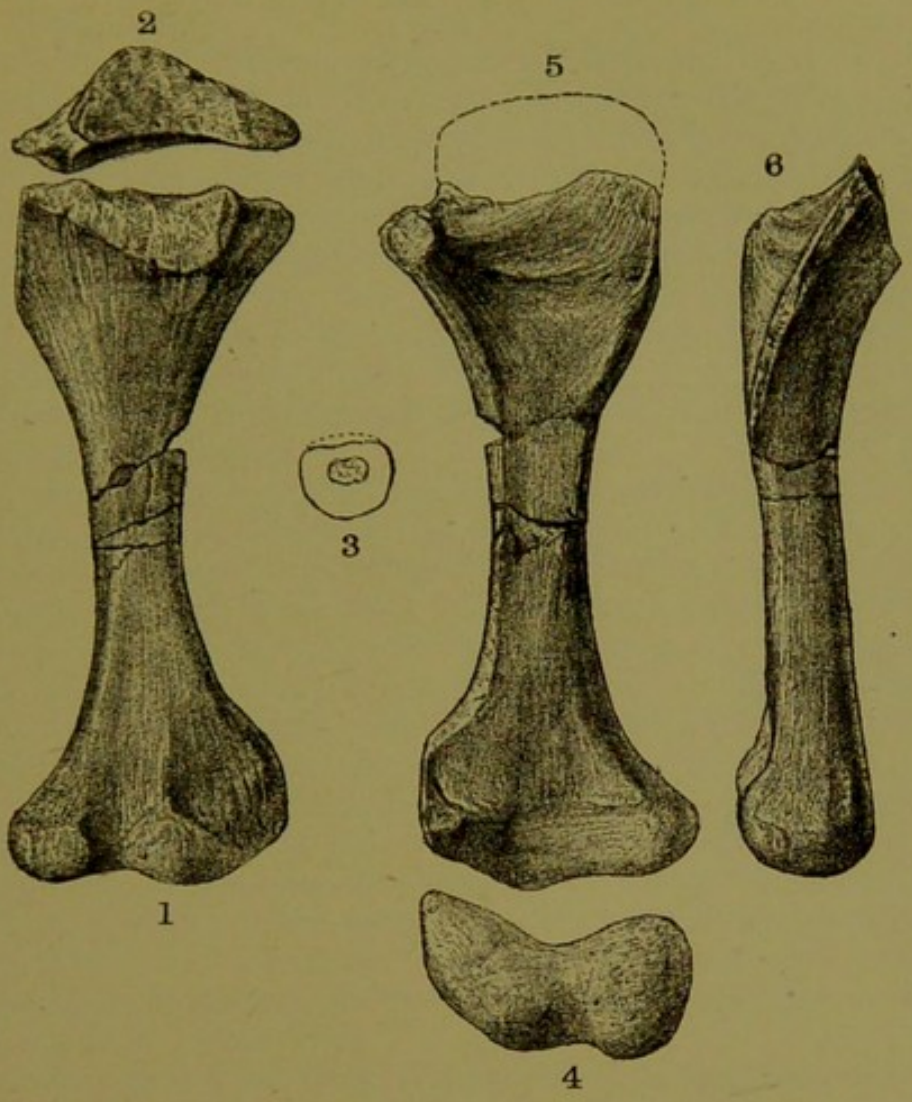
ON SAURODESMUS ROBERTSONI.

radial side of the bone above the articulation to a sharp edge, which makes the longitudinal contour convex on that side at the distal end, and in the dissimilar form of the distal articular surface with its well ossified detail and definition. Even disregarding the absence from the fossil of a radial groove or perforation, the characters enumerated seem to me to outweigh the slight resemblances to Chelonians which it seems to present, and it would follow that there is practically no evidence of value in favour of the Chelonian nature of the fossil.

At first sight the bone (figs. 1–6) is not very like the humerus of a Crocodile, yet its affinities with the Crocodilia are more important. Careful consideration of the radial process in the fossil shows that its inner prolongation is a sharp almost knife-edge, as in Crocodiles, and that the proximal articular part of the bone prolonged the shaft beyond the radial process in a way only paralleled among Crocodiles. On the other hand, the radial crest is never reflexed forward so much in existing Crocodiles, and there is no Crocodile in which the ulnar border is compressed to a sharp muscular edge, though there is, perhaps, a faint suggestion of such a ridge in a proximal angle of the ulnar tuberosity; and in Gavials, some recent species of *Crocodilus*, and some fossil Crocodiles like *Crocodilus Hastingiæ*, the character is slightly marked.

The bone as a whole is much more expanded at both ends than in Crocodiles, and is even straighter, but the distal articulation is essentially the same in plan, with like details of condylar structure and a like compression of the bone on the radial side, though the ridge in the living types is very slight compared with its development in this fossil. These are, however, homologous characters, and Crocodiles have the limb-bones hollow; so that, as the indications from the proximal and distal ends and from the internal structure all point to the same result, it may be concluded that the Linksfield fossil indicated a primitive Crocodilian stock; and that the intensified characters which it shows are feebly preserved in its surviving representatives. The chief differences from Crocodiles are that the radial crest is directed more forward and less downward; that the ulnar side is sharply compressed, ends in a muscular ridge, and has a convex curve; that the shaft is straighter; and that the distal end is relatively wider, with its radial border much more compressed.

In Lizards there are some approximations in these points which are worthy of remark. The extremities of the bone are more expanded transversely than among Crocodiles, but then the shaft is twisted. Both the radial border at the distal end and the ulnar border towards the proximal end are compressed in Lizards, but then the distal end has enormous articular condyles equally unlike those of the Linksfield fossil and Crocodiles. The concavity below the head of the humerus is more open transversely in Lizards, but then a strong rounded ridge connects the radial crest with the articular head. In no respect, however, either in characters of the proximal or distal end, can Lizards be said to approach so near to the fossil as do Crocodiles. Nevertheless, there may be a tendency



EXPLANATION OF FIGURES.

Saurodesmus Robertsoni (Seeley).

$\frac{3}{4}$ natural size.

Fig. 1. Dorsal aspect of right humerus, showing fracture of head of the bone.

Fig. 2. Outline of the proximal end of the bone, showing the relation of the radial crest to the shaft.

Fig. 3. Transverse section of the middle of the shaft, showing cancellous tissue.

Fig. 4. Outline of the distal articular end of the bone, showing form of condyles.

Fig. 5. Ventral aspect of the bone, with an approximate restoration of the proximal end.

Fig. 6. Posterior lateral aspect of the bone, showing the straight shaft, the curvature of its extremities, and the condition of the ulnar margin.

towards a generalized Lacertilian type, in so far as the characters are not Crocodilian, which is especially shown in the compressed distal radial margin.

The Trias of Elgin has already yielded *Telerpeton*, *Hyperodapedon*, and *Stagonolepis*, and the fossil is well distinguished from these. It is somewhat smaller than *Hyperodapedon*, which has the proximal end of the bone greatly expanded and concave, though less expanded than in *Stagonolepis*, but in neither genus is there the same resemblance to a Crocodilian type which is seen in the fossil under review. Among the extinct Orders it is in some ally of the Ornithosaurs that an approximation to the Linksfield type might be expected, for it is only in the humerus of the Pterodactylia that a close general resemblance to the fossil is found in those distal characters in which it varies from Crocodiles.

As preserved, the bone is 8·2 cm. long, and when perfect may have been from 1 to 2 cm. longer. At the fracture it is 3·5 cm. wide, and the bone is 1 cm. thick in the middle, where a muscular impression marks the large angle made with the ulnar and radial sides of the head. The middle of the shaft, which is nearly cylindrical, is 1·1 cm. wide. The distal end is 3·2 cm. wide. The articulation ascends the superior surface a little on two moderate ridges with a concavity between them. It is about 1·5 cm. thick on the ulnar side, and thinner on the radial side, the two parts being defined by the anterior and posterior concavities. These differ from the corresponding constrictions in the humerus of Crocodiles in that the depression in front is much narrower, while the inferior concavity is much wider. The form of the distal articulation indicates, I think, that the bones of the forearm were placed as in Crocodiles, and not as in Lizards or Anomodonts.

The compressed ulnar margin (supposing it to be unbroken), with a muscular attachment at its edge, would constitute an ordinal difference from existing reptiles. The fossil, if grouped with the Crocodilia, belongs to a suborder hitherto unknown, and defined by a combination of Crocodilian and Lacertilian characters which is not Saurischian.

Discussion on the above two Papers.

Mr. Lydekker agreed with the Author in regarding the Australian tibia as that of a Dinosaur, but asked how it was generically distinguished from *Dimodosaurus* or *Massospondylus*. He was glad that the Author termed the bone from Elgin a somewhat unsatisfactory specimen; in the speaker's opinion it was not worthy of being made the type of a genus. He differed from the Author in regarding the bone as being solid, and expressed his belief that although it might belong to a Rhynchocephalian or an extremely generalized Chelonian, it was certainly not Crocodilian, in any accepted sense of that term. He further enquired the Author's meaning in using the expression "Lacertilian affinities" in an apparently loose way. He concluded by protesting against the use of the term "Saurischia" for the typical Dinosauria. It was perfectly permissible to divide the Dinosauria

into two orders, but if this was done the original name must be retained for the typical forms. An analogous instance occurs in the separation by some writers of the Lemuroidea from the Primates, the latter being retained for the typical members of the order. Any other course would be unjustifiable.

The Author thought that if Mr. Lydekker visited Paris and sought the aid of Prof. Gaudry in making comparisons, he might learn the nature of *Dimodosaurus* and the relation of the Australian fossil now described to that type and its allies. He used the term "Saurischia" rather than "Dinosauria" in defining the position of this animal, because new ideas in classification needed new names for their adequate expression. It might be that the groups Ornithischia and Saurischia were provisional, for there were indications of a third group which could not be defined as yet. He thought there could be no more justification for the proposal to restrict the name "Dinosauria" to one of these groups than there would be to restrict the term "Mammalia" to the Monotremata or Marsupialia.

With regard to the Linksfield fossil, he had carefully compared it with every available specimen in the British Museum without finding evidence of near affinity with the Chelonia, though without doubt as to its osteological identification. This was the first necessity in making a determination of the bone. As Mr. Lydekker had been unable to determine whether the bone was a humerus or a femur, he did not know how it was possible for him to have arrived at any reference of it to the Chelonia or any other group. But when the form of the distal end was appreciated as fixing its place in the skeleton, it followed that only in Crocodiles and Ornithosaurs could any parallel be found to the characters of the proximal end, so as to bring it into harmony with the distal end of the bone. He fully admitted the difficulty in restoring the head of the bone in a new type of animal.