

L.—*Observations on Pigs* (Sus, Linnæus; Setifera, Illiger) and their Skulls, with the Description of a new Species.
By Dr. J. E. GRAY, F.R.S. &c.

THE Pigs (*Setigera*) are a well-marked group, which have been recognized from the earliest times and are distinguished by the least-informed persons. They may almost be considered the best and most anciently known thick-skinned Mammalia, or *Belluæ* of Linnæus, or *Multungula* of Illiger.

Some palæontologists, who have only a rudimentary knowledge of zoology and anatomy, and chiefly confine their attention to the imperfect skeletons found in a fossil state, have separated the Pigs from the other *Belluæ* or thick-hided Mammalia, with which they agree in all their chief external and internal characters, and placed them with the Ruminants, because they have four toes on their feet, and call them *Artiodactyla*—thus destroying a group which has been acknowledged by the Greek philosophers and by the Jewish historians, and by Ray, Cuvier, and, indeed, naturalists of all times, to combine them with a series of animals to which they have little or no affinity.

There can be no doubt that a group that has been so universally adopted as the Ruminants or Pecora should not be destroyed without very weighty reasons and on account of most important characters; and I think that every one must allow that the habit of ruminating their food, and their strictly herbivorous diet, are much more important characters than the mere fact of the animals having four toes, and constitute a good reason for not placing with them in one group animals that do not ruminate, have a quite different dentition, live on a heterogeneous diet, and have entirely different habits, fighting with tusks instead of horns. This union is only to be compared to the separation of Marsupials from the other Mammalia on account of a character that can only be observed during parturition, and which no doubt is of the greatest importance to the physiologist, but is scarcely recognizable by the zoologist.

The palæontologists, in choosing to use the group *Artiodactyla* for the Ruminants and some of the *Belluæ* with four toes, have not only destroyed a well-established group, but they have separated the Pigs and Hippopotami from their real affinities to unite them to the Pecora by a character of comparatively little importance, and one which varies in almost all the groups that they refer to it, to define which they have been obliged to separate as two distinct suborders the Hyraces and the Elephant (*Hyracoidea* and *Proboscidea*) from the Ungulata, which are as truly *Belluæ* or thick-skinned animals

as any of the rest, and are at once known as such by any person who has an eye to the natural grouping of Mammalia.

The division of the hoofed animals (Ungulata) into the Artiodactyla and the Perissodactyla has been regarded by many as an important discovery, especially by certain palæontologists; but if they had taken the trouble to read the history of zoology they would find that these terms are only Greek names for groups recognized and named in Latin by Ray, Latreille, and others.

It is amusing but sad to see the various explanations and the different theories which are put forth to make the tapirs, that have four toes before and three behind, and the horse, that has only one toe, odd-toed Ungulates or Perissodactyla, like the rhinoceros, that has only three toes on each foot; and they have been obliged to put *Hyrax* and the elephant into a separate order, because it is rather difficult to explain into which it ought to go (see Flower's 'Osteol. Mam.' pp. 264–267, figs. 90–98).

At the same time I do not at all underrate the importance of observing the structure and proportion of parts in the arrangement and definition of the minor groups. Thus it would appear that the equality of the two middle toes, which represent the middle and ring fingers of the human hand, is an important character in the Pecora or ruminant animals, and in the pigs (Setifera) and the Obesa (Hippopotami); while the greater length and thickness of the middle toe, representing the middle finger of the human hand, makes a modification in the form of the feet of these animals—especially as this toe is always present, while one or more of the side toes may be rudimentary or entirely absent, as may be expressed in the following table:—

	Toes of fore feet.	Toes of hind feet.
<i>Elephas</i>	1, 2, 3, 4, 5.	1, 2, 3, 4, 5.
<i>Hyrax</i>	0, 2, 3, 4, 5.	0, 2, 3, 4, 0.
<i>Tapirus</i>	0, 2, 3, 4, 5.	0, 2, 3, 4, 0.
<i>Rhinoceros</i>	0, 2, 3, 4, 0.	0, 2, 3, 4, 0.
<i>Equus</i>	0, 0, 3, 0, 0.	0, 0, 3, 0, 0.

Sometimes, as in the elephant, the middle toe is very little longer than the rest.

The name *Perissodactyla* has been given to the three latter genera; but I cannot conceive a slight difference in the proportion of these toes to be of ordinal importance. It is no doubt an important character in the definition of minor groups, but scarcely of higher importance, as having little influence on the habits and manners of the animals, and as separating groups

nearly allied to each other and having the same habits and appearance.

Artiodactyla and Perissodactyla are very good technical terms to define that form of the feet in which the middle finger is longer and thicker, and that in which the middle and ring fingers are equally thick—just as one might apply Chirodactyla to those animals that have the thumb-like great toe larger than the rest, and Ptychodactyla to those that have the outer and inner toes longer and stronger than the intermediate three, as in the hind feet of the seals.

The real fact is that each group of animals has a peculiar kind of foot, that will not bend itself to human systems without being distorted to suit their authors' views or theories. I think it is much better to take the facts as they are, and admit that in the bones of the feet, as in all other parts of the body, there is a network of affinities, not in a single line, but in various directions.

SETIGERA.

Section A. HOMODONTINA. *The premolars permanent, forming with the molars a continuous series; molars solid, with a tubercular crown.*

Subsection 1. Pseudoperissodactyla. *Hinder feet with three toes; the short external lateral toe of the hind feet wanting.* Western Hemisphere or America.

The two middle front toes of the fore and hind feet are of equal size, as in the pigs; and these animals are placed in the Artiodactyla, although they have an odd number of toes on the hind feet, which we are told are more to be depended upon than the front feet as giving a character of the group. It has been well observed that "the attempt to define these groups will break down with the increase of our knowledge of fossil forms," overlooking the fact that they did break down when the recent genera were properly studied. As regards number of toes they agree with the tapirs, which are referred to the Perissodactyla or odd-toed Ungulata.

True pigs are found in America, but only in a domestic or semidomestic state, having been introduced from Europe or Asia.

Family **Dicotylidæ**, Gray, Cat. B. M. p. 300.

The sides of the skulls are dilated and much expanded in front of the orbit as far as the zygomatic arch. Both the peccary or tajacu and the taguicati (or white-lipped peccary) are at birth of a pale brown colour, not striped; and the

peccary has the white collar well marked in this stage, but it much sooner assumes its dark livery than the white-lipped peccary.

This family contains only two recent species, *Notophorus torquatus* and *Dicotyles labiatus*. The skulls of the two genera are very different, and are immediately known from one another—the skull of *Notophorus* having a groove of a vessel over the eye curved to the lateral margin, then bent back over the canines and continued to the end of the nose. In *Dicotyles labiatus* the groove of the vessel over the orbit is only continued to the lateral margin of the front of the zygomatic arch. It is to be observed that De Blainville, in his 'Ostéographie,' figures them both under the name of *Sus torquatus*, t. iii. & v.

Subsection 2. Artiodactyla. *Fore and hind feet with four toes; the lateral toe of each side much shorter.* The Eastern Hemisphere, or Europe, Asia, and Africa.

Family Suidæ.

Head conical. Upper canines of the males elongate and more or less recurved, and enclosed in a bony sheath at the base. Teeth 40–44; cutting-teeth $\frac{3.3}{3.3}$; premolars $\frac{3.3}{3.3}$ or $\frac{4.4}{4.4}$. Teats ten, rarely eight. Skull with the sides of the nose in front of the orbit more or less deeply concave. Tail elongate.

The males have a large thick canine and a longitudinal ridge over the sheath of its base; this ridge is wanting in the females.

The swine of the western hemisphere have four toes on the front and hind feet.

Tribe I. POTAMOCHÆRINA.

Ears elongate, attenuated and pencilled at the end. The concavity in front of the orbit without any ridge on the lower part from the front of the zygomatic arch. The sheath of the upper canines expanded out, of the males largest and with a ridge across its upper surface, of the females often bent up at the outer margin.

1. POTAMOCHÆRUS. Africa.

Tribe II. SUINA.

Ears rounded, in the domestic state elongate, drooping, not pencilled at the end. The concavity in the skull in front of the orbit with a ridge on the lower part from the front of the zygomatic arch. Cutting-teeth $\frac{3.3}{3.3}$. The front grinders close to the back of the upper canine, which in the males is bent

upwards and outwards. The sheath of the upper canine of the males is spread out, with a ridge or crest across its upper surface; that of the females is often slightly bent up at the end.

Wild Swine. Ears moderate, hairy.

1. EUHYS.

Head elongate, twice as long as high at the occiput. Cheeks and throat covered with long projecting hairs. Lower canines of the males elongate, slender, convex on the sides and rounded in front. The front false grinders near the base of the canines separated from the other grinders by a rather broad diastema. Sheath of the upper canines in the males with an elongated ridge, which has a straight top.

Euhys barbatus.

Sus barbatus, Müller.

2. AULACOCÆRUS.

Head conical, about once and a half as long as high at the occiput. Male, the upper canines keeled in front with a very high keel across the base of the sheath; the lower canines triangular, flat on the sides, and keeled in front.

Aulacochærus vittatus.

Head, body, and legs covered with black bristles; bristles of forehead and neck white-tipped; streak round angle of mouth and lower part of cheek white.

Sus vittatus, Müller.

3. DASYCHÆRUS.

Head elongate conical, more than once and a half the length of its height at the occiput. Nose with a large flat-topped wart on each side over the angle of the mouth, with a tuft of elongate pale bristles on the lower part of each cheek. Males with a compressed ridge across the sheath of the upper canines; lower canines triangular, flat on the outer side and keeled in front. Black, with a tuft of yellow hair on each side of the jowl.

Dasychærus verrucosus.

Head nearly twice as long as high at the occiput. Black, underside and front of thighs pale.

Sus verrucosus, Müller.

Dasychærus celebensis.

Head about once and a half as long as high at the occiput. Animal black below.

4. *Sus*.

Head conical, about once and a half as long as high at the condyles, without any or only a very small wart on the side of the head. Ears ovate. The upper canines of the males recurved, with a more or less keeled ridge across the sheath at their base; lower canines of the males triangular, flat on the outer side, and keeled in front.

Sus scrofa.

Hab. Europe. And other species.

Sus mystaceus, n. sp.

Brown, with scattered black bristles on the muzzle, forehead, sides of cheek, and sides of body; crest and hinder part of body browner; streak on each side of nose and over angle of mouth elongate; whiskers (on the black cheeks), gullet, throat, chest, front of shoulders, thighs, and underside of body whitish.

Skull: concavity on the sides broad and deep, only separated from the orbits by a very narrow ridge; the sheath of the upper canines with a keeled ridge, and convex on the outside of it.

From the Zoological Gardens. Said to have come from Java; but I think that very doubtful. It is not like any of the animals described by the Dutch zoologists.

Domestic Swine. Ears more or less dependent, often very large.

SCROFA.

Scrofa domestica.

CENTURIOSUS.

Centuriosus pliciceps.Tribe III. *BABIRUSSINA*.

Ears rounded, not pencilled at the end. Cutting-teeth $\frac{2.2}{3.3}$; the front grinders separated from the upper canines by a long diastema. Upper and lower canines of the male much elongated and recurved; the sheath of the upper canines elongate, arising from the outer side of the margin of the upper jaw, and closely

applied to, but separate from, the side of the nose, without any or only a very slight indication of a cross ridge; not developed in the females, and its usual situation indicated by a sharp-edged ridge just above the lower margin of the upper jaw in front of the grinders. The males have a deep concavity on each side of the roof of the hinder upper part of the inner nostrils; in the females this part is only slightly concave. I cannot find any exit from these pits, which are very deep.

Blainville figures the skeleton of a female and gives a cross section of its skull, and also the skull of a male. He represents the canine tooth of the female as just appearing out of a very short sheath on the side of the upper jaw, considerably above the lower edge. It probably may be the skeleton of a young male; at least the skull in the museum, said to be a female, does not show any indication of the canine.

The bullæ of the ears are oblong and elongate. No such concavity exists in the back of the nasal cavity in any of the pigs that I have examined; but there is a deep pit on each side of the centre of the hinder part of the nasal cavity in *Phacochærus*, which is small in the young and larger in the more adult skulls. In the adult skulls there is a very deep concavity on each side of the roof of the inner nostrils in front of these pits, which are separated from each other by a thin, erect, longitudinal plate. These concavities are scarcely perceptible in the skulls of the very young animals.

The bullæ of the ears of the skulls of the very young *Phacochærus* are large, nearly hemispherical, and very prominent; but in the adult skulls they are small and scarcely separated from the rest of the skull.

BABIRUSSA.

Canines of the males elongate, convex at the sides, the lower ones rounded, scarcely keeled in front; of the females, wanting in the upper jaw, and only short, conical, and slightly recurved in the lower.

Babirussa alfurus.

The skulls of the adult males present two very distinct varieties. In one the upper and lower canines are very long and gradually arched; in the other the upper and lower canines are short, not more than three inches long, the upper ones being very much curved, sometimes nearly into a circle.

Section B. EURODONTINA. *Premolars deciduous, their places being filled up by the development of the molars; molars formed of laminæ, many-rooted.*

Family *Phacochoeridæ*.

PHACOCHÆRUS.

Zygomatic arch very broad, with only a very slight broad concavity in front of the orbit. Lower canines triangular; the upper canines bent upwards and outwards, very large and thick, with a ridge across their sheath as in the *Suidæ*, but in both sexes. Lower canines flat on the outer sides and keeled in front. The sheath of the upper canines with a very obscure ridge across the middle in skulls said to belong to the two sexes which were living in the Zoological Gardens. The sheath and upper canines of the females are rather smaller and more elongate than those of the males.

Phacochoerus æthiopicus.

Phacochoerus Æliani, Rüppell.

Phacochoerus Sclateri, Gray, Ann. & Mag. Nat. Hist.
1870.

Phacochoerus Æliani and *P. africanus*, Sclater.

Dr. Sclater described a young female African pig, with very small canines and small ovate ears with short hair, in the Zoological Gardens, as distinct from *P. æthiopicus*, under the name of *P. Æliani* (Proc. Zool. Soc. 1869, pp. 276, 277, fig. head, & t. xx. animal). In the 'List of Vertebrate Animals in the Zoological Gardens,' 1872, p. 83, the figure of the head is repeated as that of the young of "*P. africanus*, Gmelin," with the English name of "Ælian's Wart-hog." Gmelin established *Sus africanus* on the "Sanglier du Cap Vert" of Buffon (xiv. p. 209, xv. p. 148), and on the "Cape-Verd Hog" in Pennant's 'History of Quadrupeds,' vol. i. p. 146, which was established from Buffon's description and from a head in the Leverian Museum; and he adds to Buffon's description that the ears are "narrow, upright, pointed, and tufted with very long bristles." Buffon only describes the skull, tail, and hoofs of this animal, but says it has two teeth in the upper jaw, and says nothing about its ears.

The animal described and figured by Dr. Sclater is still living in the gardens, and no longer has small short canines; they have become elongate, conical, and bent upwards, like the

canines of the female *Phacochoerus æthiopicus*, which, as Rüppell and Sundevall say and the specimen in the museum proves, are very like those of the male, only they are smaller and more elongate.

There is a skull of this pig in the British Museum from the Cape-Verd Islands, which is exactly like the skulls of the other *Phacochoerus æthiopicus*.

If the animal is to be distinguished from the common *Phacochoerus æthiopicus* by the small size and oval form of and short hair on its ears, it is not the Cape-Verd hog of Buffon and certainly not of Pennant, from which Gmelin described *Sus africanus*. Indeed it is very probable that the head which Pennant described from the Cape of Good Hope in the Leverian Museum, which he says has the ears "narrow, upright, pointed, and tufted with very long bristles," was the head of the common African pig (*Potamochoerus africanus*), peculiar for having "narrow elongate ears, with tufts at the end,"—and that his description is made up of two genera; for Buffon's description of the skull of the "Sanglier du Cap Vert" is evidently that of a *Phacochoerus*, and, I believe, of *P. æthiopicus* with broad hairy ears, because that animal always has two cutting-teeth in its upper jaw in the very young state, and there is no doubt that one or both drop out before the animal arrives at maturity, and their presence or absence is a mere accident, and not a specific character.

It cannot be *Ælian's* Phacochoere (*Phacochoerus Æliani* of Rüppell), as that was first described and figured as having (and the typical specimen that is in the British Museum has) large, broad, hairy ears, like the figure of the male given by Dr. Sclater as the type of *Phacochoerus æthiopicus*.

If the animal in the Zoological Gardens does not as it grows older have the ears become broader and more hairy, like the ears in the adult male and female *Phacochoerus æthiopicus*, it must be a distinct species, to which my name of *Phacochoerus Sclateri* will have to be given.

See Ann. & Mag. Nat. Hist. 1870, vi. pp. 189, 264, 455, and 1871, viii. p. 138. See also Proc. Zool. Soc. 1850, p. 78, t. xvii., where two young animals, then in the Zoological Gardens, from Natal, with small oval ears, are noticed and figured; they were said to be fifteen months old. But can these be the animals that were afterwards called in the Gardens *Phacochoerus æthiopicus*, and had large hairy ears?



Gray, John Edward. 1873. "L.—Observations on pigs (*Sus*, Linnæus; *Setifera*, Illiger) and their skulls, with the description of a new species." *The Annals and magazine of natural history; zoology, botany, and geology* 11, 431–439.

<https://doi.org/10.1080/00222937308696847>.

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DOI: <https://doi.org/10.1080/00222937308696847>

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