Dicranozygoma leptoscelus, gen. et sp. nov. / H.G. Seeley.

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H. G. SEELEY.

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DICRANOZYGOMA LEPTOSCELUS, *gen. et sp. nov.*

On the Skeleton *of a* Theriodont Reptile *from the* Baviaans River (Cape Colony): *Dicranozygoma leptoscelus, gen. et sp. nov.*

By Prof. H. G. Seeley, F.R.S., F.L.S., V.P.G.S.

[Plate XXXVI.]

The fossil reptilia of South Africa collected or sent to England by the elder and younger Bain became known from isolated fragments, from a mistaken idea (fostered by the published figures) that the skull or the dentition gave information which was of chief scientific interest; but, partly owing to the rapidity with which specimens at the surface become broken and washed away when exposed to the sun and rain, skeletons in a complete state cannot often be obtained; and partly from difficulties of transport in the Karroo Desert, in which they have mostly occurred, associated bones are rarely collected.

In Cape Colony I saw only one specimen showing bones of the skeleton of an Anomodont reptile in natural association. This evidence I now bring before the Geological Society. It had been for some time in the Albany Museum at Grahamstown. The slab containing it is 31 inches long by 10 inches wide. The rock is an extremely hard siliceous sandstone, divided by natural rectangular joints into its present size and form, split so as to expose a portion of the skull, the vertebral column and ribs as far as the pelvis, scapula, part of the humerus, femur, and parts of the tibia and fibula. The skeleton curves over the slab; and has been so divided by the parallel longitudinal joints that the tail and left hind-limb, and apparently part of the right fore-limb, were lost. The bones have decomposed, and are represented by natural moulds. The specimen, slightly distorted by earth-movement and by maceration, was lent to me by the Trustees of the Albany Museum. I brought it to this country, and a beautiful cast, obtained by means of a jelly-mould, was taken from it in the Geological Department of the Natural History Museum, for the Trustees, before the specimen was returned to Grahamstown.

Dr. Schönland, M.A., F.L.S., Director of the Albany Museum, has ascertained for me that the fossil was discovered by Mr. W. Pringle, at about 3400 feet above the sea, upon his property at Ealdon, resting in the bed of the Baviaans River, a tributary of the Great Fish River, flowing south-westward between Tarkastad and Thorn Cross Station. The counterpart has never been known, and was probably swept away by the river before the slab was exposed. Dr. Schönland, however, states that 'there was an additional piece belonging to the animal—I take it to have been the remaining part of the head—which mysteriously disappeared many years ago.'

I have not been successful in my efforts to discover this missing fragment, which is believed to be in a private collection in Paris.

In its absence some uncertainty attaches to the determination of the affinities of the animal, although enough of the skull remains to show that there are striking features which separate it from all known genera of Theriodontia. It is one of the most important skeletons hitherto found, and is unique in the evidence which it affords of coordination of characters of the dorsal aspect of the more interesting bones.

The Head.

The skull appears to have been about 4½ inches long in the median line; but its greatest length was about 6 inches, owing to the unusual expansion and backward lateral prolongation of the squamosal bones. The greatest width of the skull transversely was in the line of the vertical occipital plate, where the measurement from side to side exceeds 4½ inches.

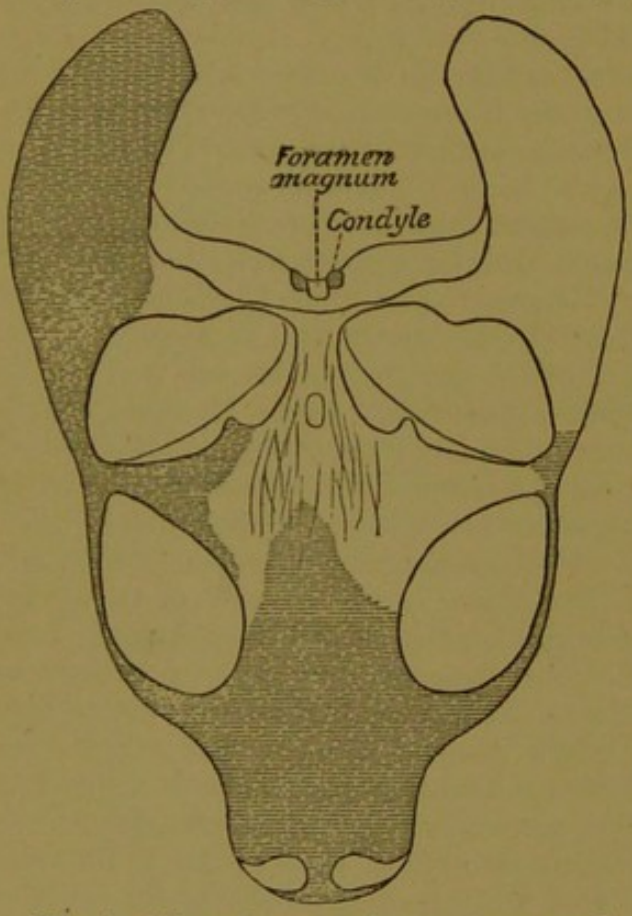
The inner borders of the orbits of the eyes are concave in length, and the least width of the interspace between them exceeds 1 inch. The hinder lateral border formed by the postfrontal bone is preserved on the left side, and has a thickened rounded prominent edge. This triangular bone, narrowing as it extends outward, is concave between its prominent anterior and posterior margins, and makes the anterior limit of the short and wide temporal vacuity. The transverse measurement of the postfrontal is about ⅞ inch. Its narrow outer edge is directed downward towards the malar region. The space between the postfrontal bones, occupied by the frontal bones, is slightly convex, and is traversed by short elevated longitudinal ridges, which are not parallel but meet so as to enclose long, shallow, fusiform pits, seven or eight in number, in the transverse width of the bones. This ornament is extended backward upon the parietal region; but there is no evidence of it farther forward, because the front of the head is in the missing part of the specimen. This Labyrinthodont type of ornament is known in certain skulls of Theriodonts, but is unknown in *Oudenodon*, *Dicynodon*, or any other South African reptiles with which this fossil may be compared. I have not seen, however, the same net-like pattern in *Cynognathus*, or any Theriodont hitherto described. Behind the postfrontal bones the short parietal region of the skull has slightly concave sides with sharp edges which converge somewhat as they extend backward. The parietal foramen is longitudinally oblong, and about 1 inch in advance of the occipital plate. Immediately behind it the surface of the parietal bones becomes concave.

The occipital plate is nearly vertical, and subtriangular, ¼ inch wide at the apex, at the median superior crest of the occiput. This region widens with a narrow concave lateral margin, which excavates a deep wide notch between this triangular plate of the skull and the lateral expansion of the squamosal bone, corresponding to the condition of the narrow edge in the triangular occipital plate of *Gomphognathus*, and corresponding to the deep lateral V-shaped notch seen in that genus between that plate and the squamosal region of the zygomatic arch. The width of the base of the occipital

plate appears to be about 2¼ inches; it is slightly concave from side to side. The foramen magnum is vertically oblong, and fairly large. On its right side appears to be the right occipital condyle, much less elevated than in *Gomphognathus* or *Cynognathus*, but better marked than in *Lycosaurus* or *Tropidostoma*. Above this region the upper narrow part of the occipital plate leans a little forward, and is slightly concave, as in most Theriodonts.

The squamosal bone is exposed on its inner aspect, very slightly displaced on the left side, so as to be depressed and inclined a little outward in its hinder part, and seen from the inner lateral aspect appears wider than it should be. The malar bone may be carried upon its outer side in the usual way, since it is seen, on the inner side of the zygoma, anteriorly, to form the lateral part of the arch in front of the squamosal bone. This suture is much farther forward than in the known genera of Cynodontia or Gomphodontia, and appears to indicate that the malar bone was relatively smaller than in the better-known Theriodonts. The squamosal has not quite the relations found in Dicynodonts. It is the most remarkable bone of the skull which is evidenced, in being a thin compressed plate prolonged backward behind the occipital crest so as to add nearly one-third to the length of the skull: it is entirely unparalleled. The quadrate articulation is not seen, but on the right side is a fragment of a squamous bone descending below and behind the quadrate region, which may be a further expansion of the quadrate bone. Its inferior edge is rounded; the posterior border is broken. The visible surface of that part of the squamosal which forms the outer hinder boundary of the zygomatic arch has a convex external contour, which becomes rounded behind, and is then reflected upward on the inner or occipital edge. The bone terminates in front below the level of the

Restoration of Skull of Dicranozygoma leptoscelus, *gen. et sp. nov.* (½ *nat. size*).



[The shaded portions are those not preserved in the actual specimen.]

summit of the postfrontal arch to the orbit, as a thin bar external to the relatively small malar bone. Its extreme length exceeds 3 inches. The short temporal vacuities are half as wide again as long, but are inclined obliquely outward and forward; while the orbits must have been directed obliquely inward and forward. On these data I have restored the skull in the accompanying figure (p. 648), basing the form and length of the snout on known characters of allied reptiles.

The Vertebral Column.

The total length of the vertebral column, as preserved, is 18 inches from the occipital plate to the last sacral vertebra. It extends in a curve convex towards the right side—which has had the effect of crushing the dorsal ribs together, so that they are all turned upward on the right side to expose their external edges and vertically-convex contour, corresponding to the natural curvature of the side of the animal. On the left side the ribs are pressed flat in the usual way, curving outward so as to expose their posterior aspect.

In the middle part of the column the specimen showed a natural mould of the neural canal, and this, in the relief-cast, is now shown as a canal, remarkable for its width and depth, which diminishes somewhat in size as it extends backward. This preservation of the neural canal is the cause for the imperfect exhibition of the forms of the neural spines of the dorsal vertebræ, which could not in all cases be completely cleared in the anterior and middle portions of the column, though I endeavoured to show the forms of several on the right side of the slab.

The cervical region has suffered from the effects of one of those explosions which so frequently disturb the natural relations of bones after death, so that the vertebræ are scattered, and the number of cervical vertebræ cannot be given with certainty. Effects of this disturbance are also seen in the curvature of the backbone, the condition of the skull, and other displacements of the bones.

I am unable to recognize more than six cervical vertebræ, which are all scattered and imperfectly exposed. One of these, having the centrum more than $\frac{1}{2}$ inch long, exposed laterally, shows the articular face of the centrum; it is transversely ovate, $\frac{5}{8}$ inch deep, $\frac{7}{8}$ inch wide, and is concavely cupped, exactly like the centrum of *Anthodon*. This fish-like form of articulation is the more interesting, because there has hitherto been no evidence of it in the centra of South African Theriodonts. The vertebra which is hindermost in position appears to have flattened blade-like ribs which are convex in front, straight behind, $\frac{1}{2}$ inch wide, and three to four times as long. The neural spines in the neck are vertical, but do not appear to have been elevated. The scattered neck-vertebræ are on a slightly lower level as compared with the dorsal vertebræ, which are in continuous sequence. But the earliest of these vertebræ are depressed out of sight, together with the earlier ribs of the left side, the scapular arch, and limb.

Twenty-one vertebræ in advance of the ilium are indicated by

ribs. On account of its extreme shortness the earliest rib, less than $2\frac{1}{2}$ inches long, may belong to the neck. The fifteen which follow may be counted as dorsal, and the four which succeed them may be regarded as lumbar, the ribs being practically absent, as in mammals, from the lower part of the back, where they do not enclose the abdomen as in reptiles.

The dorsal ribs gradually become longer, from about 4 inches in the earliest to 6 or 7 inches at the tenth or eleventh ; but then they diminish in length again, and the last dorsal rib is 5 inches long. The transition is abrupt to the short ribs of the lumbar series. The ribs of the back are strong, rounded from back to front, compressed from side to side, with a shallow longitudinal groove running along the posterior surface of each ; the anterior surface is not exposed. Each rib diminishes in depth towards its extremity, but the width remains unchanged. One specimen appears to show that the rib is hollow or cancellous at the fractured extremity. The curvature of the ribs is remarkably small, and in contrast with Plesiosaurs and Ichthyosaurs, a character which appears to indicate that the cavity of the thorax was deep in proportion to its width. There is no trace of sternal or abdominal ribs preserved; and *Mesosaurus* is still the only South African reptile in which abdominal ribs are known.

The articular head of a dorsal rib shows no indication of separation into two distinct facets. It is expanded a little from side to side, convex or angular from above downward, and is produced somewhat proximally. In the earlier ribs it is $\frac{1}{2}$ inch deep. The effect of the form of the proximal rib-facet is to produce a small emargination of the rib superiorly, external to the articulation, which truncates the rib obliquely. Its upper part articulates in the early dorsal vertebræ with the transverse process, and the lower part articulates apparently with the centrum of the vertebra. The two articular facets are not clearly seen on the side in any vertebra, and it is possible that the lower or capitular part in the early vertebræ may be between the centra, as in *Cynognathus* and *Mesosaurus*. These ribs are generally similar to those of the small *Herpetocheirus brachycnemus*, a Theriodont which I found at Klipfontein, near Fraserburg.[1]

The first lumbar or last dorsal rib is $3\frac{1}{2}$ inches long as preserved, but may be an imperfect dorsal rib, being similar to the dorsal ribs in position and curvature. But the four succeeding lumbar ribs are each about $1\frac{1}{2}$ inches long, more cylindrical, uniform in character, directed more transversely outward, a little curved at the proximal end which is compressed from side to side, and deep as in the dorsal region.

The bodies of the dorsal vertebræ are very partially exposed. They are at first less than $\frac{1}{2}$ inch long, and gradually increase in length, so that the last dorsal or first lumbar centrum is $\frac{3}{4}$ inch long. At first the bodies of the vertebræ, as exposed in the large

[1] Phil. Trans. Roy. Soc. vol. clxxxvi (1895) B, p. 158 & fig. 4.

neural canal, are seen to be in close contact one with the other; but in the middle and lower part of the back there are interspaces between the adjacent centra, which I regard as indicating probably the existence of intercentra in that part of the vertebral column. A similar condition is seen in *Cynognathus* and *Pareiasaurus*, when intercentra are developed on the visceral surfaces of the vertebræ. The interspace between the centra appears to be least at the base of the neural canal, and to augment laterally, permitting a large amount of lateral curvature of the body. Four vertebræ extend over $3\frac{1}{4}$ inches.

The neural arches are at first small. The neural spine is small, vertical, strong, wedge-shaped, sharp in front, flattened behind, terminating downward in a close-set V-shaped pair of post-zygapophyses. The transverse processes are given off at the base of the neural spine and directed outward, slightly upward, and backward, rounded from front to back, where the measurement is $\frac{1}{4}$ inch, and expanded at the extremity, which is not unlike the corresponding surface in an Ornithosaur. The articular face for the rib looks downward and outward on its inferior surface. The transverse measurement over the processes in an early dorsal exceeds 1 inch.

Only two early dorsal vertebræ have the neural spines preserved. They are followed by eight from which the neural spine and roof to the neural canal is lost. Thus there is a marked contrast between the aspect of the early dorsal and lumbar vertebræ, in which the upper part of the neural arch is preserved, due to the circumstance that the transverse processes rapidly become shorter, and disappear by ascending the side of the neural arch and becoming an oblique, sharp, lateral ridge which extends upward and backward, fully $\frac{3}{4}$ inch long, terminating in a prominent rounded tubercle (external to the post-zygapophyses) which has no relation to the rib. These processes form practically the oblique sides of the neural arch, and become merged in the neurapophyses, with the oblique facets of the zygapophysis between them in front and behind. The pre-zygapophysial facet has become much larger than in the early vertebræ, but still looks inward and upward. The neural spine, instead of being elevated and free, has become flattened, and forms the median ridge of the neural arch, which has become nearly horizontal, with the two flattened sides sloping outward from it. It terminates backward in a median point, and the lateral areas are widened a little at the posterior angles by the post-zygapophyses. The last lumbar vertebra has this superior part of the neural arch shorter, and the median ridge is more elevated.

The sacrum is entirely hidden beneath the iliac bones. I suppose that there may have been four sacral vertebræ, because the length (3 inches) corresponds to the length of the four lumbar vertebræ. There cannot have been fewer; it is improbable that there are more. The last sacral rib was slender, and less than 1 inch long; the first is more than 1 inch long, and not stout. The last shows an expansion at the external extremity, which articulated with the ilium.

The Scapula.

The right scapula is exposed resting in part upon the early dorsal ribs, its under side being concave, corresponding to their curvature. The bone is $3\frac{1}{2}$ inches long, with a strong humeral articular surface, which is an inch deep and nearly as wide. This thickened condition is prolonged up the posterior edge of the bone, which is convex in length from above downward as well as laterally, diminishing in thickness to $\frac{1}{4}$ inch at its superior termination, forming a distinct ridge along the posterior margin. On this posterior border, a little above the articulation, is a narrow muscular impression about $\frac{3}{4}$ inch long, which is much lower in position than the muscular impression on the scapula referred to *Ptychosiagum orientale* from the Panchet rocks (which may also prove to be a Theriodont), and more like the condition in *Theromus leptonotus*. The bone is constricted above the humeral articulation, and emarginate anteriorly below the acromion-process. The exact amount of the constriction is not shown, owing to the condition of the matrix. Beyond the emargination the bone rapidly widens transversely to 1 inch at the acromion, and ultimately to fully $1\frac{1}{2}$ inches, forming a smooth flattened surface, slightly concave from side to side, with the concavity slightly augmenting as it descends the length of the bone, and ultimately it curves forward on to the anterior side of the bone above the humeral articulation. The superior margin of the scapula is convex from front to back, and moderately thin, like its anterior margin. There is no trace of a spine upon the blade of the scapula, as in most mammals, or as in *Cynognathus*. Moreover, the slab is fractured, so that the blade is not quite perfect, and there are no indications of the other bones of the shoulder-girdle.

The Humerus.

The right humerus was probably 4 inches long, but its proximal end is not exposed, or rather is lost with the longitudinal fracture of the slab. The distal end and part of the radial crest are well displayed; but the bone is inverted in position, so that the radial crest is directed upward.

The crest is compressed, thin, continuous with the radial side of the bone, convex in its lower longitudinal contour, and not extending for more than half the length of the humerus. Below the termination of the crest the shaft narrows to a width of $\frac{5}{8}$ inch, the measurement becoming less as the concave sides approximate in a rounded median convexity which marks the distal disappearance of the radial crest. The thickness of the shaft in this position is about equal to its width. The width rapidly augments by widening on both sides to $1\frac{7}{8}$ inches at the distal end. The external margin of the bone continues thick, though the thickness diminishes to the condyle, and the lateral contour is deeply concave; but on the inner border of the bone its concave lateral contour terminates at $1\frac{1}{4}$ inches from the distal end. Below this point the border becomes compressed and nearly straight, and extends inward beyond the articular

condylar surface, on to which it curves convexly. The epicondylar foramen is similarly situate to that in the humerus referred to *Gomphognathus*, but relatively smaller and elongated, has a wider bridge, and does not extend so far distally. The foramen is partly blocked with a small body wedged into it, which appears to be a small terminal phalange of the foot.

The articular condyles, two in number, are obliquely inclined downward and outward, moderately convex, and defined by a shallow oblique groove parallel to the inner border such that the somewhat flattened inner condyle is nearly twice as wide as the more prominent convex outer condyle, though they are both of somewhat rounded rhomboid form.

The most distinctive feature of the bone is the unbroken concave longitudinal contour of the external border, which is equally unlike *Cynodraco* and *Gomphognathus*, and is more like the isolated humeri which Sir Richard Owen referred to *Dicynodon*.

Resting upon the lower edge of the radial crest of the humerus is a single terminal claw-phalange, presumably of the fore-foot of the same animal. It is strong, $\frac{3}{4}$ inch long, $\frac{1}{2}$ inch wide behind, flattened below, convex above, with the extremity blunt and rounded, and the surface moderately depressed. There are the usual lateral grooves, narrow and faintly impressed; and the curved contour of the posterior border of the articulation appears to be faintly indicated. The claw-digit is better preserved and more elongated than in *Platypodosaurus*, while its blunt extremity is unlike the sharp condition of the claws in *Eurycarpus*. The remainder of the foot is lost with the longitudinal joint bounding the slab.

The Pelvis.

The pelvis is represented by the right ilium, a part of the right ischium, and part of the left ilium. The pubis is only indicated in the acetabulum, and was covered by the ilium. The bones are separate one from the other, and agree in this mutual relation and in form with known Theriodonts; while they differ absolutely from the pelvic bones which have been associated with Dicynodonts, and are usually anchylosed together.

The two iliac bones now lie parallel one to the other, and are pressed nearly flat. They were probably inclined to each other originally at a considerable angle, but still may have met or approximated in the median line. The right bone is $3\frac{1}{2}$ inches long, and $2\frac{1}{4}$ inches in extreme depth in the hinder part over the acetabular wedge, which articulated with the head of the femur. The bone is large and smooth, with its thin superior border forming a semi-ovate contour, most rounded in front, where the bone is reflected slightly outward and upward as in *Platypodosaurus*, on the mammalian plan. The inferior border of the bone from the articular margin of the acetabulum to the anterior angle, is concave in length, rounded from side to side, thickens as it extends backward,

and measures $2\frac{1}{2}$ inches in length in a straight line; this pre-acetabular part of the bone is $1\frac{1}{2}$ inches deep in the middle length of the ilium. Posteriorly, the expanded blade of the ilium terminates in a relatively small wedge-shaped post-acetabular portion rounded at the posterior extremity, which is less than 1 inch deep and more than $\frac{1}{2}$ inch long, defined by an inferior notch: this separates it from the ischiac process which gives attachment to the ischium, and extends equally far back. Hence this post-acetabular process, though similar in form to the posterior process of the ilium in *Cynognathus*, is not closely comparable with it on account of its small size; and because the inferior process, which here stretches from the acetabular part of the ilium to the ischium, has no existence in *Cynognathus*. This ischiac process constitutes the distinctive feature of the ilium in the genus now described.

The width of the inferior acetabular surface of the ilium is $1\frac{1}{4}$ inches. The anterior part is the acetabular articulation, flat below, and at right angles to the expanded blade of the bone: it is convex externally from front to back, with the convexity produced upward and forward on the antero-inferior border of the bone, decreasing in amount as it extends forward. Within the acetabulum, internal to this superior ovate acetabular surface, and separated from it by a slight groove, is an oblique area towards the back of the acetabulum, which extends obliquely downward and inward, and may be a part of the pubic bone; its anterior edge is rounded.

Behind this convex external acetabular surface of the ilium is its flattened compressed ischiac process, extending backward and slightly downward for $\frac{1}{2}$ inch, fully $\frac{1}{4}$ inch deep, and terminating apparently in a nearly square truncated posterior articular surface for the ischium, which is slightly displaced downward. The inferior surface of this ischiac process of the ilium is not articular, though it formed part of the acetabulum.

Only a small portion of the ischium is exposed: it extends behind the ilium as in other Theriodonts. Its anterior articular part is expanded to a large surface which forms the posterior portion of the acetabulum, margined externally by a sharp edge, extending convexly from above downward, measuring $\frac{5}{8}$ inch as it is partly exposed. The thickness of its superior surface for cartilaginous union with the other pelvic bones appears to be $\frac{5}{8}$ inch; whence it may be inferred that the bone is in contact with the pubis. The state of preservation of the specimen affords no evidence as to whether the acetabulum was perforate or imperforate; but if perforate, the perforation must have been small, as in *Cynognathus*.

Behind the articular surfaces of the ischium the bone is compressed to a sharp superior external edge, and is preserved for only $1\frac{5}{8}$ inches of its length. The superior border is gently concave, and the inferior external surface is deeply concave behind the articulation, and is then flattened. So far as preserved, this condition of the ischium is essentially similar to that in *Cynognathus*, and unlike any other animal, though with some approximation to *Microgomphodon*.

The Hind-Limb.

The femur lies with its head just below the pelvic acetabulum, exposing the flattened superior or anterior surface. The bone is 4 inches long, more than 2 inches wide over the proximal end, with the shaft constricted to less than $\frac{1}{2}$ inch in width below the middle of its length, and then widening distally to about 1 inch at the distal articulation. The expanded proximal end is flattened or slightly concave from *post-mortem* pressure, with the superior thin proximal edge convex from within outward as in *Cynognathus*, and to a less degree in *Tribolodon*. But, unlike both these Cynodont genera, the genus now described has no upward reflexion of the trochanter major at the external margin, which is simply the flattened outer extension of the bone; a condition to which the Russian Deuterosauria and German Protorosauria approximate, though in the latter type of Theriodontia the transverse expansion of the head of the femur is small, and the proximal contour is not transversely convex.

The proximal articulation in this genus is well rounded on the inner side of the head, where it is elevated to a distinct convexity on the margin of the inner lateral aspect, as though the bone were carried by the animal more or less horizontally. The proximal edge of the bone on its terminal surface appears to have been slightly convex from side to side, and it recedes from the articular head as it extends outward. The length of the bone on the external side is only 3 inches. The external lateral contour of the femur is necessarily concave. The inner lateral contour is not completely exposed, so that the width of the distal end of the bone cannot be given exactly. It has been crushed, and although $\frac{3}{8}$ inch thick as preserved, it may have been a little thicker. The distal articulation as preserved is not well rounded, and appears to be less rounded than in some of the smaller types like *Herpetocheirus* and *Tribolodon*, but not more than half of the condylar surface is exposed: this has a vertical border on the external margin, rounded at the angles.

The tibia and fibula are in near contact with the distal end of the femur. The tibia only shows $1\frac{1}{2}$ inches of its proximal end; and this is obscured by fracture, which has left enough of the bone-tissue to mask the external form and character in the relief-cast of the bone. As exposed, the truncated proximal end of the tibia is $\frac{3}{4}$ inch wide, and apparently but little wider than the fibula, which appears to articulate with its proximal end by a small surface on the inner side, where the two bones are in contact.

The fibula as exposed is $3\frac{3}{8}$ inches long, but the distal end is partly covered with matrix, so that, although its entire length appears to be shown, it may have been a little longer. The proximal end appears to be convex, and is obliquely truncated like the proximal end of the ulna of a crocodile. It is $\frac{3}{4}$ inch wide, and defined by a sharp edge at the articular margin. The internal longitudinal contour of the bone is concave, and the external border nearly straight to the lower third of its length, where the shaft

appears to curve in a straight bow, and bend a little backward. The external surface of the shaft is flattened proximally, and marked with faint longitudinal lines; the narrow middle part, scarcely more than ¼ inch wide, is well rounded, with an appearance of a small longitudinal muscular attachment, below which the bone is flattened towards the distal end, which appears to be thinner than the proximal end, and twisted a little backward. It may be compared with the fibula of *Tribolodon*.

There is no trace of any bone of the tarsus or hind-foot, nor is there any trace of armour.

These remains indicate an animal about 2 feet long, exclusive of the tail, standing probably about 8 inches high, not more than 6 inches wide in the fore part of the body, or more than 4 inches wide in the pelvic region. It must have been an animal of great mobility, capable of easily bending the body; and by straightening the limbs, of occasionally raising its height to 10 inches or more.

Notwithstanding the imperfection of the skull, it may be regarded, from the structure of the head, pelvis, and femur, as a new type of Theriodont reptile, as contributing important facts to the osteology of the group, more especially in regard to the natural association of the bones.

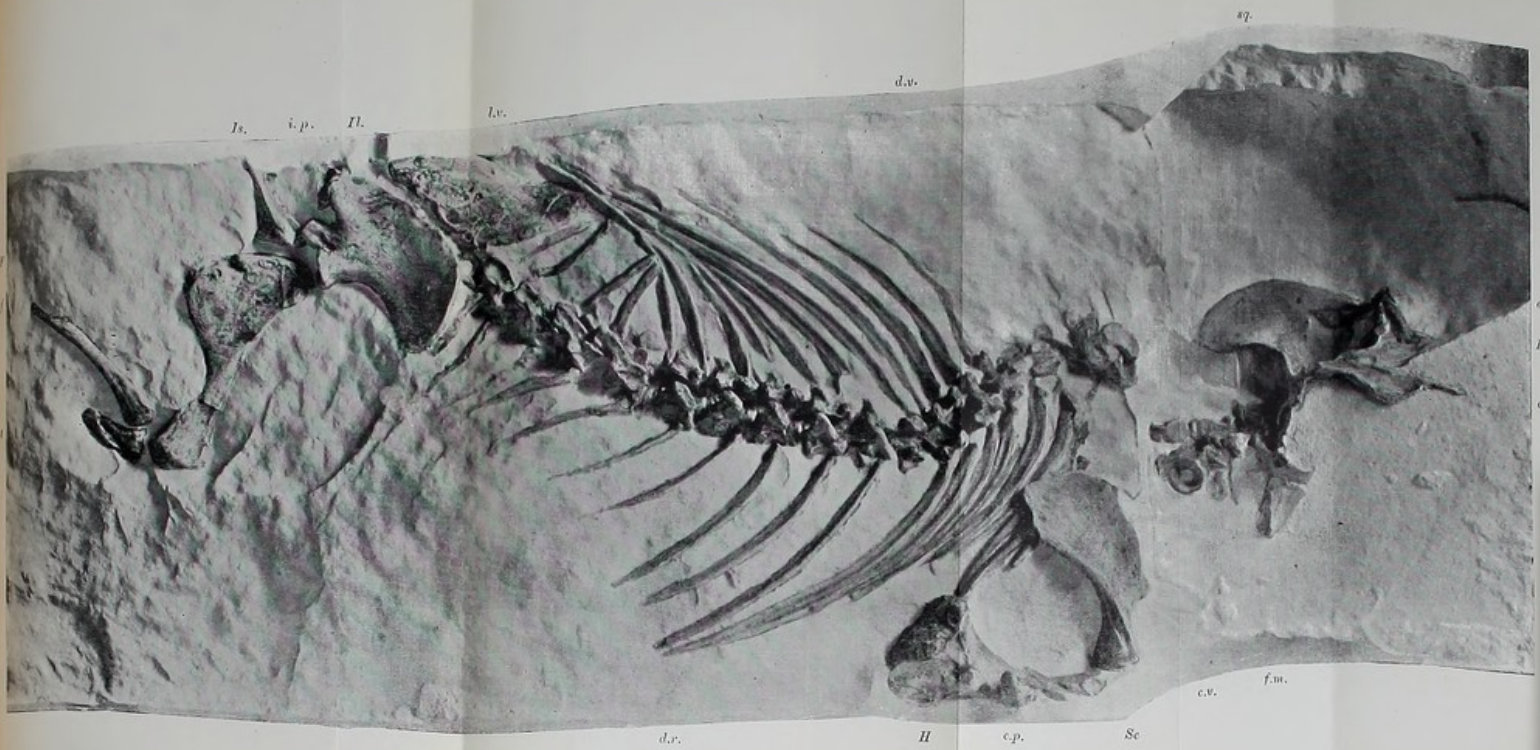
It is possibly to be included in the Cynodontia, from which it differs in characters of the ilium, scapula, and skull, which may be more than generic differences; but I have some slight ground, from fragments picked up on the drift-trail, for suspecting that in *Cynognathus* the tibia and fibula are less unequal in size than they are known to be in *Microgomphodon* and in *Eurycarpus* (which is possibly Lycosaurian). The determination of the exact systematic position of the genus within the Theriodontia, depends upon such evidence as may be obtainable from the missing slab already mentioned, which is reputed to contain the remainder of the skull.

I am indebted to the Government Grant Committee of the Royal Society, 1889, for the opportunity of examining this specimen in Grahamstown; and to the Trustees and Officers of the Albany Museum and the British Museum (Natural History) for facilities in making this record of its structures.

EXPLANATION OF PLATE XXXVI.

Photographic reproduction of the cast of a skeleton of *Dicranozygoma leptoscelus*, gen. et sp. nov. ½ nat. size.

o = Orbits.
p = Parietal foramen.
f.m = Foramen magnum.
sq = Squamosal bone.
c.v = Displaced cervical vertebræ.
d.v, d.r = Dorsal vertebræ and ribs.
l.v = Lumbar vertebræ and ribs.
Il = Iliac bones.
i.p = Ischiac process of ilium.
Is = Ischium.
F = Femur.
f = Fibula.
t = Tibia.
Sc = Scapula.
H = Humerus.
c.p = Claw-phalange.



CAST OF *Dicranozygoma leptoscelus*, gen. et sp. nov. ½ nat. size.