

NOTES ON THE GROUP OF ANIMALS KNOWN AS THE MARSUPIALIA.

THE FOLLOWING PAPER WAS READ BY CHARLES COXEN, ESQ., M.L.A., BEFORE THE PHILOSOPHICAL
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Before treating on the habits, structure, and generalities of the group of mammals termed marsupialia (from *marsupium*, a bag or pouch), it will be as well that I should enumerate the principal genera belonging to the order, together with their distribution, they not being confined, as is generally supposed, to Australia.

The first-discovered species were found in America, and are contained in one genus, *Didelphys*, or American opossum. One of these, the Virginian opossum, is common in the United States, and some five or six other species are found in Mexico and South America. This genus, may be considered as the head of the group, from its possessing a higher degree of organisation. The species contained in this genus is confined to America (North and South): they are omnivorous, and are sometimes destitute of the abdominal pouch, the marsupial bones being only rudimentary. In New Guinea there are found several species affording examples of the genera *Phascogale* (or brush-tail rats), *Perameles* (or bandicoots), *Hysiprymus* (or kangaroo rats), *Phalangista* (or opossums), and *Petaurus* (or flying squirrels); to these may be added the *Dendrolagus* (or tree kangaroo); of this genus, only two species are at present known, and these are confined to New Guinea. On the islands of Timor, Amboyna, and Banda are found several species of the *Phalangista* (or opossums). But the great metropolis of the marsupials is Australia, where (in addition to those already named), we find widely distributed the genera *Dasyures* (or native cats), *Thylacinus* (or hyæna of Van Diemen's Land), *Phascolaretos* (or kola,) phasco-

lomys (or wombat), *Echidna* (or hedgehog), *Ornithorhynchus* (or duck-billed mole), and the *Macropodidæ* (or family of kangaroos.) The number of marsupials known in Australia exceeds seventy, and may be reckoned as forming four-fifths of the mammals of this continent and its adjacent islands.

Much discussion has taken place during the last thirty years as to the propriety of classifying the genera into one group, owing to their great dissimilarity in outward appearance and natural habits; some being omnivorous, some carnivorous, some insectivorous, and others herbivorous. Many of our eminent zoologists regarded the section marsupialia as an unnatural one, and arranged the species of this group in the various other orders of quadrupeds, and it was only after a careful investigation by Professor Owen, that all animals possessing the marsupial distinctions were admitted into one group or order. A few extracts from that learned Professor's papers on the "Osteology of the Marsupialia," will, I think, clearly show a different organisation, and justify the arrangement of a separate order. In the various memoirs on the anatomy of the marsupialia, Professor Owen has constantly found it necessary in his comparisons, to refer to the oviparous classes of vertebra:—"Both sexes in the marsupial genera," says this author, "manifest their affinity to the oviparous classes, in possessing two vena cava, and in the want of the inferior mesenteric artery, and the marsupial bones, so common in the skeletons of reptiles, are limited in the mammiferous class to this division, in which alone, from the peculiarly brief

period of uterine gestation, and the consequent non-enlargement of the abdomen, their presence might be expected. In the female they assist in producing a compression of the mammary gland, necessary for the alimentation of a peculiarly feeble offspring, and they defend the abdominal viscera from the pressure of the young, as these increase in size during their mammary or marsupial existence, and still more when they afterwards return to the pouch for temporary shelter." It is without doubt in the mammalia that the brain is perfected. "We can trace through the different orders the increasing complication of this organ, until we find it in man to have attained that condition which so eminently distinguishes him from the rest of the class; and if the introduction of new powers into an organism requires a modification in its mode of development, with what other than the perfection of the nervous system can we connect true viviparous or placental generation? for we do not perceive that in their digestion, circulation, respiration, locomotion, or temperature, the mammiferous vertebrata are in any degree advanced beyond the bird, in consequence of their more complex, or, as it may be termed, more careful generation." According to this view, Professor Owen undertook a careful examination of the brain of various marsupial animals, and the result was that besides the decreased size of the hemispheres of the brain and consequent exposure of the cerebellum, indicative of a low grade of organisation, the corpus callosum and spetum lucidum were found to be entirely wanting or at least existing only in a rudimentary state. The corpus callosum has been considered as the great characteristic of the brain in the mammalia, and the want of it in this order of mammals, coupled with the ovoviviparous generation of the marsupialia will, I think, warrant the placing of this order as the lowest organism in the class mammalia. The corpus callosum, which is the principal bond of union between the opposite hemispheres of the brain, is regarded as the great characteristic of the brain in the mammals, and in fact this commissural apparatus presents the essential difference which exists between that and the oviparous vertebrata classes. There is also a remarkable feature in the skull of the marsupials, which consists in the permanent separation of the greater portions of the bones; they do not ankylose in the adult individuals (as do most of the bones of the skulls in the placental series), the temporal bone generally presents a permanent separation of the squamous, petrous, and tympanic elements. "I have observed," says

Professor Owen, "this reptile-like condition of the bone in the mature skulls of the marsupials." The palatine portion of the skull is very imperfect, presenting large openings which are wanting in placental mammals; there is also a peculiarity in the lower jaw in all the species of the marsupialia, with the exception of the *Echidna* and *Ornithorhyncus*—"the angle of the lower jaw is as if it were bent inwards in the form of a process encroaching in various shapes and degrees of development in the different marsupial genera upon the interspace of the rami of the lower jaw. In looking down upon the lower margin of the lower jaw we see, therefore, in place of the margin of a vertical plate of bone, a more or less flattened surface extending between the external ridge and the internal process or inflected angle."

One of the most striking peculiarities in the marsupial animals consists in the premature birth of their young, and consequently, the imperfect state of development which they present at this period compared with other animals. The period of utero-gestation varies considerably in the different animals of this group. On the *macropas major*, or large grey kangaroo, it is about thirty-nine days, after which time it continues its foetal life in the pouch for ten or twelve weeks: the manner of conveying the embryo animal to the nipple, has not been fully ascertained, but I believe the mouth is the vehicle used. Professor Owen examined the young of the species above named twelve hours after birth: "It resembled an earthworm in the color, and semi-transparency of its integuments, adhered firmly to the point of the nipple, breathed strongly but slowly, and moved its fore legs when disturbed. Its body was bent upon the abdomen, its short tail tucked in between the hind legs, which were one-third shorter than the fore legs, but with the three divisions of the toe distinct; the whole length from the nose to the end of the tail when stretched out, did not exceed one-inch and one-sixth." Experiments have been made on a foetus of three weeks old by detaching it from the nipple, and after an hour's separation, it, on being held to the nipple, regained its hold, and sustained no injury. When the foetus is very young, it requires some little force to remove it, and in doing so an injury to the young animal might probably be done. Until it attains a certain age the pouch of the mother has its orifice closed, and as it were glued to the body of the parent by a peculiar secretion; as the young acquires strength this secretion disappears, and the young leave the pouch to return at will. They attain a large size before they entirely quit their retreat; and

a female, on being hard run with dogs, will frequently lighten her load by throwing out the young when they are one-third grown.

The old man kangaroo, as the male grey species is called, will sometimes run to a waterhole when pressed by the hounds, and there make a good fight, standing in about three or four feet of water, catching the dogs as they swim to him, and holding them under the water until they are glad to get away. When brought to bay they sometimes inflict very severe wounds on the dogs, and will at such times, if incautiously approached by man, seize the intruder and use him very roughly, throwing him down and stamping on him. In such cases it is best to lie perfectly still, as the dogs will draw his attention in some other direction. The largest species known at present is the "red kangaroo," or "soldier" of the interior; the female is of a leaden colour, and is known as the "blue flier." These are found on the borders of the plains amongst the small forests of myall and salt bush. They are very fast, and an ordinary kangaroo dog would have but little chance of catching one. Another large species, the black wallaroo, is found in high broken ranges, and on being disturbed, takes the most inaccessible places, and when followed by dogs, will not unfrequently beat them off. It is very fierce, strong, active, and dangerous to attack in its rocky home, without sure weapons. I have seen one throw a large and powerful kangaroo dog down a ravine of some thirty feet. Gould in his work on the macropodidæ, describes a large red wallaroo found on the Coburg peninsula as being very fierce and bold. These four species appear to comprise all the large and dangerous members of the family, the remaining species being very much smaller and easily killed, when caught. Some of them are found in high rocky hills, but mostly in scrubs and thickly timbered country. Some of the smaller species make nests of dried grass, where they secrete themselves during the day; amongst these latter ones there is the jerboa kangaroo described in Gould's work as *bettongia peucillata*. This interesting little animal is found on the Lower Namoi, and like other members of the genus, constructs a thick grassy nest in such a manner that it is difficult for a common observer to detect. The most curious part of their history, is the very peculiar manner in which they convey the grass to the spot selected for their nest; the tail, which is prehensile, is (as you will see by the drawing I lay before you this evening) curled round small heaps of grass collected together, and with its load the creature leaps homewards, carrying the grass hooped and secured by the tail, which is curved underneath.

Before closing this paper I will introduce to your notice the remaining genera of the marsupialia in their separate families. The family which stands nearest to the American opossum is the "Dasyuridæ" comprising three genera "Thylacinus," "Dasyurus" and "Phascogale" all of these are carnivorous; the first is confined, I believe, to Van Diemen's Land of which there are but two species and they are very rare. Some years ago, in the early days of the colony, these animals were destructive amongst the sheep and lambs, but are now rarely seen away from the rocky uninhabited parts of the island. The second is common in all the known parts of Australia, and is comprised of some four or five species, two of which are well known as being very destructive amongst poultry and called native cats; one of these is brown with white spots, and the other black with white spots. The remaining genus *Phascogale* is represented by the animal known best as the brush-tailed rat; this is also well known in our poultry yards. The family *Phalangistidæ* is the next, and is composed of three genera, *Phalangista*, *Petaurus*, and *Phascolarctus*—the first comprises the opossums: this genus numbers some twelve or fourteen species; many of them are known to us by their skins, particularly a species of Van Diemen's Land, which produces a very handsome and valuable fur. The second genus also comprises some twelve or more species, some of which are really very beautiful, and the skins when manufactured produce a fur almost as soft and fine as the famed chinchilla of South America. Some of this genus are very small, and very little exceed the common mouse in size. The last genus in this family is the *phascolarctus* or *kola*. The *phalangistidæ* are herbivorous, and of nocturnal habits, feeding at night on the leaves and young shoots of the eucalyptus and other trees, keeping during the day in holes in trees. The next family is represented by a single genus and a single species *phascalomys* or *wombat*. This animal is also nocturnal, and feeds at night on roots, herbs, and grass. It retires during the day to deep holes in rocks, or burrows made in loose sand. These burrows extend many yards. It is no easy matter to unearth these creatures, and the only method I am acquainted with is to dig them out; but the labour and time expended in so doing is so great that the wombat is seldom procured. The flesh is very good, and would be, I believe, much esteemed if it could be obtained by reasonable labour. The wombat has a peculiar manner of defending itself, which is particularly effective when attacked in one of the rocky holes they are frequently found in; as soon as he is alarmed, he hastens to the

farthest extremity of the low cave, and places himself in such a position that the rock protects his head and sides, and then with his hinder part towards the enemy, awaits the attack, but the instant it is touched the short hind legs are thrown up and no hold can be gained on its round hard hind quarters ; but the attacking party does not escape scatheless, for the head of the dog or the hand of the man, whichever it may be, is thrown

off with such force against the side and top of the rocky hole as to lacerate it severely and cause a retreat to be made.

The ornithorhynchus and echidna are insectivorous, and differ but very little from the marsupials herein described, except in the dental formation, and the formation of the lower jaw ; in every other respect they have the peculiar character of the marsupials.



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