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On some REPTILIAN FOSSILS *from* SOUTH AFRICA.

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(PLATES I. II. III.)

Genus DICYNODON: Subgenus PTYCHOGNATHUS*, Ow.

THIS subgenus is founded on four skulls, forming part of the collection transmitted to the British Museum in 1858, by His Excellency Governor Sir George Grey, K.C.B., from the sandstone rocks at the foot of the Rhenosterberg, S. Africa. These skulls belong, by their dentition, to the Dicynodont family, but present such strongly marked deviations from the type species of the genus (*Dicynodon lacerticeps*, Ow.) as to indicate a distinct subgeneric section; they were accordingly entered in the Museum list, and labelled in the cabinet where they are exposed to view, under the term *Ptychognathus*.

Dicynodon (*Ptychognathus*) *declivis*, Ow. (Plate I. figs. 3, 4, 5.)

In this species, assuming the horizontality of the upper (fronto-parietal) plane of the cranium (Pl. I. fig. 3 11) as giving the natural position of the skull, the broad plane of the occiput meets the fronto-parietal plane at an acute angle, rising from the condyle upwards and backwards—a direction not hitherto observed in any reptile, and similar to that presented by the occiput in relation to the vertex in the feline and many other gyrencephalous mammals.

The fronto-parietal plane (ib. fig. 5) is bounded by an anterior ridge, 14, 15, extending from one superorbital process to the other, with a gentle convexity forward, including the interorbital space. From this ridge the facial part of the skull (fig. 3 15, 22) descends in a straight line in a direction nearly parallel with that of the occiput, but slightly diverging from that parallel as it extends downward and forward. The occipital ridge (fig. 4 7, 8) is much produced, and is deeply notched at the middle, the sides of the notch being continued forward and gradually subsiding on the parietal plane as they curve outward to the postfrontals (fig. 5). In the middle of the fronto-parietal surface is a transverse pair of tubercles. The occipital plane, owing to the outward expansion of the masto-tympanic plates (fig. 4 8, 28), becomes the broadest part of the skull, which quickly contracts forward to the ridged beginnings of the alveoli of the canine tusks (fig. 5 21).

* From πτὺξ (gen. πτυχὸς), a fold, and γνάθος, a jaw.

The zygomatic arch is a deep compressed plate of bone, with a convex upper border inclining a little outward, formed chiefly by the mastoids, which join the squamosal and malar near the lower and back part of the orbit,—the squamosal there being wedged between the mastoid and malar, forming the infero-anterior boundary of the temporal fossa. Between the zygomatic and tympanic plates a wide and deep oblique channel is included, which expands as it extends obliquely downward and forward.

The prefrontals, as in *Pt. declivis*, develope the superorbital tuberosities and the outer part of the ridge dividing the upper from the fore part of the cranium. The postfrontals form the hinder boundary of the orbits. The frontals contribute a small part to the upper boundary. The lacrymal forms the infero-anterior boundary, and extends a short way upon the face. A bone below the nostril appears in the present skull to be marked out by a fissure on each side from the maxillary; it may be a dismemberment of the lacrymal. The nasals are a pair of broad bones, each of a rhomboidal shape; they form the middle part of the anterior cranial ridge, behind which they unite with the frontals and prefrontals: their lower and front borders diverge to receive the upper part of the long premaxillary, and to form the upper boundary of the nostrils. Each nasal, in advance of the precranial ridge, presents two facets, the outer one bending down to join the facial part of the prefrontal.

The superior maxillary presents a deep facial plate, proportionally deeper behind than in *Pt. declivis*: its postero-inferior part is produced into a slender pointed process, underlapping and on the inner side of the malar, below the orbit: in advance of this, the bone rapidly expands, a ridge dividing the outer from the under part of the bone: this is not continued directly into the alveolar ridge, the latter beginning to rise a little above the termination of the former ridge. Below this termination and the beginning of the alveolar ridge, the maxillary sends down an inequilateral triangular plate to join the palato-pterygoid boundary of the palatal nostril. Above this plate the maxillary expands to form the socket of the canine tusk, which is strengthened by the strong ridge on its outer part. The upper part of the maxillary forms the lower half, or more, of the side of the face, and terminates anteriorly above the alveolus, by forming a small part of the alveolar border. This border, anterior to the tusk, is continued obliquely upward and forward to the middle of the premaxillary bone—a peculiarity of contour which demands a corresponding production of the fore part of the mandible to close the mouth.

The premaxillary is a long single bone; if it were ever divided at the middle line, the suture has been obliterated: the bone has all the appearance of having been single, as in Birds and most Lizards. It is of unusual length: beginning above by the pointed termination wedged between the nasals, it expands to the fore part of the nostrils, the sides of the bone there beginning to bend down at an open angle (nearly approaching a right one) with the upper surface; this surface maintains almost the same breadth to the alveolar border: it is

traversed along its middle by a low ridge: the sides of the premaxillary, in the present species, increase a little in depth as they approach the alveolar border. This border, in front of the canine, forms an open angle with the part of the border behind the canine, the one passing into the other with a convex curve on the inner side of the socket of that tooth.

The rami of the lower jaw augment in depth from the angle to the symphysis, where they meet at an acute angle and are confluent. The angle projects a very little way beyond the articulation; it is continued inward a short way, and is slightly bent down. The articular surface is moderately concave, and looks obliquely upward and backward. The elements of the posterior half of the ramus, answering to the articular, angular, and surangular in lizards, are too closely compacted together in the specimens under examination to permit an exact definition of their limits. A thin vertical "splenial" plate, on the inner side of the ramus, begins about an inch in advance of the angle, and extends forward to the symphysis, at the back part of which it appears to become confluent with its fellow. The part answering to the "angular" diverges from the surangular, and forms the hind boundary of an oblong vacuity at the middle of the side of the ramus, the fore part of which vacuity is formed by a bifurcation of the dentary element: the fore part of the angular piece is continued forward between the lower branch of the dentary and the splenial to the symphysis, where it penetrates a fissure either in the dentary or between the dentary and splenial: it forms the lower boundary of the vacuity at the middle of the ramus. The upper boundary is formed by the upper branch of the dentary, which overlaps the fore part of the surangular. The dentary is thickened and strengthened by a ridge or rounded rising, continued forward from the upper boundary of the fissure, and subsiding at the vertical channel upon the side of the symphysis, receiving the tusks when the mouth is closed. The symphysis of the mandible (fig. 3 32) in both species of *Ptychognathus* is peculiarly massive—broad, high, and thick. Anteriorly it is convex in every direction; it is bent or produced upward, terminating in a broad, convex, subtrenchant or trenchant margin, and resembles the fore part of the lower mandible of a Maccaw. The upward development of the fore end of the lower jaw is necessitated by the oblique truncation of the premaxillary,—the mouth here opening obliquely upward, as in some Fishes, giving a very odd physiognomy to the skull of *Ptychognathus*.

The modification of the back part of the head of *Ptychognathus*, especially the great expansion due exclusively to the development of ridges for augmenting the surface of attachment of muscles (for the brain of the cold-blooded reptile would need but a small spot of the centre of the occipital plates for its protection), indicates the power that was brought to bear upon the head as the framework in which were strongly fixed the two large tusks. The power of resistance of the cavities receiving the deeply implanted bases of the tusks was increased by the ridges developed from the outer part of their bony wall.

Ptychognathus verticalis, Ow. (Pl. I fig. 2.)

The skull upon which this species is founded is about half the size of the foregoing, from which it differs in the more vertical position both of the occiput, the canines and their sockets, and the premaxillary part of the skull.

The orbits, relatively larger than in the foregoing species (which may be, however, an immature character), are oval in form, as in *Pt. declivis*; but the long axis is in the opposite direction, viz. from above downward and backward.

The hind boundary of the orbit, formed by the postfrontal, curves forward at its lower part to join the malar, leaving an entering angle between it and the zygomatic part of the malar. The composition of the cranium and lower jaw accords with that of the preceding species. In the relative breadth of the almost flat interorbital platform, the abrupt down-bending of the face, the small size of the nostrils, the ridged canine sockets, and the general angularity of the profile of the skull, the present species repeats the subgeneric characters of the two foregoing kinds of *Ptychognathus*; and they are well-marked in comparison with those species of *Dicynodon* proper (viz. *D. testudiceps* and *D. strigiceps*) which most resemble the *Ptychognathus verticalis* in the relative position and direction of the tusks. A vertical transverse section taken across the base of these tusks shows their wide pulp-cavity at that part; the thin inner wall of their alveoli encroaching upon the nasal cavity; the thin septum narium bifurcating below; the absence of all trace of successional teeth where in such sections their germ is commonly seen in other Saurians; and the great thickness of the undivided facial part of the premaxillary, forming the roof of the nasal passages. The bony palate is entire from the premaxillary border to a little beyond the sockets of the tusks: it presents the pair of short anterior ridges and the longer and more prominent median ridge behind these, answering to those in the palate of *Dicynodon testudiceps*.

Genus Oudenodon*, Bain.

Mr. Andrew G. Bain, the discoverer of the bidental Reptiles of South Africa, in a letter published in 'The Eastern Province Monthly Magazine' (p. 10), Graham's Town, September 1856, thus notices another form of fossil Reptile occurring in formations of the same age, near Fort Beaufort:—"There were many skulls entirely without teeth, which we at first thought had belonged to the Chelonians or Turtles; but afterwards, finding that the animals had distinct narrow ribs, which Chelonians have not, we put them down also for something new, and named them 'Oudenodons,' or toothless animals."

Of this genus, Mr. Bain's collection, now transferred to the British Museum, contains cranial evidences of two distinct species; and a third species is represented by an entire but somewhat crushed cranium and lower jaw, in the collection transmitted in 1858 to the British Museum by Governor Sir George Grey, G.C.B.

* From *οὐδείς*, none, and *ὀδούς*, a tooth.

Oudenodon Bainii, Ow. (Pl. I. fig. 1.)

In this species the back part of the skull, greatly extended in breadth by the expanse of the lamelliform sinuous masto-tympanics, inclines from above the occipital condyle upward and forward, the superoccipital being continued into the parietal by a longitudinal channel between the occipito-temporal cristæ, where the back part passes into the upper part of the cranium.

The temporal fossæ are longer than they are broad, and are relatively much longer and narrower than in the *Ptychognathus*; in this respect *Oudenodon* more resembles *Dicynodon*: a relatively wider space is left between the temporal ridges at the upper or parietal region of the cranium. The zygoma is a long, rather slender, compressed bar, with its upper border directly obliquely upward and outward, its inner side obliquely upward and inward. The postfrontal bar dividing the temporal fossa from the orbit is directed from within outward, backward and slightly downward. The interorbital space is narrower than the intertemporal one, so that the lower border of the orbit has a more outward position than the upper one, and the aspect of the orbits is very oblique, rather more upward than outward. The profile of the face descends by a regular curve from the upper to the fore part, which is nearly vertical,—the premaxillary being continued more nearly to the level of the alveolar border of the maxillary than in *Ptychognathus*. There is a low tubercle upon the prefrontal part of the orbital border; and a somewhat larger tubercle projects above the nostril. This cavity is relatively larger than in *Ptychognathus declivis*; and both premaxillary and maxillary are more deeply notched to form its fore and under boundary: the nasal, prefrontal, and lacrymal complete that boundary. Below the middle of the orbit a thick, smoothly rounded, vertical ridge projects from the maxillary, in the position of the alveolus of the tusk in *Pt. verticalis*; but it rather suddenly subsides upon the alveolar border, which is here entire and imperforate, forming simply a low obtuse angular projection upon that border. Sections of fragments of *Oudenodon* have demonstrated this ridged part of the maxillary to be solid, without the vestige of a germ of a tooth answering to the tusk in Dicynodonts. The rest of the alveolar border, chiefly formed by the premaxillary, is toothless and subtrenchant, as in the Dicynodont reptiles; and, the lower jaw presenting the same structure, we have in the present remarkable reptile an edentulous Saurian, as is the *Rhynchosaurus* of the New Red Sandstone of Shropshire.

The composition of the skull is essentially the same in *Oudenodon* as in *Dicynodon*; and the same affinities may be predicated of it, with such additional approach to Chelonia as the total absence of teeth may indicate. But the double nostril and well-ossified occiput demonstrate the more essential Saurian affinities of the genus.

Oudenodon prognathus, Ow.

As the former species of *Oudenodon* resembled the typical *Dicynodon* in the shortness of the face and curvature of its contour, so the

present species resembles the *Ptychognathus* in the length of the face, and more especially the *Pt. declivis* and *Pt. latirostris* in its direction and in the relative position of the ridge representing the canine's socket to the nostril. In *Oudenodon Bainii* this ridge is behind the nostril; in the present species it is beneath it, and is more horizontal than vertical.

The orbits have the same oblique aspect, upward and outward, as in *Oud. Bainii*, but their longitudinal exceeds their vertical diameter; the nostrils have a similar longitudinally oval shape, and are more directly in advance of the orbit; the supernarial tuberosity is relatively larger. The maxillary ridge is more angular and more produced, besides being continued more obliquely forward. The correspondingly produced and sloping part of the premaxillary is nearly straight, and is strengthened, as in *Ptychognathus*, by a low median obtuse ridge. The maxillary ridge subsides below, to the edentulous alveolar border, rather more gradually than in *Oudenodon Bainii*, its outer longitudinal contour forming a gentle convex curve; these ridges give a very peculiar feature to the present skull. The fore part of the premaxillary does not descend so nearly to the level of the maxillary alveolar process as in the *Oudenodon Bainii*, and consequently the symphysis of the mandible is more produced and curved upward, which is another feature of resemblance to *Ptychognathus* in the present skull,—the depth of the symphysis here exceeding the same diameter of the opposed fore part of the upper jaw. The symphysis is narrower in proportion to its length than in *Ptychognathus*; its fore part is slightly produced along the middle line, resembling a low ridge. The vacuity between the dentary and angular elements is long and narrow; it is overarched by a slight ridge.

Oudenodon Greyii, Ow.

A third species of *Oudenodon*, with maxillary ridges as in *O. prognathus*, has a less elongated cranium and temporal fossæ, more rounded orbits, and a narrower interorbital space. It forms part of the collection transmitted by Sir George Grey, to whom the species which it indicates is dedicated.

Hyoid apparatus of Oudenodon. (Pl. III. fig. 5.)

In an obliquely crushed specimen of the skull with the lower jaw of the *Oudenodon Greyii* there are several bones, constituting a symmetrical apparatus in the position of the hyoid, beneath and between the rami of the lower jaw, where they are evidently in advance and rather to one side of their proper position. The hindmost, on the middle line (fig. 5 43), is best preserved. It is broad, flat, and very thin, of a symmetrical semicircular form, with a production like a stem from the middle of the straight side, which is directed forward. This stem is partly underlapped by the median end of a pair of long, narrow, flattened bones (ib. 45), which procced transversely outward, slightly expanding to that end. Their anterior border is straight, the posterior border is slightly concave.

To the outer end of each of these bones seems to have been connected or articulated a long slender bone (ib. 46), with a slight sigmoid curve, directed backward. The following appear to be the homologies of the foregoing bones. The median and most posterior of them is the uro-hyal, no. 43. The transverse pair answer to the hindmost pair, *a a*, in the hyoid of the Tortoise, figured by Cuvier* in the 'Ossemens Fossiles,' 4to, tom. v. pt. ii. pl. 12. fig. 42 (my "basibranchial," no. 45). The longitudinal pair appended to them answer to *c c* in the same figure (my "hypobranchials," no. 46†).

In advance of the left basibranchial is a flattened broad lamelliform bone with the fore and hind borders convex, the outer and inner ones concave; but the median or inner border of this plate is not entire. The bone in question may be either a median symmetrical piece, like the uro-hyal, but displaced; or it may be the left of a pair of plates, answering in that case to the middle pair, *a a*, in the above-cited figure of the hyoid of the tortoise. I incline to the latter opinion, and believe it to be the half of a basi-hyal, no. 41, divided in the median line.

To the outer concavity of this bone has been attached the end of a long and strong bone, flattened and gradually expanded at both ends; it is directed outward and backward. It is a large and strong cerato-hyal, no. 40, and is double the length of the hypobranchial or posterior "cornu."

The lower jaw in the skull, showing the above-described hyoid apparatus, is $4\frac{1}{2}$ inches long. The length of the cerato-hyal is $3\frac{1}{2}$ inches: that of the hypobranchial is $2\frac{1}{4}$ inches. The length of the uro-hyal, 4, is 1 inch; its breadth is nearly the same.

At the fore part of this lower jaw the intercalation of the fore end of the angular element (31) between the splenial (32) and dentary (33) is well shown.

In the Crocodilians there is a broad cartilaginous basi-hyal suspended by a pair of strong bony cerato-hyals; but there are no distinct thyro-hyals (hypobranchials), nor any uro-hyals.

In Lacertians there are both cerato- and thyro-hyals; and in some genera of Iguanians and Lizards proper (*Lacerta*, Cuv.) there is a long and slender bifurcated uro-hyal or pair of uro-hyals. The thyro-hyals are not supported on distinct bones, answering to the basibranchials, 45.

In Chelonians the uro-hyal is wanting; but in some species (*Testudo elephantopus*) the thyro-hyals or hypobranchials are articulated to a pair of bones answering to the basibranchials in Fishes, which diverge from each other to form those articulations.

In *Oudenodon*, and probably also in *Dicynodon*, the type of the hyoid apparatus conforms most with that in the *Chelonia*, but combines therewith certain Lacertian characters.

In the composition and general form of the skull *Oudenodon* so closely resembles *Dicynodon* and *Ptychognathus* as to indicate a general family relationship. Viewing, indeed, the ridged indication

* Archetype of the Vertebrate Skeleton, 8vo, p. 68. † Ib. p. 71.

of the sockets of the pair of upper canines in *Oudenodon* (Pl. I. fig. 1 21), the surmise is suggested whether the species of this genus may not originally have possessed tusks, which after being shed had not been replaced, leaving the cavity of the sockets to absorption and obliteration. Or it might be asked whether the Oudenodons may not be the females of Dicynodons, in which, as in the Narwhal, rudimental tusks may have been originally hidden in the substance of the ridged tracts of the upper jaw, and afterwards absorbed. Hitherto, however, I have not met with species of *Dicynodon* or *Ptychognathus* sufficiently resembling any *Oudenodon* in cranial characters to support their ascription to the same species with merely the sexual difference in respect to tusks.

The following are admeasurements of some of the skulls of the Dicynodont Reptiles above described:—

	Oudenodon				*Ptychognathus*			
	Bainii.		*progna-thus.*		*Greyi.*		*declivis.*		*latiros-tris.*		*verti-calis.*	
	in.	lin.	in.	lin.	in.	lin.	in.	lin.	in.	lin.	in.	lin.
Length of skull	6	5	.....		.....		8	0	8	6	5	0
Breadth of occiput	5	6	.....		.....		6	4	6	8	3	6
——— intertemporal space	1	2	1	2	0	10	1	2	1	7	0	11
——— interorbital space	0	11	1	1	0	9	2	8	3	0	1	10
——— between the superorbital protuberances	1	6	1	10	1	3	3	6	4	0	2	6
——— skull anterior to the orbits	2	8	2	10	.....		3	10	3	6	2	8
——— across middle of alveoli of tusks	.....		.....		.....		2	8	3	4	2	3
——— internasal space	0	9	0	9	0	8	1	3	1	7	0	10
——— each temporal fossa	1	4	.....		.....		2	6	2	6	1	9
Length of each temporal fossa	2	6	.....		.....		2	3	2	3	1	9
From hindmost part of skull to the orbit	3	10	.....		.....		2	4	2	7	2	3
——— forepart of orbit to the forepart of premaxillary	2	3	2	8	2	4	3	9	4	0	2	3
Long diameter of orbit	1	8	1	9	.....		2	2	1	7	1	6
——— nostril	0	11	0	8	.....		0	11	0	8	0	6
Greatest breadth of bony palate	1	6	.....		.....		1	5	1	8	0	0

Genus Galesaurus, Ow.*

Galesaurus planiceps, Ow. (Pl. II.)

The shape of the skull on which the above genus and species are founded is that of a narrow spade on playing-cards, the occipital condyle forming the handle: it measures 3½ inches in length and 2 inches 9 lines in extreme breadth across the zygomatic arches; but its greatest depth, including the lower jaw, does not exceed an inch; and this diameter varies very little, the upper surface of the skull being unusually flat and level.

* From γαλῆ, a weasel, and σαῦρος, a lizard.

The occipital plane is singularly inclined from below upward and forward, and that of the occipital foramen (fig. 3 *f*) partakes of the same inclination, the condyle (figs. 2 & 3 *g*) being much produced behind and beyond the upper border of the foramen. The shape of the occipital surface, which is completely or continuously ossified, is triangular, bounded laterally by a pair of strongly developed sharp ridges, converging upward and forming the boundary between the occipital (2, 3) and temporal (*t*) fossæ. The occipital surface may be called a "fossa" from its concavity; but the surface is undulated by a median and two lateral slight convexities along lines radiating from the foramen magnum.

The parietal crest (fig. 3 7), advancing from the angular summit of the occipital ridge, bifurcates to surround an elliptical "foramen parietale;" and the divisions thence gradually diverge to the post-frontal (12). The tympanic (28) is a broad deep plate of bone, convex outwardly; it extends outward and forward from the lower part of the occipital ridge, formed by the mastoid (8) and paroccipital (4).

The zygomatic arch is continued forward from the tympanic (fig. 1 28), a little decreasing in depth, to the postorbital boundary (26). The temporal fossa (fig. 3 *t*) is very wide, and is of a rhomboidal figure, the antero-lateral boundary being parallel with the occipital ridge, and the postero-lateral boundary being parallel with the internal or cranial boundary. The long diameter of the fossa is 1 inch 3 lines; its short diameter is 1 inch; from the front to the hind angle the fossa measures 1 inch 6 lines; the breadth of the cranium between the fossæ is 6 lines.

The orbits are of a subtriangular form, with the corners rounded off: their aspect is more upward than outward: their long diameter is 6 lines: the breadth of the upper interorbital space is 9 lines. The suture between the frontals and nasals is parallel with the fore part of the orbits. The post- (12) and pre- (14) frontals unite above the orbit, and contribute a narrow tract to each side of the interorbital space: this space is flat. The nasals are flat: the rounded angles by which the upper surface passes into the vertical side-surface of the facial part of the skull are formed by the maxillaries. The nostril (figs. 1 & 2 *n*), is single, terminal, and vertical; it is bounded laterally by short premaxillaries.

The most interesting peculiarity in the skull is the well-marked definition from the other teeth, by a contrasted superiority of size, of an upper and lower canine tooth on each side, having the same position in the skull and relative position to each other as in the carnivorous mammals. In no other Saurian are incisors so divided from molars by a single canine; in none is such definition of the three kinds of teeth so plain and unequivocal.

The premaxillaries contain each four equal-sized teeth with simple conical crowns, 2 lines in length, sloping a little forward from the vertical position, and passing in front of the lower incisors when the mouth is shut. The eight lower incisors are narrower, but have about the same length of crown. Both upper and lower incisors are arranged in contact, or close order, as in Mammals.

The lower canine (figs. 1 & 2 *c'*) is subcompressed, very slightly recurved, 9 lines in length, 2 lines in breadth. The projecting crown is $5\frac{1}{2}$ lines long; the implanted base is $3\frac{1}{2}$ lines long: this extends very close to the lower margin of the mandible and becomes a little contracted there, but shows a short conical pulp-cavity, without any trace of the germ of a successor. It closely resembles the completely formed canine of a mammalian carnivore, in shape, structure, implantation, and direction.

The upper canine (ib. *c*) is larger; two-thirds of the tooth are preserved on the right side (fig. 2); the inner wall of the socket is shown on the left side (fig. 1 *c*). In shape this tooth resembles the lower canine: its greatest breadth is nearly 3 lines, its length seems not to have been less than 11 lines: it crossed the lower canines obliquely, its socket being more backward and outward in position; and while the points of the lower canines a little diverged from each other, those of the upper ones slightly converged. The socket of the upper canine extends close to the upper surface of the skull, and even causes a slight prominence on that part of the maxillary, close to its suture with the nasal. The depth of the implanted part of the upper canine is 7 lines. There is no trace of a recess for a successional tooth at the base of the inner wall of the socket (*c*, fig. 1).

Twelve close-set, conical, subcompressed teeth succeed the lower canine, their protruded crowns becoming shorter, and their implanted bases longer, as they recede in position. A thin layer of bone immediately surrounding the simple base of each molar tooth has a brick-red colour, as if retaining a stain from the hematosine of the vascular alveolar lining membrane; the exposed socket of the upper canine presents the same colour; the other parts of the fossil bone are grey.

The upper molars passed external to the lower ones when the mouth was shut. The "symphysis mandibulæ" is very short. The rami diverge from the linear trace of junction, at an acute angle, straight to the articular end. The length of each ramus from the lower and back part of the symphysis is 2 inches 8 lines. The receding "mentum" is 6 lines long: the depth of the ramus below the first molar is $4\frac{1}{2}$ lines; it gradually increases to 6 lines below the last molar.

There is a series of small vascular foramina above the alveolar border of the upper jaw; and indications of the same saurian character are discernible in parts of the lower jaw.

The reptilian nature of the above-described skull is shown by its single occipital condyle, and by the complex "frontal bone"; its crocodilian affinities by its terminal single nostril. The more generalized saurian character is exemplified by the large temporal fossæ and the "foramen parietale"; whilst a most singular and suggestive approach to the mammalian class is made in the above-described characters of the dentition.

The predominance of the canines, their seeming want of successors—the certain absence, at least, of such evidence as would have appeared had the canines been subject to the ordinary law of saurian dentition—point to at least an analogical relationship with the Dicynodonts;

the structure of the occipital region of the skull also conforms to the type of those singular South African reptiles. The breadth and flatness of the skull and the proportions of the orbits and temporal fossæ recall the proportions of *Simosaurus* amongst the peculiar saurians of the triassic deposits of Germany.

The original (from the Rhenosterberg) was transmitted to the British Museum by Governor Sir George Grey, K.C.B.

Genus Cynochampsa*, Ow.

Cynochampsa laniarius, Ow. (Pl. III. figs. 1–4.)

This genus and species are indicated by the extremity of the upper and lower jaws (figured in Pl. III. figs. 1-4), from the same locality as *Galesaurus*, and forming part of the same collection transmitted by Governor Sir George Grey, K.C.B. Sufficient of the jaw is preserved to show that it must have terminated in a more or less produced narrow muzzle, which, including the under jaw, would present a subcylindrical transverse section, as in the Gavial and Teleosaur: but a close-set series of small and similarly sized incisor teeth are separated from the rest of the dentition by a pair of upper and a pair of lower canines, as well contrasted by their superiority of size as in *Galesaurus*. Instead, however, of these canines being immediately followed by small molar teeth, there was a toothless space extending at least as far as the upper jaw has been preserved on the fossil under description; and this space equals at least twice the breadth of the crown of the upper canine.

The upper incisors are ten in number (five in each premaxillary bone), conical, with a subcylindrical base. The lower incisors, of similar size and shape, appear to have been eight in number. Both upper incisors and canines overlapped those teeth in the lower jaw when the mouth was shut. The crowns of the upper canines and the implanted roots of the lower ones have been broken across, exposing the pulp-cavity, as is shown in looking upon the fossil from below, as in fig. 4 *c*, *c'*; and the lower canines are a little in advance of the upper ones. The relative positions of the incisors and canines were nearly the same as in *Galecynus*; the crowns of the lower canines were perhaps more completely concealed when the mouth was shut. The nostril is single, terminal, of a transversely oval shape, with the plane of its outlet inclined from above downward and forward. The aperture is bounded by the premaxillaries (fig. 3 22) below and at the sides, and by the nasals (ib. 15) above. The extremity of the upper jaw, pierced by the nostril, is slightly expanded, as in the Teleosaur, but in a less degree than in the Gavial.

In a collection of fossil remains from the Drakenberg Mountain, near Harrismith, Cape of Good Hope, transmitted in 1854 by Joseph Millard Orpen, Esq., Government-Surveyor of that Colony, and described in the 'Catalogue of the Fossil Organic Remains of Reptilia

* From *κύων*, a dog; and *χάμψαι*, the Egyptian name for the crocodile, applied by Wagner to the Indian Gavial.

and Pisces' in the Museum of the Royal College of Surgeons, 4to, 1854, pp. 97–106, there is a specimen, consisting of a portion, 2½ inches in length, of a symmetrical pair of bones, each of a subtrihedral form, and joined together by the flattest of their sides. The description which I then gave of this fossil is as follows:—"Each bone increases in vertical, and decreases, but in a less degree, in transverse extent, the bones becoming more closely and extensively united together as they extend forward. Posteriorly, each bone is grooved near the middle of its inner flattened side, the grooves, when coadapted, forming a canal answering to that in a similar position on the elongated symphysial part of the lower jaw of the Gavial. At the opposite end of the fragment this canal is reduced to a fissure. The groove which divides the two bones, both above and below, at the back part of the fragment, contracts to a linear fissure as the bones advance and become more united together. The result of an extensive series of comparisons is, that the symmetrical bones in this remarkable fossil most resemble in shape the coadapted elongated dentary elements of the lower jaw of the Gavial and Teleosaurus: but they show no traces of alveoli, and, if they be parts of those bones, indicate a reptile either edentulous or with the teeth confined to the anterior extremity of the jaw" (p. 106).

The subsequent discovery of the fore end of the jaw of the Gavial-like reptile *Cynochampsa* adds to the probability of the above conjecture.

Vertebræ of Saurians from the same deposits of the Drakenberg afforded characters of the genera *Massospondylus*, *Pachyspondylus*, and *Leptospondylus*, which characters are given in detail in the volume above cited, and were further illustrated by figures and diagrams in my Lectures on Fossil Reptilia, delivered at the Museum of Practical Geology in 1858.

EXPLANATION OF PLATES I. II. & III.

Illustrative of Reptilian Remains from South Africa.

PLATE I.

Fig. 1. Side view of the skull of *Oudenodon Bainii*, one-half nat. size. [In the British Museum.]
Fig. 2. Side view of the skull of *Ptychognathus verticalis*, one-half nat. size. [In the British Museum.]
Fig. 3. Side view of the skull of *Ptychognathus declivis*, one-half nat. size.
Fig. 4. Back view of the skull of *Pt. declivis*, one-third nat. size.
Fig. 5. Top view of the cranium of *Pt. declivis*, one-third nat. size. [In the British Museum. Some distorted and dislocated parts have been restored in the figures; the letters and figures are explained in the text.]

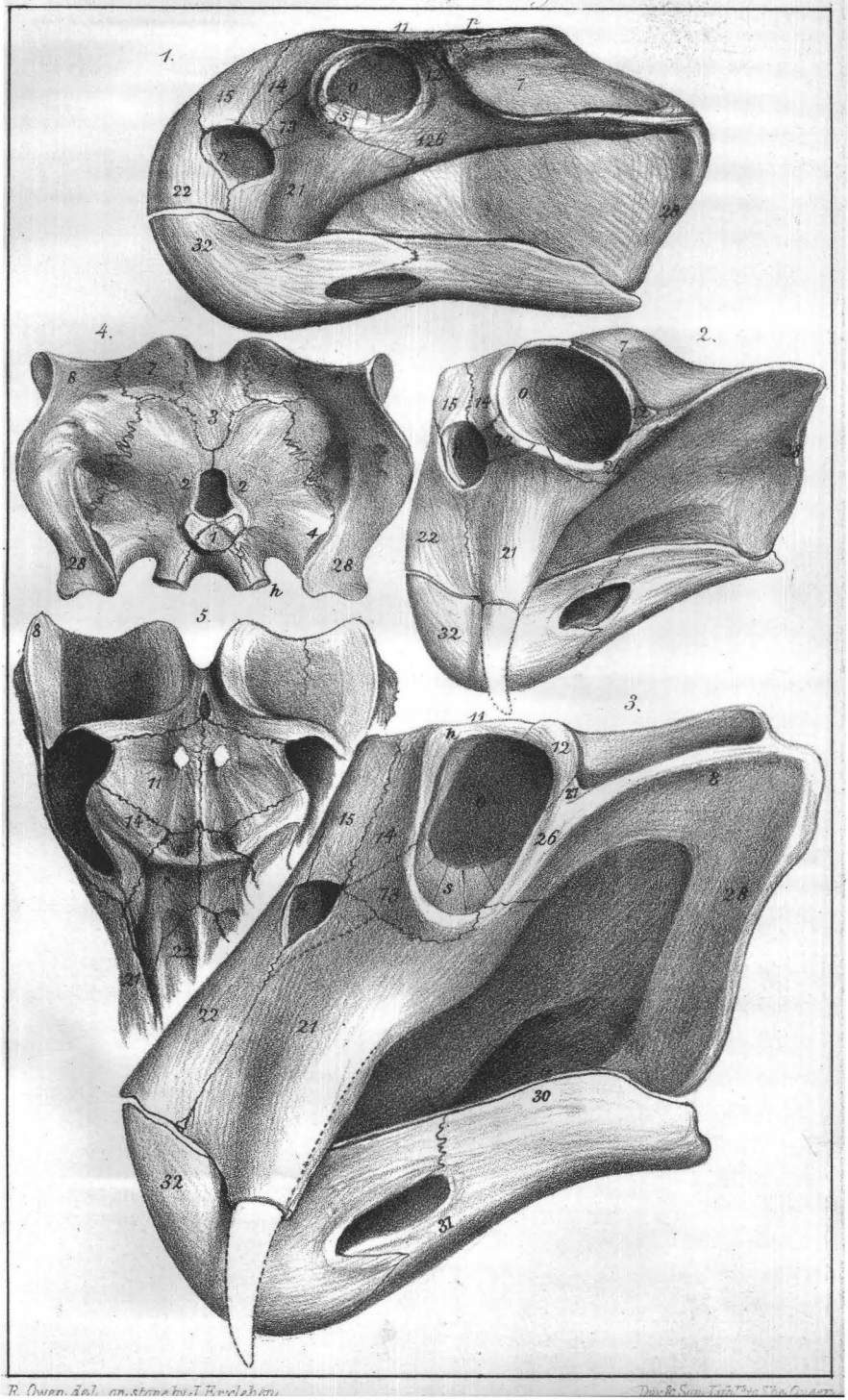
PLATE II.

Fig. 1. Side view of the skull of *Galesaurus planiceps*, showing the socket and part of the base of the upper canine, *c*, and the lower incisors.
Fig. 2. Opposite side of the same skull, showing the base of the upper canine, *c*, *in situ*, and the upper incisors.
Fig. 3. Upper view of the same skull.
Fig. 4. Back view of the same skull.

Fig. 5. Under view of the same skull. [All the figures are of the natural size: the original is in the British Museum; the letters and figures are explained in the text.]

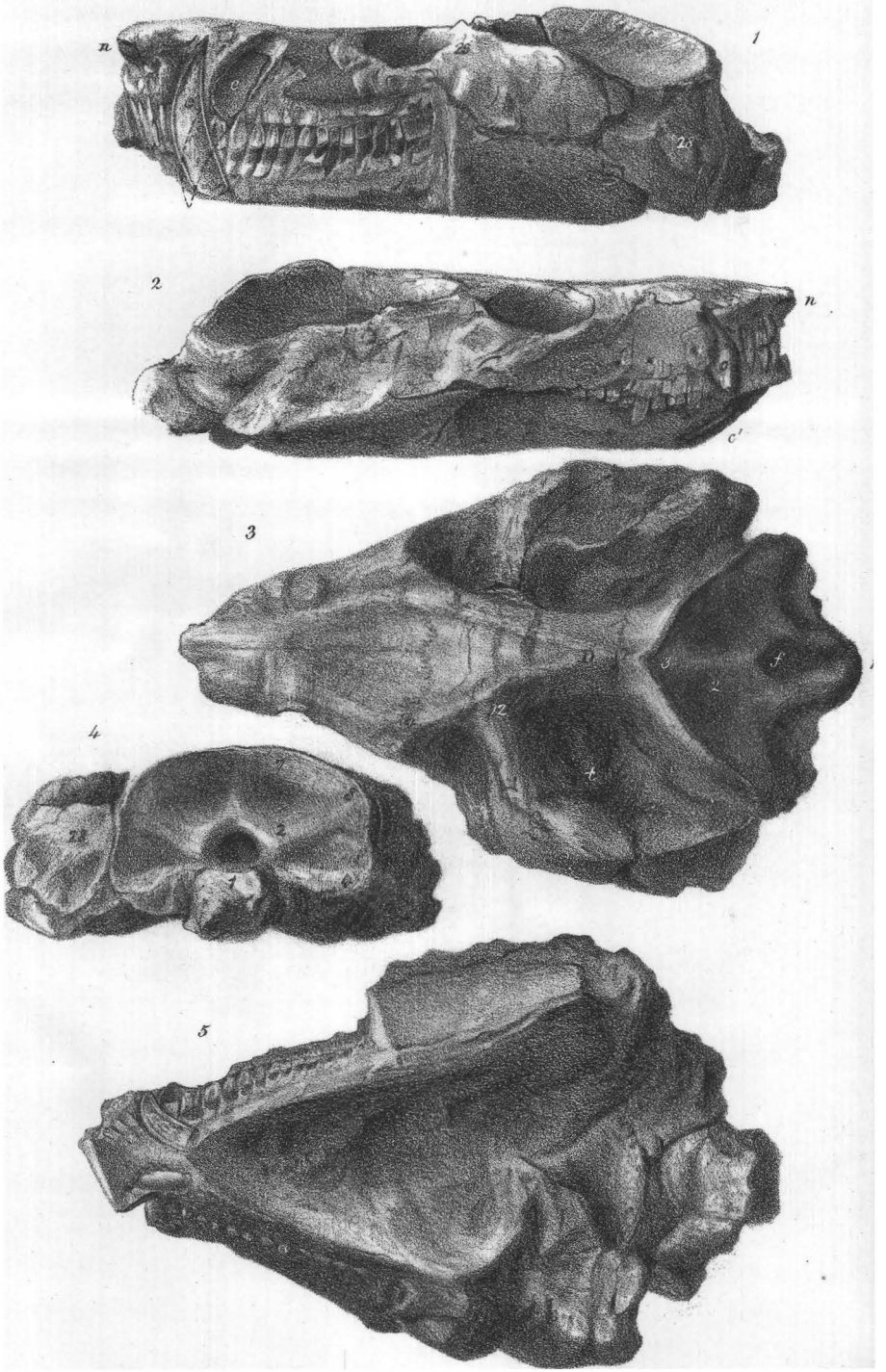
PLATE III.

Fig. 1. Side view of the fore end of the skull of *Cynochampsa laniarius*.
Fig. 2. Front view of the same.
Fig. 3. Upper view of the same.
Fig. 4. Under view of the same, showing the bodies and pulp-cavities of the fractured upper and lower canines, nat. size. [Original in the British Museum.]
Fig. 5. Under view of part of the skull, with the hyoidean arch and appendages, of *Oudenodon*, nat. size. [The original is in the British Museum; the letters and figures are explained in the text.]



R. Owen, del. on stone by J. Erxleben.

Day & Son, Lith.rs to The Queen.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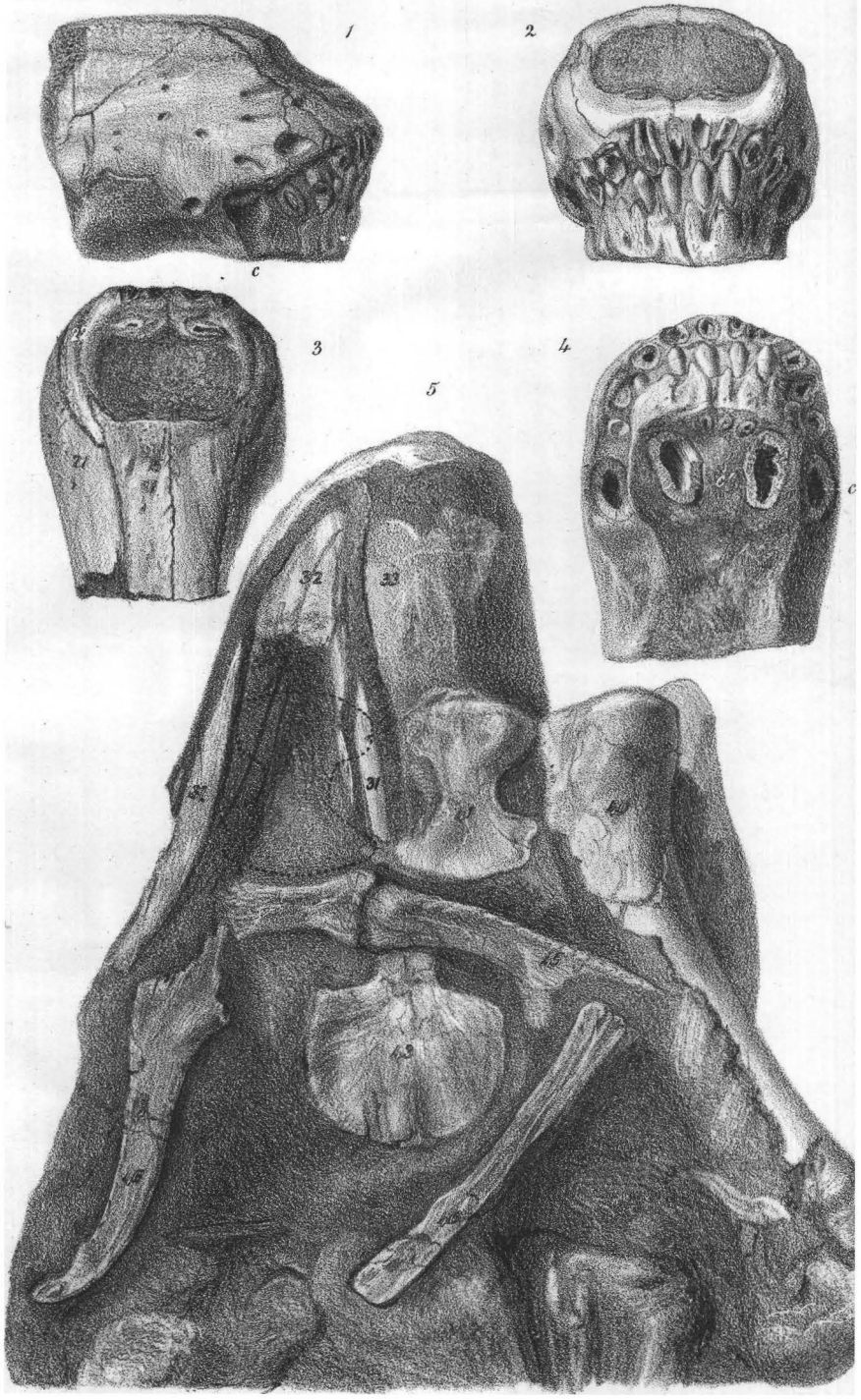
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