ABSTRACT OF LECTURES
ON THE
ANATOMY, PHYSIOLOGY, AND ZOOLOGY OF THE EDENTATA.

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Lecture VIII.—Anatomy of the Armadillos (Dasypodidæ) *(continued)*.

The organs of generation differ much from those of the families previously described. There is nothing like a cloaca, the urino-genital and the anal apertures being far apart. In the male, the penis is of great size, though simple in structure, cylindrical, and tapering towards its apex. It consists chiefly of the corpora cavernosa, which are fixed posteriorly to the rami of the ischium, as in higher mammals. The corpus spongiosum, sometimes described as absent, forms a thin covering to the urethra, and does not dilate at its extremities, either into a glans or bulb. The testes are internal. There are a well-developed prostate and Cowper's glands in all, but vesiculæ seminales only in the genus *Tatusia*. In the female, the uterus is simple, and the vagina has no median partition as in the Sloths and Anteaters. The great size of the copulating organs is evidently, as long ago suggested by Professor Owen, related to the difficulties which would otherwise be interposed to sexual congress by the arrangements of the dermal armour, which, of course, do not occur in the Sloths and Armadillos. The fœtal membranes have not been fully described; but there is no reason to suppose that they differs essentially from those of the *Myrmecophagidæ*, the placenta being said to be oval or discoidal. A. Milne Edwards has described a remarkable condition in *Tatusia*, in which genus he found four fœtuses contained in a common chorion, attached to a single placenta of a zonary form, apparently the result of the coalescence of four originally distinct placentæ. Most Armadillos have but one or two young at a birth, but *Tatusia* a much larger number, sometimes as many as ten; but, as they have but four mammæ, many of the young in these cases are said to die. The other *Dasypodidæ* have only two mammæ, pectoral in position.

Fossil remains of Armadillos have been found by Lund and others in the caves of Brazil, in deposits of pleistocene age. Some of them are attributable to genera still existing, but others are assigned to distinct modifications of the type called *Euryodon*, *Chlamydotherium*, *Eutatus*, etc.

In the same region, but still more abundantly in the fluviatile deposits which cover the country in the neighbourhood of Buenos Ayres, and associated with the *Megatherium* and *Mylodon*, are found the remains of one of the most remarkable forms of mammals yet discovered. The first known example of this group received, in 1839, the name of *Glyptodon* from Professor Owen, and of *Hoplophorus* from the Danish naturalist Lund, almost simultaneously; but by the former name they are usually known. They differ from the existing *Dasypodidæ* in their large size, and in having the carapace composed of one whole piece (formed by the union of a multitude of bony dermal scutes), without any movable joints in the middle part; and in having also a ventral piece or plastron. The upper surface of the head was protected by a cephalic shield, as in the Armadillos. The facial portion of the skull was very short. The zygoma was complete, and furnished with a strong descending process, something like that of the Sloths, but formed of the maxillary and not the malar bone. The teeth in all the known species were eight in number, on each side, above and below, all much alike, having two deep grooves or flutings in the outer and inner surface, so as to divide them into three nearly distinct lobes. It is this grooving of the teeth that suggested Professor Owen's name of *Glyptodon*. The vertebral column was more strongly modified than in any other mammal—the greater part of it forming a solid tube for the spinal cord, without any proper bodies to the vertebræ. Enclosed as it was, in such an unyielding barrel-like shell, the power of motion, except at certain points, would be superfluous; but it is still very remarkable that so complete a modification from the ordinary form has been carried out. The atlas was always free. The axis, third, fourth, and fifth cervicals, was always united, forming a medio-cervical piece. The sixth was usually free, though in some species united to the last. The seventh cervical and two anterior dorsals were united together, forming the "postcervical" piece of Burmeister, or "trivertebral bone" of Huxley. This articulated, by a very peculiar ginglymoid joint, with the next segment, composed of the ten or eleven united dorsal vertebræ. The lumbar and sacral vertebræ all coalesced to form a solid tube. The anterior seven or eight caudal vertebræ were free and well developed; —the remainder were small and united. The complex joint at the root of the neck allowed the head to be retracted within the carapace, the anterior orifice of which would then be blocked up by the bony shield which, judging from the analogy of existing Armadillos, covered its upper surface. The limbs were very strong, and the feet broad and short, resembling externally those of an elephant or tortoise. The pelvis was very massive, and of remarkable shape; the crests of the ilia, and the median ridge formed by the conjoined spines of the sacrum, formed together a T-shaped piece, upon which the weighty cuirass was suspended. No clavicles have yet been found. The fore foot had never more than four toes. In some genera *(Panochthus* and *Hoplophorus)*, the first is wanting, and in others *(Glyptodon* proper) the fifth is absent. In *Dædicurus*, both outer toes are missing, leaving only three. The hind foot had usually five toes, though the hallux might be absent. All the ungual phalanges were broad and flat. The tail was of moderate length, enclosed in closely united bony plates, usually arranged in rings, and often provided with knobs or spikes, like a fabled giant's club. The bony scutes, of which the carapace was composed, are computed at from 2,500 to 2,800. As many as eighteen species of animals of this family have been described, arranged by Burmeister in five genera—viz., *Hoplophorus*, *Panochthus*, *Dædicurus*, *Glyptodon*, and *Schistopleurus*—distinguishable by the number of toes on the feet, and the characters of the carapace.

The remaining Edentata all belong to the old world. Those of the family *Manidæ* present some very singular characters. They are covered externally (except the under surface of the body and inside of the limbs) with large imbricated horny scales, with scattered hairs growing in the intervals; and, like the American Anteaters, they have no teeth, and a long, vermiform and protractile tongue. They are usually called *Pangolins*, or Scaly Anteaters; are all of small or moderate size; inhabitants of the hottest parts of Asia and Africa; terrestrial and burrowing; and feed mainly on Termites. One small African species climbs trees. They can roll themselves up in a ball when in danger. Their peculiar elongated form, small head, short limbs, long, gradually tapering tail, and scaly covering, give them, on a superficial inspection, more the appearance of reptiles than of mammals. The skull is somewhat of the form of an elongated cone, with the small end turned forward, very smooth, and free from crests and ridges. There is no distinction between the orbits and the temporal fossæ. The zygomatic arch is usually incomplete, owing to the absence of the malar bone. There is no distinct lacrymal bone. The palate is long and narrow. The pterygoids extend back as far as the tympanics, but do not meet in the middle line below. The tympanic is ankylosed to the surroundiug bones, and more or less bullate, but not produced into a tubular auditory meatus. The rami of the mandible are very slender and straight, without any angle or coronoid process. From near the anterior extremity of the upper edge a sharp cervical tooth-like process projects upwards and outwards. There are no clavicles, and no third trochanter to the femur. The ungual phalanges are bifid at their terminations. The caudal vertebræ, have very long, strong, transverse processes, and numerous chevron bones. The tongue is long, vermiform, flattened towards the tip; the retractor and sterno-glossal muscles arise from the hinder extremity of the immensely prolonged ensiform cartilage of the sternum. The stomach has thick muscular walls and lining membrane, and a special gland near the middle of the great curvature, consisting of a mass of complex secreting follicles, the ducts of which terminate in a common orifice. The interior of the stomach is nearly always found to contain a number of small stones, swallowed apparently, as in birds, for the purpose of aiding the triturating powers of the organ. There is no cæcum. The liver is provided with a gall-bladder. In the male, the testes are situated in the inguinal canal, and the penis is well developed, and separated by a distinct perinæum from the anal orifice. The female organs and placentation resemble those of many Ungulates, and are quite different from those of the American Anteaters, the uterus being bicornuate, and the placenta diffuse and non-deciduate.

Family *Orycteropodidæ*. This contains but one genus, *Orycteropus*, the best known species of which is the Cape Anteater *(O. capensis)*, or Aard-Vark (Earth-pig) of the Dutch colonists, from South Africa, an animal not altogether unlike a pig in size and general appearance. It lives in burrows in the ground, and feeds chiefly on ants and other insects. A second species, *O. æthiopicus*, inhabits the North-Eastern parts of Africa. Their external surface is scantily clothed with bristle-like hairs. In anatomical characters they are quite alike. The mouth is elongated and tubular, and the tongue extensile, though not to the same extent as in the true Anteaters. The total number of teeth appears to be from eight to ten in each side of the upper and eight in the lower jaw; but they are never all in place at one time, as the

small anterior teeth are shed before the series is completed behind. In the adult, they number usually five on each side, above and below, of which the first two are simple and compressed; the next two larger and longitudinally grooved at the sides; the most posterior simple and cylindrical. The structure of all these teeth is quite peculiar among mammals, though resembling that of some fishes. Their summits are rounded before they are worn; their bases do not taper to a root, but are evenly truncated and continually growing. Each tooth is made up of an aggregation of parallel dental systems, having a slender pulp-cavity in the centre, from which the dentinal tubes radiate outwards; and, being closely packed together, each system assumes a polygonal outline, as seen in transverse section. No evidence of any vertical succession of teeth has been discovered. The skull is moderately elongated, the facial portion subcylindrical, and slightly tapering. The zygoma is complete and slender. The tympanic is annular, and not ankylosed to the surrounding bones. The mandible is slender anteriorly, but rises high posteriorly, with a slender recurved coronoid process, and a small oval condyle, which looks as much forwards as upwards. Vertebræ, C 7, D 13, L 8, S 6, C 25. The large number of lumbar vertebræ is peculiar among Edentata. The tongue is less vermiform than in *Myrmecophaga*, being thick and fleshy at the base, and gradually tapering to the apex. The salivary apparatus is developed much in the same manner as in that genus, but the duct of the submaxillary has no reservoir. The stomach consists of a large subglobular cardiac portion, with a very thick, soft, and corrugated lining membrane; and a smaller, muscular, pyloric part, with a comparatively thin and smooth lining. There is a very distinct ileo-cæcal valve, and a considerably sized cæcum; also a gall-bladder. The penis is rudimentary. The uterus more bicornuate than in Manis, the two cornua opening separately into the vagina. The placenta is broadly zonular. The fore feet want the pollex, but all the other digits are well developed, with strong moderate-sized nails, suited for digging.

Extinct Edentata of the Old World.—Certain remains, chiefly of bones of the limbs, found in France and Greece, and assigned to genera called *Macrotherium* and *Ancylotherium*, united provisionally in the family *Macrotheriidæ*, indicate the existence of animals of large size, inhabiting Europe during the middle tertiary epoch, the characters of which appear to indicate a generalised Edentate form; or something intermediate between the Edentata and the Ungulata. In the structure of the phalanges, they most resembled the Manidæ; but there is some evidence that they possessed teeth. Some fragment from the Eocene of Paris are still more doubtfully assigned by Gervais to the order.

SURGICAL MEMORANDA.

COMPOUND COMMINUTED FRACTURE OF THE SKULL: PUNCTURE OF THE BRAIN AND PROTRUSION OF THE CEREBRAL SUBSTANCE: RECOVERY.

ON September 2nd, 1881, I was urgently summoned to a boy, named William Conolly, thought to be dead or dying. On my arrival, I found him in the following condition. The whole of the right parietal bone was broken in, with parts of the occipital, temporal, and left parietal, with an extensive lacerated wound penetrating the brain, and a good deal of the cerebral substance protruding the wound; some lying over the surface, mixed through the blood and hair. The boy was suffering from shock at the time, the face being very pallid, though not extremely cold; he had previously vomited partly digested food, mixed with blood and mucus. The pupils were dilated, perfectly equal; no strabismus; the pulse was weak and slow. He was unconscious. The accident had occurred about ten minutes previously, about two hundred yards from his own residence, where I saw him. This boy was, with some companions, climbing a tree, and was on a branch, about thirty feet from the ground, when he slipped, or the branch gave way with him, and he fell to the ground, head foremost, his head striking on a sharp-pointed stone, about as large as a man's head. The sharp point of the stone pierced the brain, as well as the broken and loose pieces of bone. Dr. Scott, of this town, had been summoned at the same time, and continued to treat the case with me to the end. We decided on not interfering further than to apply a very weak antiseptic lotion on lint. In less than three hours, the boy recovered consciousness, and was able to partially describe the cause of the accident. He said he felt nothing but "a sore head" and "very weak." About five months afterwards, a piece of bone came away, about half an inch long by a fourth of an inch broad, and, shortly afterwards, another smaller piece, and two or three more subsequently. During the treatment, there was a good deal of creamy-looking, not offensive pus. At this time, the wound has granulated over, and is perfectly closed and healed, and feels firm and hard under pressure. Though there is a good deal of depression on the right side of the head, it is every week filling up and getting more on a level with the other side.

During the whole progress of the case, the temperature hardly rose above normal, and never was up to 100°; nor was the pulse different in character or frequency from health. The only treatment was the weak cold antiseptic water lotion, which was kept constantly applied on lint, and mild aperients as required.

I think this case worthy of record from the extensive nature of the injury, involving the scalp, bone, dura mater, arachnoid, and brain itself; the rapid recovery of consciousness after such injury so caused; the absence of fever; the slight constitutional disturbance from so great an injury; and the simple treatment to which he was subjected. Rest in a darkened room, quiet, the weak antiseptic lotion, and occasional aperients, constituted the whole treatment necessary. This lad had been noted at school for his intelligence, application, and mental activity; and there appears to be no failure in these respects. There is not the slightest strabismus, the pupils are perfectly equal, and he has not developed the slightest paralytic symptom.

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PATHOLOGICAL MEMORANDA.

DILATATION OF THE STOMACH AND STRICTURE OF THE PYLORUS.

I HAVE lately read some observations on three cases of dilatation of the stomach, before the members of the Reading Pathological Society. One specimen was a pylorus, taken from a man under the care of Mr. Richardson, my partner. The patient died rapidly, rather than suddenly. On opening the abdomen, the stomach was seen much more distended, descending to the umbilicus. I happened to cut through its coats, when a bloody coloured fluid escaped. When I was prepared for its examination, I extended the incision through its whole length. It was filled with coagulated blood—not less than four pints, probably more. Hæmorrhage was plainly the cause of death. An examination of the mucous membrane of the stomach failed to find an ulcer. On removing the organ the pylorus was found hardened, and was seen to be irregular or uneven, the forefinger not easily passing through it. The duodenum was cut across, and the stomach removed. No doubt as to stricture could be entertained. It was probably scirrhous, and, if so, an explanation of the source of the ulcer and consequent hæmorrhage was afforded. As to the cause of the dilatation, this I believe to have been the stricture of the pylorus. Mr. Richardson told me the patient was obliged to live principally on slops; that, whenever he took solid food, it produced on its way to the stomach a sense of "scraping"; that, when at work, he would often stoop, resting on his knees, which would be followed by eructation of gas, and relief. Over the heart, Mr. Richardson heard a double *bruit*, which led him to consider that his symptoms depended on heart-mischief. This organ, however, showed no signs of disease, but the aorta was dilated, thin, and atheromatous, showing here and there a very thin spot. His age was 47. He belonged to the cavalry, and was a pensioner.

A second case I attended (first in the order of time), in which our late esteemed and able physician, Dr. Cowan, diagnosed dilatation of the stomach. A *post mortem* examination revealed stricture of the pylorus, and confirmed the diagnosis as to dilatation. This patient, a male also, died December 12th, 1871, aged 51.

The third patient I did not attend, seeing him only at his sister's on his way for change of air. I knew nothing of the diagnosis; all I heard was a narrative of stomach symptoms. He was pale in an aggravated form, so as to lead to a suspicion of malignant disease. His bowels were confined, and he had a frequent desire to empty them. A pill of one grain of the watery extract of aloes brought on action, followed by a discharge of blood, fainting, and death two or three hours afterwards. A *post mortem* examination, at which his medical attendant was present, revealed a dilated stomach and stricture of the pylorus. It was hardened, and it was difficult to pass the forefinger through it. We entertained no doubt as to there being stricture and dilatation. His age was 52, and he died June 8th, 1880. No cancerous deposit was found.

The ages of these three cases is worthy of remark—51, 47, 52. Dilatation was found in all, and also stricture of the pylorus. That dilatation should be diagnosed is of the highest importance; but the inference I should be inclined to draw from these cases is, that stricture of the pylorus exists, and is the cause of the dilatation. And when I say that stricture exists, I do not mean that there is obstruction; on the contrary, the pylorus neither forbids the passage of the contents of