

3. On Associated Remains of a Theriodont Reptile from the Karoo System of the Cape. By R. LYDEKKER, B.A., F.G.S., F.Z.S.

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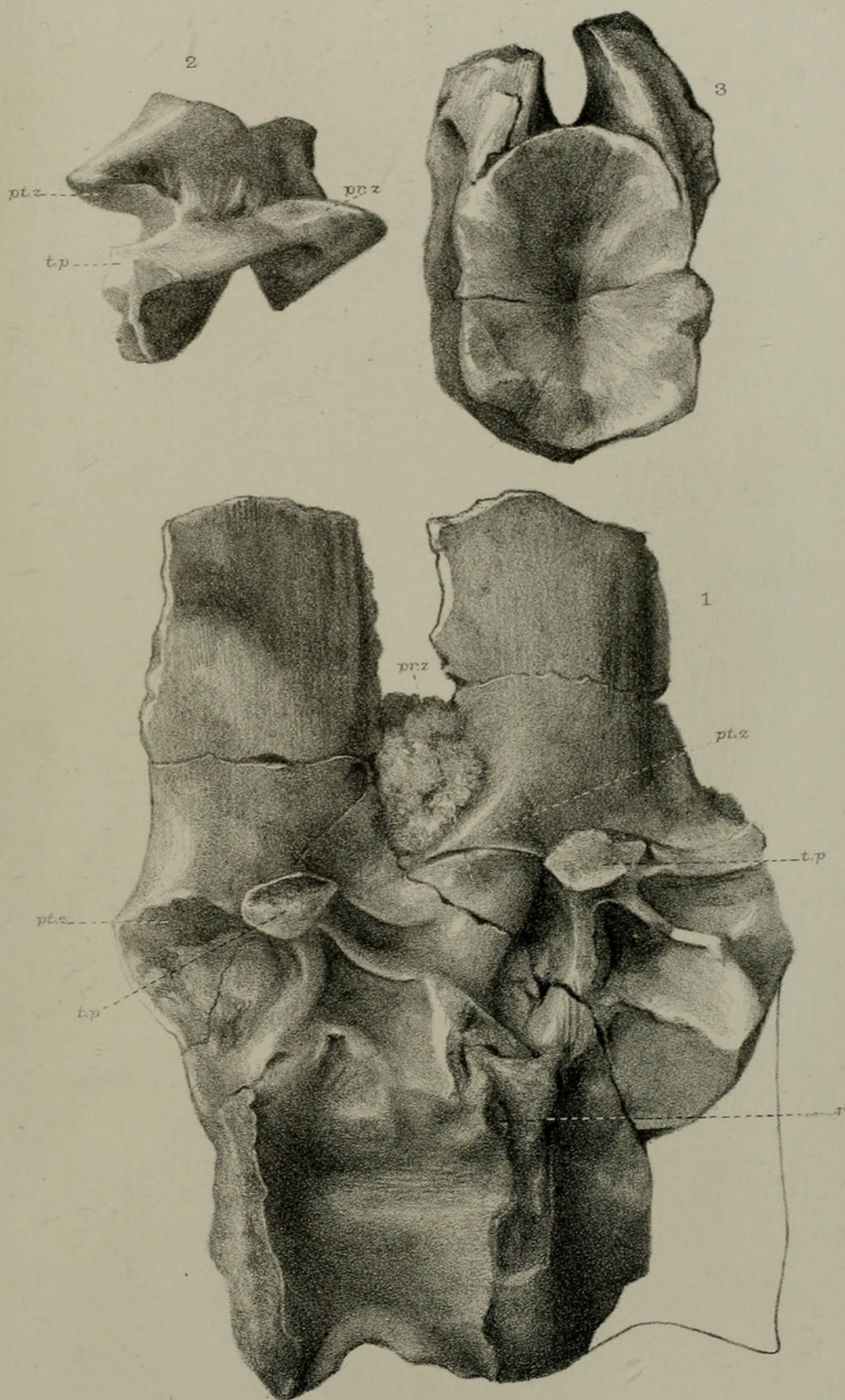
(Plates LIV. & LV.)

The remains of Anomodont Reptiles from the great Karoo system of the Cape Colony are so rarely found in associated sets that every instance of such association is of especial interest and importance, and I accordingly bring to the notice of the Society a series of associated, although imperfect, bones, presented in 1884 to the British Museum by Mr. C. S. Orpen, of Smithfield in the Orange Free State.

These specimens (Brit. Mus. No. R. 533) were obtained from the Karoo system of the Rouxville District, Orange Free State, and probably from the Beaufort stage, although I cannot be certain on the latter point. The bones retain portions of a brick-red ferruginous matrix, which is frequently very closely adherent to them, and with the colour of which they are much impregnated. This matrix so closely resembles that in which the reptilian bones are found in the Maleri stage of the Gondwana system of Central India, that if the specimens had been shown to me without any clue to their locality I should have said that they were probably of Indian origin. The majority of the fossils in the British Museum from the Beaufort beds are of a blackish or brownish-grey colour; but according to Prof. A. H. Green red beds are of common occurrence on this horizon. The fossils in the Museum of the Royal College of Surgeons from the overlying Stormberg beds, catalogued by Sir R. Owen under the name of *Massospondylus*, exhibit a similar red matrix.

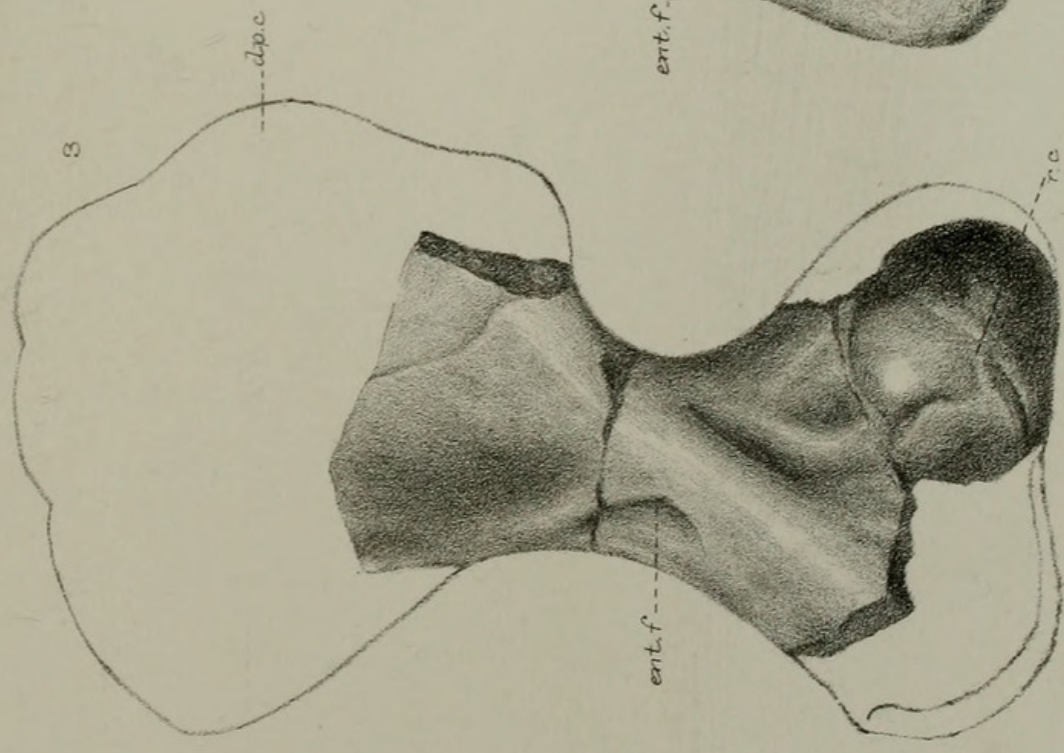
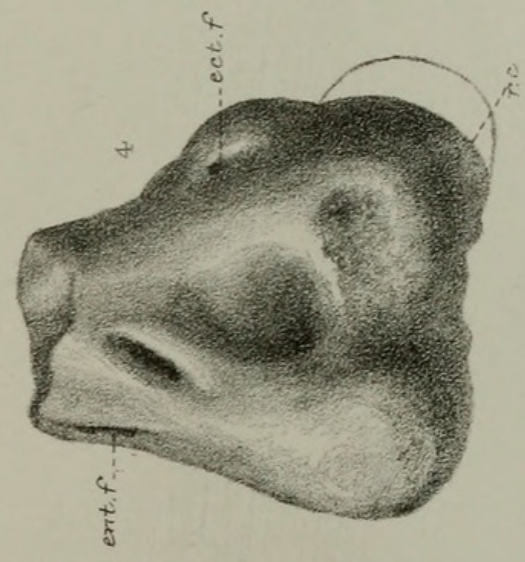
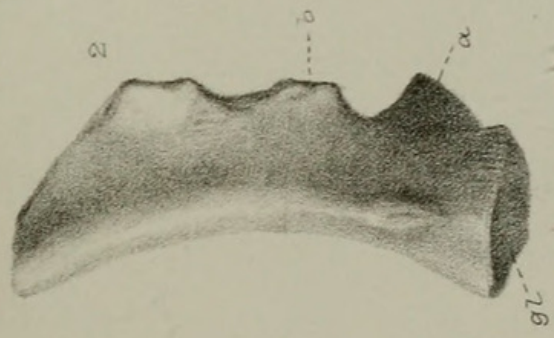
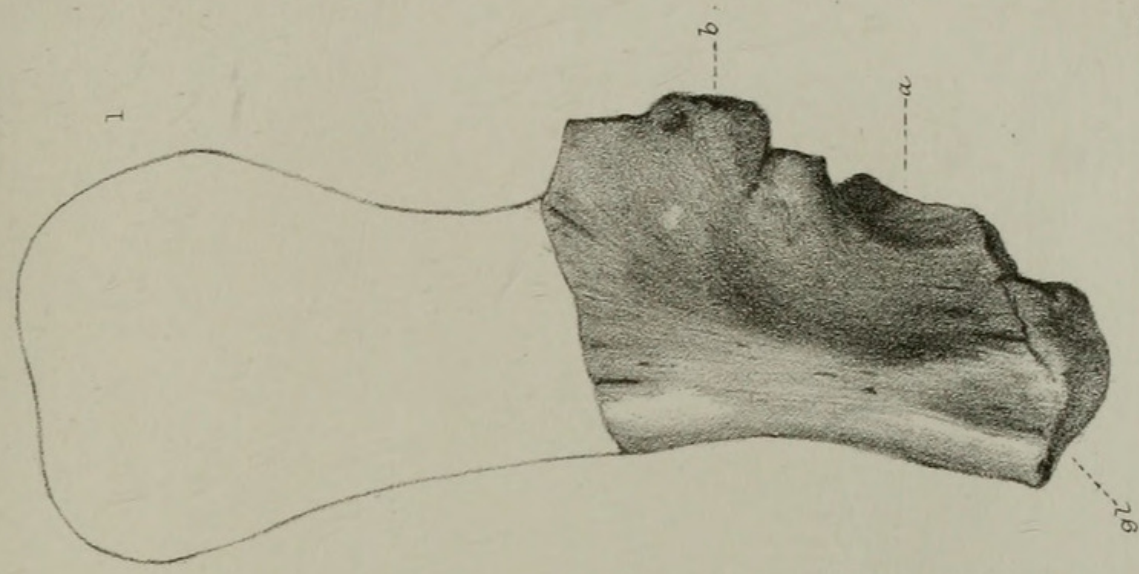
The series of specimens comprises a number of more or less imperfect vertebræ from the dorsal and caudal regions, and several imperfect bones of the limbs and limb-girdles. Unfortunately, however, there is no trace of a tooth or any portions of the skull,—a circumstance which is the more to be regretted, since the South-African representatives of the Theriodont suborder of the Anomodonts (to which suborder these specimens belong) have been mainly founded upon the evidence of the skulls and teeth. The specimens I select for description are certain of the vertebræ and an imperfect scapula and humerus.

Of the vertebræ two somewhat imperfect dorsals, cemented together by matrix, are represented from the right side in Plate LIV. fig. 1, on a scale of two thirds the natural size. These specimens, although somewhat flattened by pressure, exhibit the entire contour of the centrum and neural spine, and also show the peculiar characters of the transverse processes and the position of the zygapophyses. The two latter features are, however, exhibited still more clearly by the imperfect arch of a dorsal represented in fig. 2 of the same Plate. The centra of the dorsal vertebræ are of considerable length, and



Theriodont Vertebrae.





E.C. Woodward lith. ad. nat.

Theriodont Limb-bones.

West, Newman imp.



somewhat compressed from side to side; and the neural spines are likewise flattened, and of moderate length and height. Their terminal faces are but slightly cupped, and show a notochordal canal penetrating towards the middle of the vertebra. The transverse processes (*t.p.*) are of moderate length, and directed backwardly as well as outwardly. These transverse processes are strengthened by three plate-like buttresses arising from the sides of the arch, and recalling the structure observed in the dorsal vertebræ of *Megalosaurus*. A trace of a rib-facet is observable on the anterior border of the centra of these vertebræ, which probably indicates that they belong to the earlier part of the series. The hæmal aspect has a sharp carina. Intercentra were totally wanting in this part of the spinal column. The total height of these vertebræ is 6.7 inches, the vertical diameter of the centrum being 2.4 inches.

Somewhat larger trunk-vertebræ probably belong to the lumbar region, an imperfect specimen being represented from the anterior aspect in fig. 3 of the same Plate. In this specimen the centrum is very much shorter than in the dorsals, but the hæmal carina is still sharper. In the caudals, of which there are three in apposition, the centrum again lengthens, and the hæmal carina becomes less sharp. Chevrons were certainly present, but whether intercentra occurred in this region cannot be satisfactorily determined.

The apparently notochordal character of these vertebræ indicates that this series of specimens does not belong to the Dicynodont sub-order of the Anomodonts. Notochordal vertebræ are met with both in the Pariasaurian and Theriodont subdivisions of that order; but since the associated humerus to be immediately noticed accords with that of the Theriodonts and is quite different from the type apparently referable to the Pariasauria¹, there seems every reason for regarding these specimens as referable to the Theriodontia.

Turning to the bones of the appendicular skeleton, we have first to consider the scapula, of which the proximal portion of that of the right side is preserved. This specimen is represented from the dorsal aspect in Plate LV. fig. 1, on a scale of one third, with a restoration of the missing half from the scapula described by Sir R. Owen as *Platypodosaurus*. The proximal portion of this bone agrees so closely in general characters with the latter specimen, as figured by its describer (Quart. Journ. Geol. Soc. vol. xxxvi. pl. xvii. fig. 1), that there is no necessity for a detailed description. It will be seen that the process marked *a* in the figure corresponds with that marked *f* in Owen's plate, while the one here marked *b* represents *e* of the latter.

In regard, however, to the homology of these two processes with those of other Dicynodont scapulæ, it is necessary to make a few remarks, since some confusion has arisen between the two. In his 'Catalogue of the Fossil Reptilia of South Africa,' Sir R. Owen figured, in plate lxx. fig. 1, the ventral aspect of the right scapula of a species of *Dicynodon*, with a portion of the precoracoid attached

¹ Described by Prof. Seeley (Proc. Roy. Soc. vol. xlv. p. 142, 1888) as *Propappus*. The writer will take a later opportunity of giving his reasons for this reference.



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