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NATURALIST TO THE EXPEDITION.

FOSSIL MAMMALIA,

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comprehensive characters of kind and general structure of the teeth, or upon the more restricted ones, of form and such modifications in the disposition and proportions of the component textures of the tooth, as give rise to the characteristic appearances of the triturating surface of the crown.

With respect to existing Mammalia, most naturalists of the present day seem to be unanimous as to the convenience at least of founding a generic or subgeneric distinction on well marked modifications in the form and structure of the teeth, although they may correspond in number and kind, in proof of which it needs only to peruse the pages of a *Systema Mammalium* which relate to the distribution of the Rodent Order. According to this mode of viewing the logical abstractions under which species are grouped together, the extinct Edentate Mammal discovered by Jefferson must be referred to a genus distinct from *Megatherium*, and for which the term *Megalonyx* should be retained. This will be sufficiently evident by comparing the descriptions given by Cuvier of one of the teeth of the *Megalonyx Jeffersonii*, and by Dr. Harlan of a tooth of his *Megalonyx laqueatus*, with those of the *Megatherium* which have been published by Mr. Clift. The fragment of the molar tooth of the *Megalonyx Jeffersonii*, described and figured in the *Ossemens Fossiles*, seems to have been implanted in the jaw, like the teeth of the *Megatherium*, by a simple hollow base similar in form and size to the protruded crown: its structure Cuvier describes as consisting of a central cylinder of bone enveloped in a sheath of enamel.* The transverse section of this tooth presents an irregular elliptical form, the external contour being gently and uniformly convex, the internal one, undulating; convex in the middle, and slightly concave on each side, arising from the tooth being traversed longitudinally on its inner side by two wide and shallow depressions.

The imperfect tooth of the species called by Dr. Harlan *Megalonyx laqueatus*, and of which a cast was presented by that able and industrious naturalist to the Museum of the Royal College of Surgeons, resembles in general form, and especially in the characteristic double longitudinal groove on the inner side, the tooth of the *Megalonyx Jeffersonii*. It is thus described by Dr. Harlan:

"The fractured molar tooth appears to have belonged to the inferior maxilla on the right side; the crown is destroyed; a part of the cavity of the root remains. The body is compressed transversely, and presents a double curvature, which renders its anterior and exterior aspects slightly convex; the posterior and interior gently concave; these surfaces are all uniform, with the exception of the interior or mesial aspect, which presents a longitudinal rib or ridge, one-half the thickness of the long diameter of the tooth; with a broad, not profound longitudinal

* It is most probable that the substance which is here termed "enamel," is similar to that which forms the dense prominent ridges in the tooth of the Megatherium, and which I have shown to be composed of minute parallel calcigerous tubes, similar to the ivory or bone of the human tooth.

groove or channel along each of its borders. It is from this resemblance to a portion of a fluted column, that the animal takes its specific appellation (*Meg^x. laqueatus*).

"The crown would resemble an irregular ellipsis widest at the anterior portion. The tooth consists of a central pillar of bone surrounded with enamel, the former of a dead white, the latter of a ferruginous brown colour: the transverse diameter is more than two-thirds less than its length, whilst that of *Meg^x. Jeffersonii* is only one-third less—the antero-posterior diameter is one-half its length in the former, and two-thirds less in the latter. The proportions of this tooth are consequently totally at variance with that of its kindred species." [Vide Pl. XII. fig. 7, 8, 9.]*

Dr. Harlan describes also two claws of the fore-foot, a radius, humerus, scapula, one rib, an os calcis, a metacarpal bone, certain vertebræ, a femur, and tibia, of the same *Megalonyx;* these parts of the skeleton, together with the tooth, which so fortunately served to establish the generic relationship of the species with the *Megalonyx* of Jefferson and Cuvier, were discovered in Big-bone-cave, Tenessee, United States.

Dr. Harlan does not enter into the question of the generic characters of *Megalonyx,* but it would seem that he felt them to rest not entirely on dental modifications, for he observes that "a minute examination of the tooth and knee-joint renders it not improbable, supposing the last named character to be peculiar to it, that if the whole frame should hereafter be discovered, it may even claim a generic distinction, in which case, either Aulaxodon, or PLEURODON, would not be an inappropriate name."†

There can be no doubt, as it appears to me, with respect to a fossil jaw presenting teeth in the same number, and of the same general structure, as in the *Megatherium,* and with individual modifications of form, as well marked as those which distinguish *Megatherium* from *Megalonyx,* that the Palæontologist has no other choice than to refer it, either as Fischer has done with *Megalonyx,* to a distinct species of the genus *Megatherium,* or to regard it as the type of a subgenus distinct from both. With reference, however, to the *Pleurodon* of Dr. Harlan, after a detailed comparison of the cast of the tooth on which that genus is mainly founded, with the descriptions and figures of the tooth of the *Megalonyx Jeffersonii,* in the "Ossemens Fossiles," they seem to differ in so slight a degree as to warrant only a specific distinction, and this difference even, viewing the various proportions of the teeth in the same jaw of the *Megatherium,* is more satisfactorily established by the characters pointed out by Dr. Harlan in the form and proportions of the radius, than by those in the tooth itself.

* Medical and Physical Researches, pp. 323—4.

† Loc cit. p. 330.

The next notice of the *Megalonyx* which I have consulted, in the hope of meeting with additional and more precise information as to its real generic characters, is an account given by the learned Professor Doellinger,* of some fossil bones, collected by the accomplished travellers Spix and Martius in the cave of Lassa Grande, near the Arrayal de Torracigos, in Brazil. In this collection, however, it unfortunately happens that there are no teeth, but only a few bones of the extremities, including some ungueal phalanges, which Professor Doellinger concludes, from their shape, the presence of an osseous sheath for the claw, and the form of their articulation, to belong, without doubt, to an animal of the Megatherioid kind, about the size of an Ox. He particularly states that they are not bones of an immature individual; but that they agree sufficiently with Cuvier's descriptions and figures of the *Megalonyx* to be referred to that species of animal (zu dieses thierart;) and he adds, what is certainly an interesting fact, that the fossils in question form the first of the kind that had been discovered out of North America.

Subsequently to the discovery of these bones, and of those of the *Megalonyx laqueatus* above alluded to, the remains of another great Edentate animal were found in North America, and were deposited in the Lyceum at New York; among these is a portion of the lower jaw with the whole dental series of one side. It is thus described by Dr. Harlan.

"The fragment I am now about to describe is a portion of the dexter lower jaw of the Megalonyx, containing four molar teeth; three of the crowns of these teeth are perfect, that of the anterior one is imperfect. These teeth differ considerably from each other in shape, and increase in size from the front, the fourth and posterior tooth being double the size of the first, and more compressed laterally; it is also vertically concave on its external aspect, and vertically convex on its internal aspect; the interior or mesial surface is strongly fluted, and it has a deep longitudinal furrow on the dermal aspect, in which respect it differs from the tooth of the *M. laqueatus* previously described by me, of which the dermal aspect is uniform, but to which, in all other respects, it has a close resemblance. I suppose it therefore probable, that this last may have belonged to the upper jaw. The three anterior molars differ in shape and markings: they are vertically grooved, or fluted, on their interior and posterior aspects, a transverse section presenting an irregular cube. The length of the crown of the posterior molar is two inches: the breadth about five-tenths of an inch: the length of the tooth is three inches and six-tenths. The diameter of the penultimate molar is eight-tenths by seven-tenths of an inch. The length of this fragment of the jaw-bone is eight inches and four-tenths; the height three inches and six-tenths: the length of the space occupied by the alveolar sockets five inches and eight-

* Spix and Martius, Reise in Brazil, Band ii. p. 5.

tenths. The crown of the tooth presents no protuberances, but resembles that of the Sloth; the roots are hollow."*

This fossil is referred by Dr. Harlan to his *Megalonyx laqueatus;* but, pending the absence of other proof of the identity of species, in which, as may be seen by comparing fig. 2, with fig. 4, in Pl. XVII., the teeth differ widely in form, it would be obviously hazardous to adopt such an approximation on hypothetical grounds.† In order, however, to obtain more satisfactory evidence of the nature and amount of the difference between the *Megalonyx laqueatus*, and the allied animal represented by the above-described fragment of lower jaw, I wrote to my much respected friend M. Laurillard, requesting him to send me a sketch of the teeth in the cast of that lower jaw, which had been transmitted from New York to the Garden of Plants. With full confidence in the characteristic precision and accuracy of the drawing with which I have been obligingly favoured by M. Laurillard, I am disposed to regard the amount of difference recognizable in every tooth in the lower jaw in question (fig, 3 and 4,) as compared with the molar tooth either of *Megalonyx Jeffersonii* (fig. 1,) or *Meg^x. laqueatus* (fig. 2) to be such as to justify its generic separation from *Megalonyx* on the same grounds as *Megalonyx* is distinguished from *Megatherium*, and for the subgenus of Megatherioid Edentata, thus indicated, I would propose the name of Mylodon.‡ The species of which the fossil remains are described by Dr. Harlan may be dedicated to that indefatigable Naturalist who has contributed to natural science so much valuable information respecting the Zoology, both recent and fossil, of the North American continent. The fossil about to be described represents a second and smaller species of the same genus, and I propose to call it *Mylodon Darwinii*, in honour of its discoverer, of whose researches in the Southern division of the New World it forms one of many new and interesting fruits.

* Harlan's Medical and Physical Researches, 1835, p. 334. M. de Blainville speaks of a cast of a fragment of a lower jaw "portant encore *cinq* dents en série;" as having been transmitted to the Museum of the Garden of Plants from North America, together with other bones, all of which he refers to the genus *Megalonyx;* M. de Blainville does not describe these teeth, which is to be regretted, inasmuch as, if he be correct in regard to their number, which can hardly be doubted, and if he wrote with any clear and definite ideas of the generic characters of *Megalonyx*, this would indicate that *Megalonyx* differed generically both from *Megatherium* and *Mylodon* in a more important dental character than has hitherto been suspected (See "Comptes Rendus, &c." 1839, No. V. p. 142.)

† Dr. Harlan also indicates differences in certain parts of the skeleton of the New York fossils as compared with his *Megx. laqueatus;* but thinks them probably due to a difference in the age of the individuals: he says "There is also in Mr. Graves' collection, in New York, a tibia, nearly perfect from the right leg; the segment of a flattened sphere, on which the external condyle of the femur moves, is rather more depressed, than in the specimen from Big-bone-cave. Other marks and peculiarities are observable on this bone, not found on that of the *Megalonyx laqueatus* of Big-bone-cave, but they are probably due to a difference in the age of the individuals." Loc. cit. p. 335.

‡ Μυλη, *mola;* οδους, *dens.*

This fossil was discovered in a bed of partly consolidated gravel at the base of the cliff called Punta Alta, at Bahia Blanca in Northern Patagonia: it consists of the lower jaw with the series of teeth entire on both sides: but the extremity of the symphysis, the coronoid and condyloid processes, and the angular process of the left ramus, are wanting. The teeth are composed, as in *Bradypus*, *Megatherium* and *Megalonyx*, of a central pillar of coarse ivory, immediately invested with a thin layer of fine and dense ivory, and the whole surrounded by a thick coating of cement.

In the fig. 5, Pl. XVII., the fine ivory is represented by the white striated concentric tract on the grinding surface of the teeth; it is of a yellowish-white colour in the fossil, and stands out, as an obtuse ridge, from that surface: both these conditions depend on the large proportion of the mineral to the animal constituent in this substance of the tooth. The external layer of the cement presents in the fossil the same yellowish-brown tint as the bone itself, which it so closely resembles, both in intimate structure and in chemical composition; the internal layer next the dense ivory is jet black, indicating the great proportion of animal matter originally present in this part. The central pillar of coarse ivory, which, from its more yielding texture, has been worn down into a hollow at the triturating surface of the tooth, also presents, as a consequence of the less proportion of the hardening phosphates, a darker brown colour than the external layer of the cement, or the bone itself.

The teeth are implanted in very deep sockets; about one-sixth only of the last molar projects above the alveolus; the proportion of the exposed part of the tooth increases as they are placed further forwards. The implanted part of each tooth is simple; preserving the same size and form as the projecting crown, and presenting a large conical cavity at the base, indicative of the original persistent pulp, and perpetual growth of these teeth.

The extent of the whole four alveoli is four inches, eight lines; the length of the jaw from the angle to the broken end of the symphysis is seventeen inches and a half;* from the figures it will be seen that only a small proportion of the anterior part of the jaw is lost, so that we may regard the dentigerous part of the jaw as being limited to about one-fourth of its entire length; the alveoli being nearly equidistant from the two extremities. The first and second teeth, counting backwards, are separated by an interspace of rather more than three lines; that between the second and third is one line less; the third and fourth are rather more than a line apart: from the oblique position, however, of the three hinder teeth the intervals between them appear in a side view, as in fig. 1, Pl. XIX., to be less than in reality, and the third and fourth teeth seem to touch each other.

* If the lower jaw of *Mylodon Harlani*, bears the same proportion to its teeth as does that of *Mylodon Darwinii*, it must be about two feet in length.

Each tooth has a form and size peculiar to itself, and different from the rest, but corresponds of course with its fellow on the opposite side. The same may be observed, but in a less degree, in the teeth of the Megatherium itself; hence, it is obviously hazardous to found a generic distinction upon a single tooth, unless, as in the case of the *Glyptodon*,* the modification of form happens to be extremely well marked. The whole series of teeth, or their sockets, at least of one of the jaws, should be known for the purpose of making a satisfactory comparison with the previously established Edentate genera.

The first molar in the present jaw is the smallest and simplest of the series: its transverse section is ellipsoid, or subovate, narrowest in front, and somewhat more convex on the outer than on the inner side: the long diameter of the ellipse is nine lines, the short or transverse diameter six lines: the length of the tooth may be about three inches, but I have not deemed it necessary to fracture the alveolus in order to ascertain precisely this point.

The second tooth presents in transverse section a more irregular and wider oval figure than the first: the line of the outer side is convex, but that of the inner side slightly concave, in consequence of the tooth being traversed longitudinally by a broad and shallow channel or impression; the longitudinal diameter of the transverse section is one inch; the transverse diameter at the widest part nine lines. There is a slight difference in the size of this tooth on the two sides of the jaw, the right one, from which the above dimensions are taken, being the largest.

The transverse section of the third tooth has a trapezoidal or rhomboidal form; the angles are rounded off; the posterior one is most produced; the anterior and posterior surfaces are flattened, the latter slightly concave in the middle; the external and internal sides are concave in the middle, especially the inner side, where the concavity approaches to the form of an entering notch. The longest diameter of the transverse section of this tooth is thirteen lines, the shortest seven lines and a half: in the tooth on the right side the external surface is nearly flat; this slight difference is not indicated in the figure (Pl. XVIII.)

The last molar, which is generally the most characteristic in the fossil ***Bruta***, presents in an exaggerated degree the peculiarities of the preceding tooth; the longitudinal channels on both the outer and inner surfaces encroach so far upon the substance of the tooth, that the central coarse ivory substance is as it were squeezed out of the interspace, and the elevated ridge of the dense ivory describes an hour-glass figure upon the triturating surface, the connecting isthmus being but half the breadth of the rest of the tract; the external cæmentum preserves nearly an equal thickness throughout. Of the two lobes into which this tooth is

* See Proceedings of the Geological Society, March 1839, and Parish's Buenos Ayres, p. 178, *b*, Pl. 1, fig. 2 and 3.

divided by the transverse constriction, the anterior is the largest; their proportions and oblique position are pretty accurately given in the figure. The longitudinal diameter of the transverse section of this tooth is one inch, seven lines, its greatest lateral or transverse diameter is ten lines, its least diameter at the constricted part is three lines, the length of the entire tooth is four inches. Judging from the form of the jaw, the length of the other teeth decreases in a regular ratio to the anterior one. The posterior tooth is slightly curved, as shown in fig. 2, Pl. XIX., with the concavity directed towards the outer side of the jaw.

The general form of the horizontal ramus of the jaw, is so well illustrated in the figures Pl. XVIII. and XIX., that the description may be brief.

The symphysis is completely anchylosed, about four inches in length, and extended forward to the extremity of the jaw at a very slight angle with the inferior border of the ramus: it is of great breadth, smooth and gently concave internally, and suggests the idea of its adaptation for the support and gliding movements forwards and backwards of the free extremity of a long and well-developed tongue.

The exterior surface of the symphysis is characterized by the presence of two oval mammilloid processes, situated on each side of the middle-line, and about half way between the anterior and posterior extremes of the symphysis. A front view of these processes, of the natural size, is given in fig. 4, Pl. XIX.: a side view of the one on the right side represented in the reduced figure.

Nearly four inches behind the anterior extremity of the above process is the large anterior opening of the dental canal: it is five lines in diameter, situated about one-third of the depth of the ramus of the jaw from the upper margin. The magnitude of this foramen, which gives passage to the nerve and artery of the lower lip, indicates that this part was of large size; and the two symphyseal processes, which probably were subservient to the attachment of large retractor muscles, denote the free and extensive motions of such a lip, as we have presumed to have existed from the size of the foramina destined for the transmission of its nervous and nutrient organs.

The angle of the jaw is produced backwards, and ends in an obtuse point, slightly bent upwards; a foramen, one-third less than the anterior one, leads from near the commencement of the dental canal, to the outer surface of the jaw, a little below and behind the last molar tooth; this foramen presents the same size and relative position on both sides of the jaw. I find no indication of a corresponding foramen, or of symphyseal processes in the figures or descriptions of the lower jaw of the Megatherium, nor in the lower jaw of the Sloths, Ant-eaters, Armadillos, or Manises, which I have had the opportunity of examining with a view to this comparison.

In the Megatherium the inferior contour of the lower jaw is peculiarly remarkable, as Cuvier has observed, for the convex prominence or enlargement which is developed downwards from its middle part. In the Mylodon the corresponding convexity exists in a very slight degree, not exceeding that which may be observed at the corresponding part of the lower jaw of the Ai, or Orycterope. A broad and shallow furrow extends along the outer side of the jaw, close to the alveolar margin, from the beginning of the coronoid process to the anterior dental foramen.

The base of the coronoid process begins external and posterior to the last grinder: the whole of the ascending ramus of the jaw, beneath the coronoid process is excavated on its inner side by a wide and deep concavity, bounded below by a well-marked ridge, which extends obliquely backwards from the posterior part of the alveolus of the last grinder to the inferior margin of the ascending ramus, which is bent inwards before it reaches the angle of the jaw.

The large foramen or entry to the dental canal is situated in the internal concavity of the ascending ramus of the jaw, two inches behind the last molar, three inches from the lower margin of the ramus, and nearly five inches from the elevated angle of the jaw: it measures nine lines in the vertical diameter, and its magnitude indicates the large size of the vessels which are destined to supply the materials for the constant renewal of the dental substance, — a substance which from its texture must be supposed to have been subject to rapid abrasion. About an inch behind the dental foramen a deep vascular groove, about two lines in breadth, is continued downwards to the ridge which circumscribes the internal concavity of this part of the jaw, and perforates the ridge, which thus arches over the canal: this structure is present in both rami of the jaw. The mylo-hyoid ridge is distinctly marked about an inch and a half below the alveolar margin. Other muscular ridges and irregular eminences are present on the outer side of the base of the ascending ramus, and near the angle of the jaw; as shown in fig. 1, Pl. XIX.

From the preceding descriptions it will be seen that the lower jaw of the *Mylodon* is very different from that of the *Megatherium;* with that of the *Megalonyx* we have at present no means of comparing it. Among existing Edentata the Mylodon, in the form of the posterior part and angle of the jaw, holds an intermediate place between the Ai and the great Armadillo; in the form of the anchylosed symphysis of the lower jaw it resembles most closely the Unau or two-toed Sloth; but in the peculiar external configuration of the symphysis resulting from the mammilloid processes above described, the Mylodon presents a character which has not hitherto been observed in any other species of *Bruta*, either recent or fossil.

In conclusion it may be stated, that the teeth and bones here described offer all the conditions and appearances of those of a full grown animal; and that they present a marked difference of size as compared with those of the *Mylodon Harlani*, as will be evident by the following admeasurements.

ADMEASUREMENTS OF THE LOWER JAW OF MYLODON DARWINII.

	Inches.	Lines.
Length (as far as complete)	17	6
Extreme width, from the outside of one ramus to that of the other	9	0
Depth of each ramus	4	9
Length of alveolar series	4	8
From first molar to broken end of symphysis	6	0
Breadth of symphysis	3	7
Longitudinal extent of symphysis	4	6
Circumference of narrowest part of each ramus	5	9

DESCRIPTION OF A CONSIDERABLE PART OF THE SKELETON OF A LARGE EDENTATE MAMMAL, ALLIED TO THE MEGATHERIUM AND ORYCTEROPUS, AND FOR WHICH IS PROPOSED THE NAME OF

SCELIDOTHERIUM* LEPTOCEPHALUM.

Of the large Edentate quadrupeds that once existed in the New World, sufficient of the osseous remains of the gigantic Megatherium alone has been transmitted to Europe to give a satisfactory idea of the general form and proportions of the extinct animal.

Different bones of the Megalonyx, Mylodon, and Glyptodon have been described, but not sufficient of the remains of any individual of these subgenera has, hitherto, reached Europe, or been so described as to enable us to form a comparison between them and the Megatherium, or any of the existing Edentata, in regard to the general construction and proportions of the entire skeleton.

This state of our knowledge of the osteology of the singular giants of the Edentate Order renders the remains of the present animal peculiarly interesting, since, although the extremities are too imperfect to enable us to reconstruct the entire skeleton, a sufficient proportion of it has been preserved in the natural position to give a very satisfactory idea of its affinities to other Edentata, whose osteology is more completely known.

* Σκελις, *femur;* θηριον, *bellua;* in allusion to the disproportionate size of the thigh-bone.

The fossil remains here described were discovered by Mr. Darwin in the same bed of partly consolidated gravel at Punta Alta, Northern Patagonia, as that in which the lower jaws of the *Toxodon* and *Mylodon* were imbedded. The parts of the skeleton about to be described were discovered in their natural relative position, as represented at Pl. XX., indicating, Mr. Darwin observes, that the sublittoral formation in which they had been originally deposited had been subject to little disturbance.* They include the cranium, nearly entire, with the teeth and part of the os hyoides; the seven cervical, eight of the dorsal, and five of the sacral vertebræ, the two scapulæ, left humerus, radius and ulna, two carpal bones, and an ungueal phalanx ; both femora, the proximal extremities of the left tibia and fibula, and the left astragalus.

The principal parts of the cranium which are deficient are the anterior extremities of both the upper and lower jaws, the os frontis, æthmoid bone, and the whole upper part of the facial division of the skull ; but sufficient remains to show that the general form of the skull resembled an elongated, slender, sub-compressed cone, commencing behind by a flattened vertical base, slightly expanding to the zygomatic region, and thence gradually contracting in all its dimensions to the anterior extremity.

The Cape Ant-eater (*Orycteropus*), of all Edentata, most nearly resembles the present fossil in the form of its cranium, and next in this comparison the great Armadillo (*Dasypus gigas*, Cuv.) may be cited: on the supposition, therefore, that the correspondence with the above existing Edentals observable in the parts of the fossil cranium which do exist, was carried out through those which are defective, the length of the skull of the Scelidothere must have been not less than two feet. If now the reader will turn to Pl. XX. he will see that this cranium is singularly small and slender in proportion to the rest of the skeleton, especially the bulky pelvis and femur, of which bones the latter has a length of seventeen inches, and a breadth of not less than nine inches; the astragalus, again, exceeds in bulk that of the largest Hippopotamus or Rhinoceros ; yet the condition of the epiphyseal extremities of the long bones proves the present fossils to have belonged to an immature animal. Hence, although the Scelidothere, like most other Edentals, was of low stature, and, like the Megatherium, presented a disproportionate development of the hinder parts, it is probable, that, bulk for bulk, it equalled, when alive, the largest existing pachyderms, not proboscidian. There is no evidence that it possessed a tesselated osseous coat of mail.

I shall commence the description of the present skeleton with the cranium.

* This beach is covered at spring tides; many parts of the skeleton were encrusted with recent *Flustræ*, and small marine shells were lodged in the crevices between the bones.

The condyles of the occiput (See Pl. XXI. fig. 2,) are wide apart, sub-elliptic, very similar in position, form, and relative size to those in *Orycteropus*. The foramen occipitale is transversely oval, its plane slopes from above downwards and forwards at an angle of 40° with that of the occipital region of the skull. This region, as before stated, is vertical in position (see fig. 1, Pl. XXI.), of a sub-semicircular form, the breadth being nearly one-third more than the height; it is bounded above and laterally by a pretty regular curve; but the superior margin is not produced so far backwards as in *Orycteropus*. The occipital plane is bisected by a mesial vertical ridge; there is a less developed transverse curved inter-muscular crest which runs parallel with and about half an inch below the marginal ridge: the surface of the occipital plane on the interspaces of these ridges is irregularly pitted with the impression of the insertion of powerful muscles. The corresponding surface is smooth in the Orycterope and Armadillos; in the great extinct Glossothere it resembles in character that of the Scelidothere; but in the forward slope of the occipital plane the Glossothere differs in a marked degree from the present animal.

The upper surface of the cranium is smooth and regularly convex. The extent of the origin of the temporal muscles is defined by a slightly-raised broad commencement of a ridge, which, in the older animal, might become more developed. There is no trace of this ridge in the Orycterope; but it exists in the Armadillos, in which the teeth are of a denser texture, and better organized for mastication, and consequently are associated with better developed masticatory muscles. It will be subsequently shown that the Scelidothere resembles the Armadillos in so far as it possesses a greater proportion of the dense ivory to the external cæmentum in its teeth, than does the Megatherium; while it differs widely from the Orycterope, in the structure of its teeth. The teeth, however, are fewer in the Scelidothere than in any Armadillo, and relatively smaller than in most of the species of that family. Accordingly we find that the zygomatic arches are relatively weaker; and in this particular the *Scelidothere* corresponds with the Orycterope. The zygomatic process of the temporal commences posteriorly about an inch and a half from the occipital plane, its origin or base is extended forwards in a horizontal line fully four inches, where it terminates as usual in a thin concave edge, as shown on the right side in Pl. XXII. The free portion of the zygoma, continued forwards from the outer part of this edge, is a slender sub-compressed process, half an inch in the longest or vertical diameter, and less than three lines in the transverse; the extremity of this process is broken off; the opposite extremity of the malar portion of the zygoma is entire, and obtusely rounded. The bony arch may have been completed by the extension of the temporal process to the malar one, but the two parts undoubtedly were not connected together by so extensive a surface as in the Orycterope. On the other hand, if the zygomatic arch be naturally incomplete in the Scelidothere, the interspace between the malar and temporal portions must be relatively much less than in the Sloth or Ant-eater; for the broken end of the temporal part is separated from the obtusely rounded apex of the malar process in the present specimen by an interval of only one inch.

The articular surface (Pl. XXIII., fig. 2) beneath the zygoma for the lower jaw is flat and even, with the outer and inner margin slightly bent down, but having no definable anterior or posterior limits; its breadth is two inches. It differs from the corresponding surface in the Orycterope in being separated by a relatively wider interval from the tympanic bone, and in wanting consequently the support which the bony meatus auditorius gives in the Orycterope to the back part of the mandibular joint. The Armadillos differ still more from the Scelidothere in this important part of the cranial organization, inasmuch as the glenoid cavity is not only protected behind by the descending os tympanicum, but also in front by a corresponding vertical downward extension of the os malæ. The Scelidothere in the general form and relative position of the surface for the articulation of the lower jaw resembles the Glossothere more closely than any other Edentate animal with which I have been able to compare it.

The malar bone of the Megatherium presents, as is well known, two characters, in which it conspicuously differs from that of the Orycterope and Armadillos, and approximates in an equally marked degree to the Sloths; these characters consist in a process ascending as if to complete the posterior circumference of the orbit, and another process descending outside the lower jaw to give advantageous and augmented surface of attachment to the masseteric muscle, in its character of a protractor of the jaw. Now both these modifications of the malar bone are present in the Scelidothere, and are the chief if not the sole marks of the affinity to the Megatherium which the structure of the cranium affords. They are, however, the more interesting, perhaps, on that account, and because they are associated with other and more numerous characters approximating the species in question to the ordinary terrestrial as distinguished from the arboreal Edentata. For if the Scelidothere, instead of the Megathere, had been discovered half a century ago, and if its true nature and affinities had been in like manner elucidated by the genius and science of a Cuvier; and supposing on the other hand that the Megatherium instead of the Scelidothere had been one of the novel and interesting fruits of Mr. Darwin's recent exploration of the coast of South America, then the affinities of the Megathere with the Sloths would undoubtedly have been viewed from a truer point than at the time when, —the Scelidothere, and analogous transitional forms, being unknown,—it was regarded as a gigantic Sloth.

Having indicated the principal characters of the cranium of the Scelidothere, which determine its affinities amongst the *Edentata,* there next remains to be considered the relative position, extent, and connections, of the different bones composing the cranium.

The occipital bone constitutes the whole of the posterior, the usual proportion of the inferior, and a small part of the upper and lateral portions of the cranial cavity: there is a small descending ex-occipital process immediately exterior to the condyle: above this part the occipital bone is articulated to the mastoid process of the temporal, and the supra-occipital plate is joined by a complex dentated lambdoidal suture to the two parietals, without the intervention of interparietal or Wormian bones; the course and form of the lambdoidal suture is shown in Pl. XXII; it has the same relative position as in the Orycterope; in the Armadillos, the suture runs along the angle between the posterior and superior surfaces of the skull. The thickness of the occipital bone, at this angle, in the Scelidothere, exceeds an inch, and its texture consists of a close massive diploë, between the dense outer and inner tables, (Pl. XXIII. fig. 1.)

The squamous portion of the temporal bone has a very slight elevation, not extending upon the side of the cranium more than half an inch above the zygoma; it is thus relatively lower than in the *Orycteropus;* but is similarly bounded above by an almost straight line, (Pl. XXI., fig. 1.) The mastoid process is small, compressed, with a rounded contour; immediately internal to it is a very deep depression, corresponding to that for the digastric muscle. But the most interesting features in this region of the temporal bone consist in the free condition of the tympanic bones, and the presence of a semicircular pit, immediately behind the tympanic bone for the articulation of the styloid element of the hyöid or tongue-bone: in these points we trace a most remarkable correspondence with the Glossothere, and in the separate tympanic bone the same affinity to the Orycteropus, as has been already noticed in the more bulky extinct Edental.

This correspondence naturally leads to a speculation as to the probable generic relationship between the Glossothere and Scelidothere: now it may first be remarked that the styloid articular depression is relatively much larger and much deeper in the Glossothere than in the Scelidothere; in the former its diameter equals, as we have seen, one inch; in the Scelidothere it measures only a third of an inch, the whole cranium being about two-fifths smaller; if we turn next to the anterior condyloid foramina, which in the Scelidothere are double on each side, we obtain from them evidence that the muscular nerve of the tongue could only have been one-third the size of that of the Glossothere. These proofs of the superior relative development of the tongue in the Glossothere indicate a difference of habits, and a modification, probably, of the structure of the locomotive extremities; and when we associate these deviations from the Scelidothere, with the known difference in the position of the occipital plane, which in the Glossothere corresponds with that in the *Myrmecophaga* and *Bradypus*, we shall be justified in continuing to regard them, until evidence to the contrary be obtained, as belonging to distinct genera.

The parietal bones present an oblong regular quadrate figure, the sagittal suture running parallel with the squamous, and the frontal with the lambdoidal suture; there is scarcely any trace of denticulations in the sagittal suture; the bones are of remarkable thickness, varying, at this suture, from six to nine lines, and their opposed surfaces are locked together by narrow ridges, which slightly radiate from the lower to the upper part of the uniting surface: the substance of the bone consists of an uniform and pretty dense diploë; and there are no sinuses developed in it. We can hardly regard the extraordinary air-cells which occupy the interspace of the two tables of the skull in the parietal and occipital bones of the Glossothere (Pl. XVI., fig. 3) as a difference depending merely on age.

The frontal and æthmoid bones are broken away in the present cranium. The sphenoid commences two inches in front of the foramen occipitale; the fractured state of the skull does not allow its anterior or lateral limits to be accurately defined; its body is occupied with large air-sinuses; the only part, indeed, of this bone which is exposed to observation is that which forms part of the floor of the cranium; and this we shall now proceed to describe, in connexion with the other peculiarities of the cranial cavity, (fig. 1. Pl. XXIII.) The body of the sphenoid is impressed on its cranial surface with a broad and shallow sella turcica (*a*), bounded by two grooves, (*b b*,) leading forwards and inwards from the carotid foramina (*c*); the line of suture between the sphenoid and occipital bones runs along a slight transverse elevation (*d*), which bounds the sella posteriorly; this suture is partially obliterated: a slight median protuberance (*e*) bounds the sella turcica anteriorly; there are neither anterior nor posterior clinoid processes. External to the carotid channel there is a wide groove (*f*) leading to the foramen ovale (*g*); this foramen is about one-third smaller than in the Glossothere, and therefore, as compared with the anterior condyloid foramina, indicates that the tongue was endowed with a greater proportion of sensitive than motive power in the Scelidothere: but in reasoning on the size of this nerve, it must be remembered that in both animals certain branches, both of the second and third divisions of the fifth pair of nerves, are to be associated with the persistence of large dental pulps, of which they regulate the secreting power. Anterior to the foramen ovale, and at the termination of the same large common groove, lodging the trunk of the fifth pair of nerves is the foramen rotundum (*h*); this leads to a very long canal, the diameter of which is five lines, being somewhat less than that for the third division of the fifth pair. The anterior sphenoid is broken away, so that no observation can be made on the optic foramina.

The basilar process of the occipital bone is perforated at its middle by two small foramina (*i*) on the same transverse line, about half an inch apart.

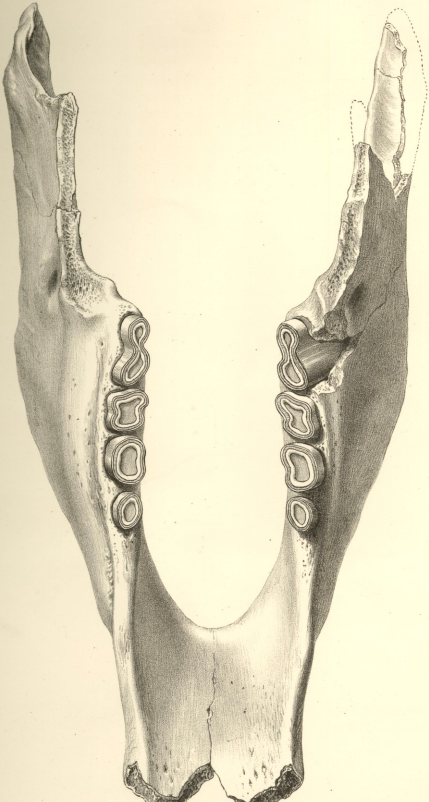
In the Armadillo these foramina do not exist: in the Orycterope they are present, but open beneath an overhanging ridge, which is continued from them to the upper part of the anterior condyloid foramen on each side. The sella turcica of the Orycterope is deeper and narrower than in the Scelidothere; and is separated from the basilar occipital process by a transverse ridge, which sends forward two short clinoid processes; two smaller anterior clinoid processes project backwards from the angle of the anterior boundary of the sella turcica. The foramina ovalia and rotunda open in the same continuous groove, as in the Glossothere and Scelidothere, but they are relatively wider apart; and the canal for the third division of the fifth pair is shorter, and runs more directly outwards.

The petrous bone in the Scelidothere is relatively larger than in the Glossothere, but this probably arises from the precocious development of the organ of hearing in the present immature specimen in obedience to the general law. The trunk of the fifth pair of nerves does not impress it with so deep and well defined a groove as in the Glossothere; the elliptic internal auditory foramen (*k*) is situated about the middle of the posterior surface; behind this is the aqueductus vestibuli; and immediately posterior to the petrous bone is the foramen jugulare (*l*): the shape of the os petrosum agrees more with that of the Armadillo than with that of the Orycterope. An accidental fracture of the right os petrosum demonstrates its usual dense and brittle texture, and at the same time has exposed the cochlea with part of its delicate and beautiful lamina spiralis. The conservation of parts of the organs of vision in certain fossils, has given rise to arguments which prove that the laws of light were the same at remote epochs of the earth's history as now; and the structures I have just mentioned, in like manner, demonstrate that the laws of acoustics have not changed, and that the extinct giants of a former race of quadrupeds were endowed with the same exquisite mechanism for appreciating the vibrations of sound as their existing congeners enjoy at the present day.

The brain, being regulated in its development by laws analogous to those which govern the early perfection of the organ of hearing, appears to have been relatively larger in the Scelidothere than in the Glossothere: it was certainly relatively longer; the fractured cranium gives us six inches of the antero-posterior diameter of the brain, but the analogy of the Orycterope would lead to the inference that it extended further into the part which is broken away. The greatest transverse diameter of the cranial cavity is four inches eight lines: these dimensions, however, are sufficient to show that the brain was of very small relative size in the Scelidothere; and, both in this respect, and in the relative position of its principal masses, the brain of the extinct Edental closely accords with the general character of this organ in the existing species of the same Order. We perceive by the obtuse ridge continued obliquely upwards from above the upper edge of the petrous bone, that the cerebellum has been situated wholly behind the cerebrum; we learn also from the same structure of the enduring parts that these perishable masses were not divided, as in the Manis, by a bony septum, but by a membraneous tentorium, as in the Glossothere and Armadillos: in the Orycteropus, as has been before remarked, there is a strong, sharp, bony ridge extending into each side of the tentorium. The vertical diameter of the cerebellum and medulla oblongata equals that of the cerebrum, and is two inches three lines: the transverse diameter of the cerebellum was about three inches nine lines; its antero-posterior extent about one inch and a half. The sculpturing of the internal surface of the cranial cavity bespeaks the high vascularity of the soft parts which it contained, and there are evident indications that the upper and lateral surfaces of the brain had been disposed in a few simple parallel longitudinal convolutions. The two anterior condyloid foramina (*m*) have the same relative position as the single corresponding foramen in the Glossothere, Orycterope, and Armadillos, and the inner surface of the skull slopes outwards from these foramina to the inner margin of the occipital condyle.

Of the bones of the face there remain only portions of the malar, lachrymal, palatine, and maxillaries. The chief peculiarities of the malar bone have been already noticed: the breadth of the base of the descending masseteric processes is two inches two lines; its termination is broken off: the length of the ascending post-orbital process of the malar cannot be determined from the same cause, but it is fortunate that sufficient of this part of the cranium should have been preserved to give this evidence of the affinities of the Scelidothere to the Megathere. The malar bone is continued anteriorly, in a regular curve forwards and upwards, to the lachrymal bone, and completes, with it, the anterior boundary of the orbit: the size of the orbit is relatively smaller than in the Orycterope, and still less than in the Ant-eaters: here, however, we have merely an exemplification of the general law which regulates the relative size of the eye to the body in the mammalia. The malar bone does not extend so far forwards in front of the orbit as in either the Orycterope or Armadillo; in the inclination, however, with which the sides of the face converge forwards from the orbits, the Scelidothere holds an intermediate place between the Armadillos and Orycterope.

The lachrymal bone does not extend so far upon the face in the Scelidothere as in the Orycterope; in which respect the Scelidothere resembles more the Megathere. The foramen for the exit of the infra-orbital nerve has the same situation near the orbit as in the Megathere; its absolute distance from the anterior border of the orbit is only half that in the Orycterope. The foramen is single in the Scelidothere, as in the Orycterope; in the Megathere there are two or three antorbital foramina. The vertical diameter of this foramen is eight lines, the transverse diameter four lines. So much of the outer surface of the superior maxillary bones as has been pre-



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Mylodon: 2/3 Nat Size.

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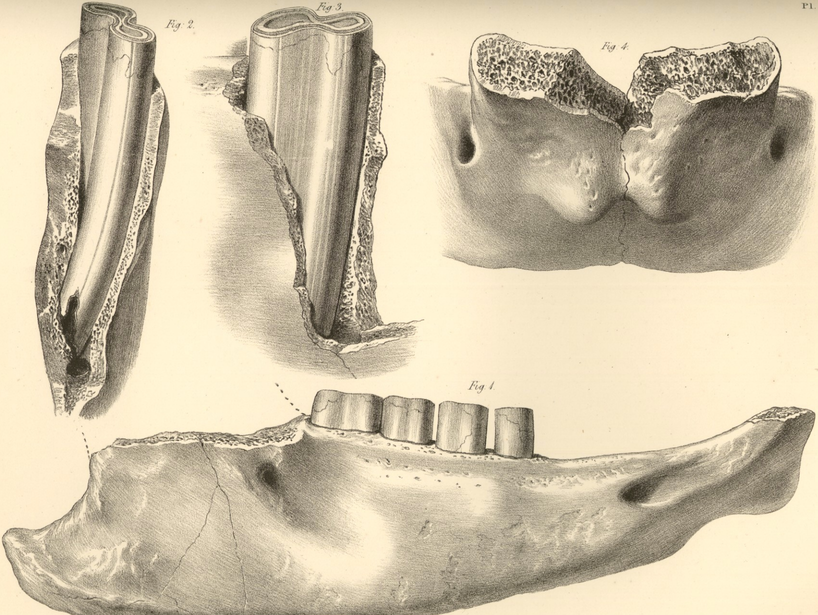

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Mylodon.

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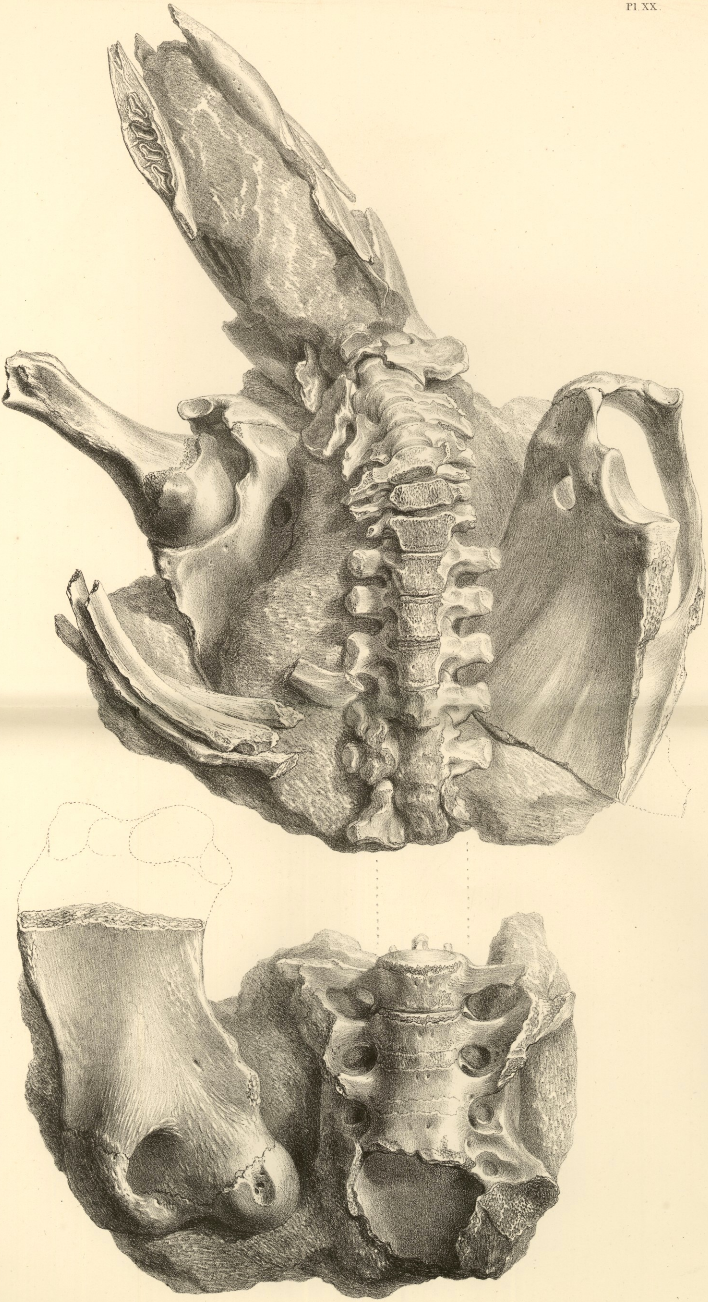

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Fig. 4.

Fig. 3.

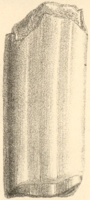


Fig. 2.

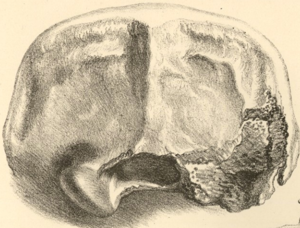
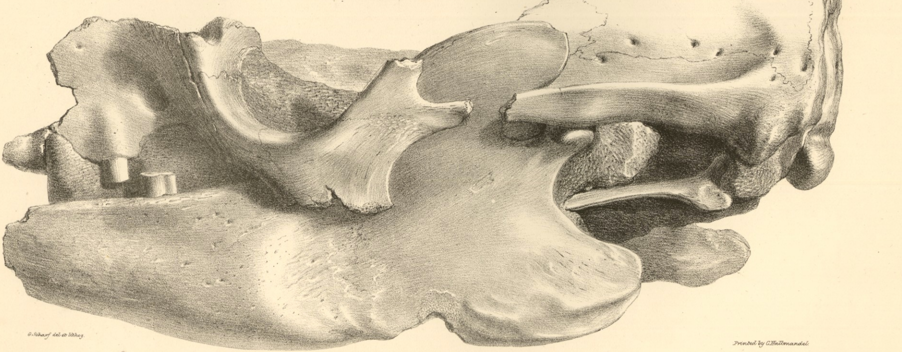


Fig. 5.

Fig. 1.



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Scelidotherium.

Fig 1 & 2 2/3 Nat. Size. Fig 3_5. Nat. Size.

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Pl. XXII.

Scelidotherium

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Scelidotherium.

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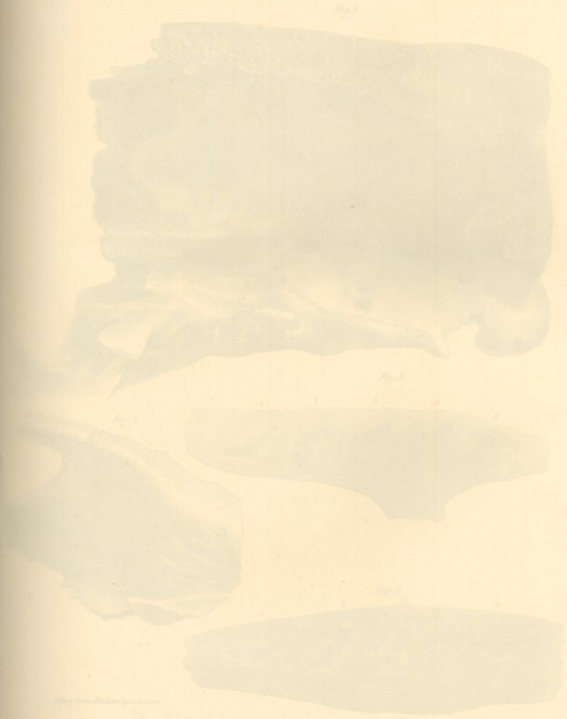
Pl. XXIII



Cranial Cavity and Dentition of Scelidotherium.

Fig: 1.

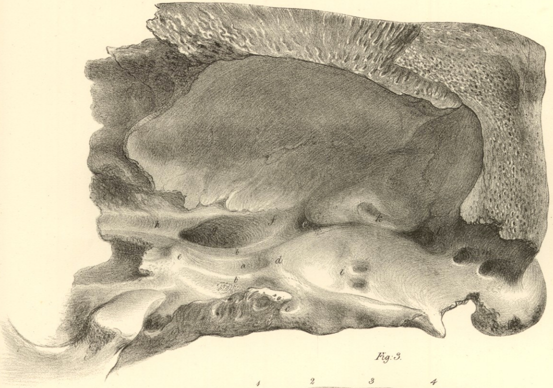


Fig: 2.

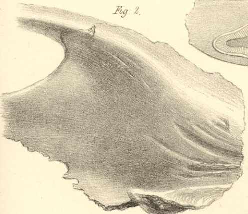


Fig: 3.

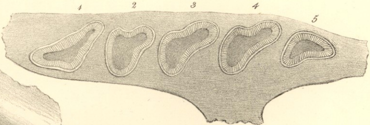
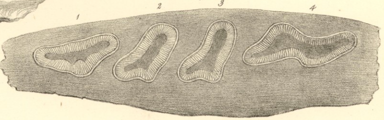


Fig: 4.



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Cranial Cavity and Dentition of Scelidotherium.

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Pl. XXIV

Cervical and Anterior Dorsal Vertebræ.

Fig. 1.

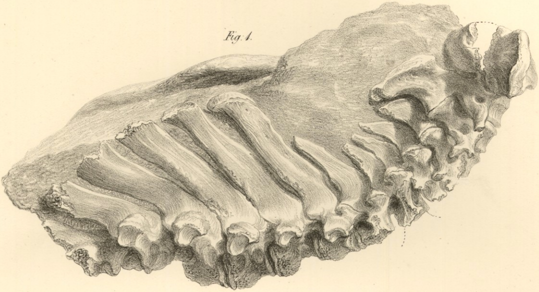


Fig: 2.

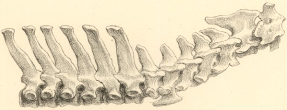
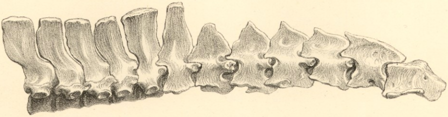


Fig. 3.

Fig: 4.



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Cervical and Anterior dorsal Vertebræ.

Fig: 1. Scelidothere. Fig: 2. Orycterope. Fig: 3. Armadillo. Fig: 4. Great Anteater.

One third Nat: Size.

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Scelidotherium. 1/3 Nat. Size.

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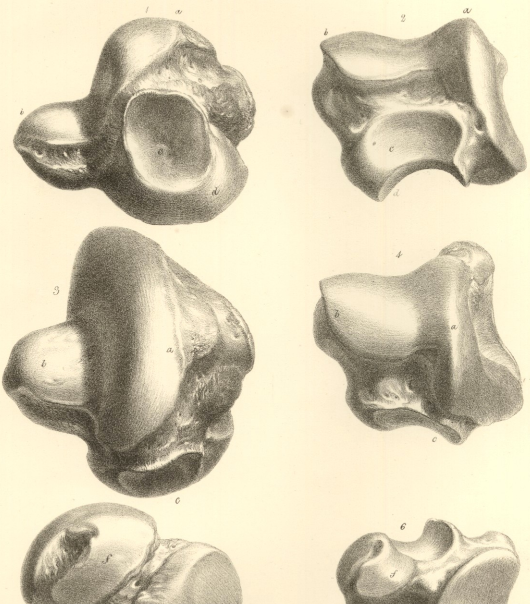
Left Astragalus.



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Left Astragalus.

Fig. 1.3.5. Megatherium: 1/3 Nat: Size. 2.4.6. Scelidotherium: 2/3 Nat: Size.

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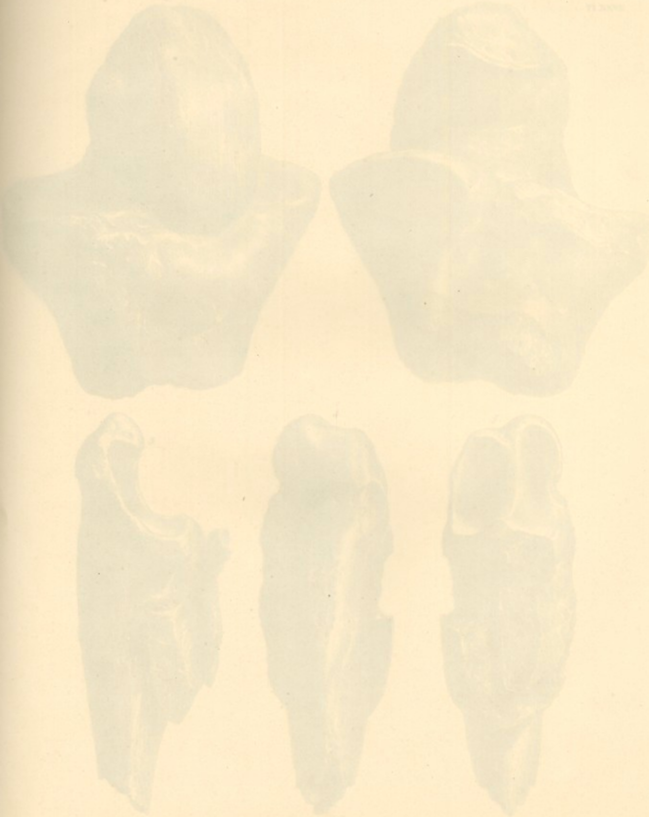

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Scelidotherium.

Fig: 1. 2. ⅔ Nat: Size. 3. 4. 5 Nat: Size.

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The Entomological portion of the work will be from the pen of W. S. Macleay, Esq., who has kindly undertaken that department. The rest of the descriptions will be furnished by Dr. Smith, who will add a summary of African Zoology, and an inquiry into the Geographical ranges of species in that quarter of the Globe.

Conditions of Publication.

The Work will appear periodically; and it is estimated that the whole will be completed in about thirty-four parts, price, on an average, Ten Shillings each. As it will be necessary that the plates be published promiscuously, they will be arranged in five divisions, viz. Mammalia, Aves, Pisces, Reptilia, and Invertebratæ. The plates of each of these divisions will be numbered independently, and the letter-press descriptions left unpaged, so that on the work being completed, they may be arranged either agreeably to the general classified order which will accompany the last number, or according to the particular views of the purchasers.

The whole of the Plates will be engraved in the highest style of Art, from Drawings taken expressly for this Work, and beautifully coloured after Nature.

THE FIRST FIVE PARTS ARE NOW READY.