CLOVEN-FOOTED HORSE.

Equus Bisulcus. *E. pedibus bisulcis. Lin. Syst. Nat. Gmel. p.* 209.
Horse with cloven hoofs.
Le Gnemel, ou Huemel. *Molin Chil. p.* 303.
Huemel. *Pennant Quadr.* 1. *p.* 15.

THE very name of this species seems to imply a kind of equivocal and anomalous being; one of the most prominent characters of the present genus being a simple or undivided hoof. Indeed if only a single specimen of this animal had been described, we might have hesitated as to admitting it otherwise than as an accidental variety.

The cloven-footed Horse is a native of South America, and was first described by Molina in his Natural History of Chili. In its general appearance, size, colour, and many other particulars, both external and internal, it resembles the Ass; but has the voice and the ears of a Horse, and has no cross or transverse band over the shoulders. It is very wild, strong, and swift, and is found in the rocky regions of the Andes or Cordilleras of Peru and Chili. The hoofs are divided like those of ruminant animals.

It is singular that this curious species, which seems, as it were, to form a kind of link between the cloven-hoofed and whole-hoofed tribes, should have so long remained unknown to the naturalists of Europe.

HIPPOPOTAMUS. HIPPOPOTAMUS.

Generic Character.

Dentes Primores in utraque maxilla quatuor: superiores per paria, remoti: inferiores prominentes, intermediis longioribus.

Laniarii solitarii, inferiores longissimi oblique truncati, recurvati.

Pedes margine unguiculati.

Front-teeth in each jaw four: the superior ones standing distant, by pairs: the inferior prominent, the two middle ones longest.

Canine-teeth solitary, those of the lower jaw extremely large, long, curved, and obliquely truncated.

Feet armed at the margin with four hoofs.

AMPHIBIOUS HIPPOPOTAMUS.

Hippopotamus Amphibius. *H. pedibus quadrilobis. Lin. Syst. Nat. p.* 101.

Ash-coloured Hippopotamus, with four-lobed feet.

Hippopotamus. *Pliny. Gesn. Aldrov. Jonst. &c. &c.*

Hippopotamo. *Zerenghi monogr.*

Hippopotame. *Buff.* 12. *p.* 22. *pl.* 3. *and Suppl.* 6. *p.* 68. *pl.* 4, 5.

Hippopotame. *Pennant Quadr.* 1. *p.* 167.

THE Hippopotamus is an animal which, from its superior size, and peculiar manner of life, appears, like the Elephant, to have attracted the ob-

HIPPOPOTAMUS.

servation of mankind in the earliest ages. It is a native of the warmer regions of the globe, and is chiefly found in the middle parts of Africa, inhabiting large rivers, and especially such as run through countries overshadowed by large forests; walking about at the bottom, and raising itself at intervals to the surface, for the purpose of respiration. By night it quits it watery residence, to graze in the neighbouring plains, devouring great quantities of herbage, and with its vast teeth destroying the more tender kind of trees and other vegetables. It is sometimes seen even in the sea, at some distance from the mouths of rivers; but this is supposed to be merely for the purpose of spatiating more at large, by way of exercise; for it will not even drink salt water, and does not prey on fish, or indeed live on any kind of animal food. The general size of the Hippopotamus seems to be nearly equal to that of the Rhinoceros, and it is sometimes even superior * Its form is highly uncouth; the body being extremely large, fat, and round; the legs very short and thick; the head very large; the mouth extremely wide, and the teeth of vast strength and size; more particularly the tusks or canine teeth of the lower jaw, which

* Authors vary considerably in their accounts of the size of this animal. It is said that some specimens have measured seventeen feet in length, seven in height, and fifteen in circumference, the head alone measuring three feet and a half. It is added, that twelve oxen have been found necessary to draw one ashore which had been shot in a river. Hasselquist says the hide is a load for a

are of a curved form, subcylindric, striated in a longitudinal direction, and obliquely truncated or cut off at their extremities: they sometimes measure more than two feet in length, and weigh upwards of six pounds each. Those in the upper jaw are much smaller. The front teeth in the upper jaw are of moderate size: those of the lower jaw are very strong, of a somewhat conical form, slightly pointed, and project forwards almost horizontally: the lips are very thick and broad, and are beset, here and there, with scattered tufts of strong, short bristles: the nostrils are rather small: the eyes small and black: the ears small, slightly pointed, and lined internally with short soft hair: the tail is thick, short, slightly compressed, sparingly covered with hair, and marked by several strong circular wrinkles: the feet are very large, and are divided into four segments or toes, each armed or covered with a strong short hoof. The whole animal is covered with short hair, which is much more thinly set on the under parts than on the upper. The Hippopotamus, when just emerged from the water, appears of a palish brown, or mouse-colour, with a blueish or slate-coloured cast on the upper parts; and the belly is flesh-coloured, the skin appearing through the hair. When perfectly dry, the colour is an obscure brown, without any of the blueish cast. The skin is most excessively tough and strong, except on the belly, where it is considerably softer. This animal is the *Behemoth* of the sacred writings, where it is poetically described as

drinking up a river, and having bones as strong as brass*, and ribs of iron. Its voice is a peculiar kind of interrupted roar, between that of a bull and the braying of an Elephant. When on land, it moves in a somewhat slow and awkward manner, but if pursued, can run with considerable speed, and directly plunging into the water sinks to the bottom, and pursues its progress beneath. It is observed to be extremely cautious of making its appearance by day; especially in such places as are much frequented by mankind; scarcely lifting its nose above the surface while breathing; but is fearless in rivers which run through unfrequented regions; where it is occasionally seen to rush out of the water with sudden impetuosity, trampling down every thing in its way; and at such times is, of course, highly dangerous. It is, however, naturally of a harmless disposition; not attacking other animals, but merely committing havoc in plantations of maize, rice, sugar-canes, &c. and destroying the roots of trees, by loosening them with its vast teeth. It is capable, notwithstanding its great bulk, of swimming very swiftly. Sometimes Hippopotami are seen going in herds, or companies, to the distance of some miles from the bank of a river, in quest of food. If wounded in the water, they become furious, and are said to attack the boats or canoes, from whence the injury proceeded, and either overturn or sink them, by biting out large

* Job. c. 40.

pieces from the bottom. The Hippopotamus sleeps in the small reedy islets which are found here and there in the rivers it frequents. In such spots it also brings forth its young; having only one at a birth, which it nurses with great care for a considerable time. The young is capable of being tamed, and we are assured by Belon that he saw one so gentle as to shew no inclination to escape, or to do any kind of mischief when let out of the stable in which it was kept.

These animals are said to be most successfully taken by preparing pitfals for them, of large size, near the rivers. They are also occasionally shot, or killed with harpoons. Their flesh is reckoned good by the Africans, and the fat is said to be a fine kind of lard. But it is chiefly on account of the teeth, and more particularly of the tusks, that this animal is killed; their hardness being superior to that of ivory, at the same time that they are not so subject to become yellow; for which reason they are much used by the dentists. The skin, from its great thickness and strength, when dried, is used by the African nations for bucklers or shields, and is said to be proof against the stroke of a bullet; and indeed the living animal, if shot at any where but on the head or the belly, is scarcely vulnerable; the tough skin causing a bullet to glance from its surface.

The Hippopotamus was known to the ancient Romans, and we are told by Pliny that *Scaurus* treated the people, during his ædileship, with the

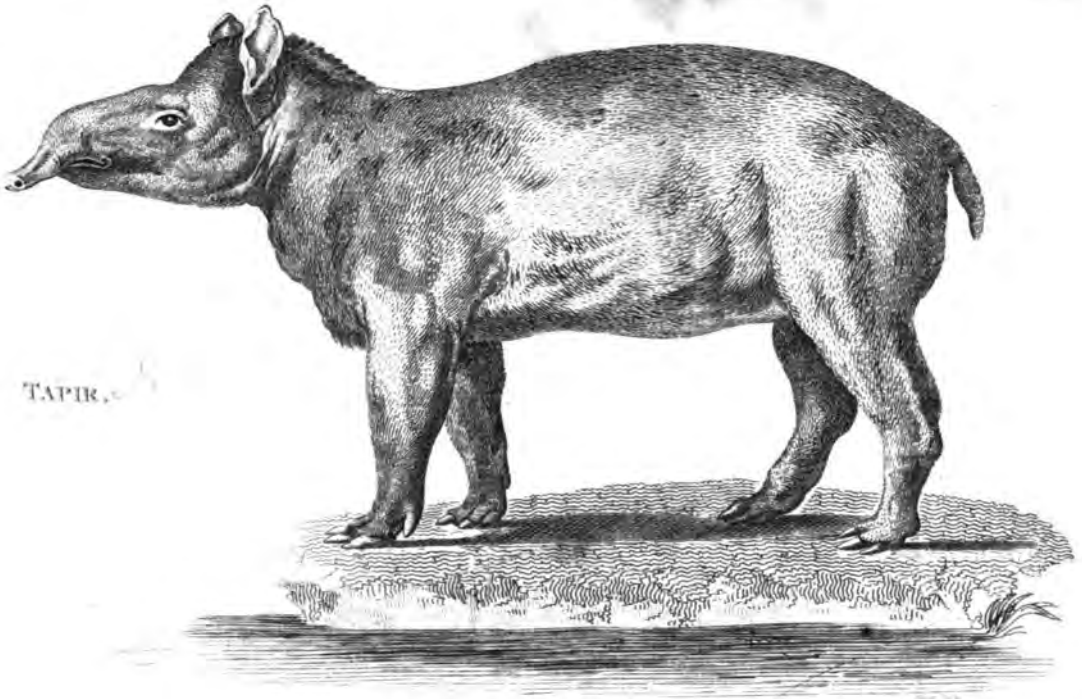
sight of four crocodiles, and one Hippopotamus. They were exhibited in a temporary lake prepared for the purpose. Augustus is also said to have exhibited one on his triumph over Cleopatra. The animal, however, was not so far noticed as to have been properly described by the ancients; neither Aristotle nor Pliny giving accurate accounts of it; nor was it till about the beginning of the seventeenth century that it could be said to be justly described. At that period Zerenghi, an Italian surgeon, printed at Naples a tolerably accurate description, accompanied by a figure from the dried skin. The same figure is also repeated in Aldrovandus, &c. It is but lately that the full history of the animal has been known, and that accurate and satisfactory representations of it have been published; and this has been chiefly owing to the laudable and zealous efforts of Dr. Sparmann, Colonel Gordon, Mr. Masson, and others, in examining the living animal in its native regions, and by their observations contributing to complete the descriptions of naturalists.

The largest female Hippopotamus killed by Colonel Gordon was about eleven feet long, and the largest male, which always exceeds the female in size, about eleven feet eight inches. Mr. Bruce, however, speaks of Hippopotami in the lake *Tzana* of more than twenty feet long.

The Hippopotamus has only a single stomach, and does not ruminate: the stomach, however,

has certain cells and divisions, analogous, in some degree, to those of the Camel.

Mons. Sonnini thinks it not improbable that there may in reality exist two species of Hippopotamus; one of which confines itself entirely to rivers and fresh waters, and the other to the sea.



TAPIR.

TAPIR. TAPIR.

Generic Character.

Dentes Primores in utraque maxilla decem?	*Front-teeth* in both jaws ten?
Laniarii * solitarii, incurvati.	*Canine-teeth* in both jaws single, incurvated.
Molares utrinque quinque, latissimi.	*Grinders* in both jaws five on each side, very broad.
Pedes ungulis tribus, anticis ungula succenturiata.	*Feet* with three hoofs, and a false hoof on the fore-feet.

AMERICAN TAPIR.

Tapir Americanus. *Lin. Syst. Nat. Gmel. p.* 216.
Brown Tapir, with lengthened snout.
Hippopotamus terrestris. *H. pedibus posticis trisulcis. Lin. Syst. Nat. edit.* 10. *p.* 74.
Danta. *Nieremb. Hist. Nat. p.* 187. *Jonst. Quadr. p.* 216.
Anta. *Marcgr. Bras. p.* 229.
Sus aquaticus multisulcus. *Barr. Fr. Equin. p.* 160.
Long-nosed Tapiir. *Pennant Quadr.* 1. *p.* 163.
Le Tapir. *Buff.* 11. *p.* 444. *pl.* 43. *and Suppl.* 6. *p.* 1. *pl.* 1.

THE Tapir, with respect to the size of its body, may be considered as the largest of all the native

* In the Gmelinian edition of the Systema Naturæ, the generic characters of this animal are somewhat differently given; the canine-teeth being said to be wanting; but I think we may depend on the description of the teeth by Mons. Bajon, published in the Memoirs of the French Academy.

quadrupeds of South America, except the lately discovered *Equus bisulcus* of Molina. When full grown it is nearly equal to a heifer. In its general form it bears some distant resemblance to the Hippopotamus, and in the earlier editions of the Systema Naturæ was ranked by Linnæus in that genus, under the title of Hippopotamus terrestris. By others it has been considered as more allied to the Hog, and has been called *Sus quaticus multisulcus*, or Water Hog with fingered hoof. But, in reality, the Tapir cannot properly be associated, otherwise than by a distant general alliance, with any other quadruped, and forms a peculiar genus. It is of a gregarious nature, and inhabits the woods and rivers of the eastern parts of South America; occurring from the isthmus of Darien to the river Amazons; feeding chiefly by night, and eating sugar-canes, grasses, and various kinds of fruit. Its colour is an obscure brown, the skin itself being of that cast, and covered sparingly with somewhat short hair: the young animal is said to be commonly spotted with white. The male is distinguished by a kind of short proboscis or trunk, formed by the prolongation of the upper lip to some distance beyond the lower: this part is extensile, wrinkled at the sides, and in some degree resembles that of the Elephant on a smaller scale, though not of the same tubular structure: the neck is very short, and furnished above with a rising mane: the body is thick and heavy; the back much arched; the legs short; the fore-feet divided into

four toes with pointed hoofs; the hind into three only: the tail is very short, thickish, and pointed. The female is said to be destitute of the proboscis*.

In its manners this animal is perfectly harmless; endeavouring merely to save itself by flight when pursued, plunging into some river, if at hand, and swimming with great readiness, and even continuing for a considerable time under water, in the manner of the Hippopotamus. The young is easily tamed, and may be rendered domestic, as is said to be the case in some parts of Guiana. In feeding the Tapir makes use of the trunk in the same manner as the Rhinoceros of its upper lip, to grasp the stems of plants, leaves, &c. Its most common attitude, when at rest, is sitting on its rump, in the manner of a dog.

The Tapir has been occasionally imported alive into Europe. The flesh is considered by the South Americans as a wholesome food, though not very pleasant or delicate, and the skin serves for various purposes where a strong leather is required: the Indians make shields of it, which are said to be so hard that an arrow cannot pierce them. This animal sleeps much by day in the retired parts of the woods, and is shot by the Indians with poisoned arrows. When attacked by dogs, it is said to make a very vigorous resistance. Its voice is

* It is thus described and figured by Mr. Allamand, but Mons. Sonnini, in his edition of Buffon, is inclined to doubt this circumstance.

a kind of whistle, which is easily imitated, and thus the animal is often deceived and trepanned. It is rather slow in its motions, and of a somewhat inactive disposition.

The Tapir produces but one young at a birth, of which it is extremely careful; leading it early to the water, in order to instruct it in swimming, &c.

Mons. Bajon, a surgeon at Cayenne, has communicated some very good observations on this animal to the French Academy of Sciences for the year 1774, which are inserted into the sixth supplemental volume of the Count de Buffon's Natural History.

"The figure of the Tapir," says Mons. Bajon, "bears some general resemblance to that of a Hog; but he is of the height of a small mule; having an extremely thick body, and short legs. He is covered with hair of a longer kind than the horse or ass, but not so long nor thick as that of a hog. His mane, which is strait, is but little longer than the rest of the hair, and reaches from the top of the head to the shoulders: the head is large and long; the eyes very small and black: the ears short, and somewhat like those of a hog. He is provided with a trunk on the upper lip of near a foot long, the movements of which are extremely supple, and in which resides the organ of smell, as in the Elephant, and which he extends in order to grasp fruits, &c. The two nostrils part the end of the trunk. The tail is only two inches long, and is nearly naked. The hair of the body

is of a somewhat deep brown; the limbs short and thick; the feet very large, and rather rounded: the fore feet have four toes, and the hind three; all the toes are covered with a hard, thick hoof, or horn. Though the head is very large it contains but a very small brain: the jaws are much elongated, and furnished, in general, with forty teeth; but sometimes there are more, and sometimes fewer. The incisors are sharp-edged, and are the teeth which vary as to number. After the incisors we find a canine tooth on each side, both above and below, which have a good deal of resemblance to those of a Boar: we then find a small space or interval without teeth; and then follow the grinders, which are very large, with very broad surfaces."

"On opening this animal," says M. Bajon, "the first thing that struck me was, that it was a ruminating animal. Though the feet and teeth have no analogy with those of other ruminating animals, yet the Tapir or Maipouris has three receptacles or stomachs, which are commonly full; and especially the first, which is filled like a balloon. This stomach answers to the first stomach of an Ox, but here the cancellated or honey-comb part is not distinct, but the two parts form one cavity: the second or next stomach is the plaited or laminated one, which is also very considerable, and much resembles that of an Ox; with this difference, that the laminæ or plaits are much smaller, and the coats much thinner: lastly, the third stomach is the least, and the thinnest, and has

only simple rugæ in its interior, and I have almost constantly found it full of completely digested aliment. The intestines are not very large, but are very long, and the scybala resemble those of a horse."

This description of the interior parts of the Tapir is however declared by the Count de Buffon to be erroneous in a very important particular; and as forming an interesting subject of comparative anatomy, I shall here give the general tenor of his observations.

"I am obliged," says the Count de Buffon, "to contradict a part of this account of Mons. Bajon, and to affirm that the Tapir or Maipouri is not a ruminant animal. We had lately here a living Tapir which bore its voyage very well, and was stationed near Paris; but which happened to die not long after. Of this event I had timely notice, and, accompanied by Mons. Mertrud, a very able surgeon, I requested him to open the animal, and examine its interior structure; an examination for which he was perfectly well qualified, having, under the inspection of Mons. Daubenton, dissected most of the animals described in the course of my work; and who joins to a perfect knowledge of anatomy, the highest degree of dexterity in his operations. This dissection was made in my presence, and the results were drawn up by Mons. Daubenton the younger: Mons. de Seve, my draughtsman, was also present. Instead of three stomachs, as described by Mons. Bajon, we found only one; the size of

which was indeed very large, and straitened or contracted in two places, but was still a single viscus, a simple uniform stomach, opening into the duodenum, and not consisting of three distinct and separate stomachs, as represented in M. Bajon's account. Yet it is not astonishing that he should have fallen into this error, since one of the most celebrated anatomists in Europe, Dr. Tyson, of the Royal Society of London, fell into a similar error in dissecting the Peccari or Tajassu of America, of which he has yet given an excellent description in the Philosophical Transactions. Tyson assures us, as M. Bajon does with respect to the Tapir, that the Peccari has three stomachs, though it really has but one, parted a little, like that of the Tapir, by two strictures or contractions, which seem, at first, to indicate three stomachs. It is therefore certain that the Tapir has only one stomach, and that it is not a ruminating animal; and accordingly that now under consideration was never seen to ruminate during the time of its living here; and its keepers fed it with bread, grain, &c. This mistake of M. Bajon does not prevent us from acknowledging that his memoir contains many excellent observations and remarks. The female, he observes, is always smaller than the male, and has a weaker or less piercing voice. One of the females which he dissected was six French feet in length, and appeared never to have produced young; its teats were two in number, and resembled those of the ass. The Tapir is far from deserving the name of an amphi-

bious animal, being continually on the surface of the ground, near the sides of hills, and in dry places; and if it occasionally frequents marshy ground, it is chiefly in quest of sustenance, and because it finds there a greater quantity of vegetables than on more elevated spots: but as it daubs itself much, during its wanderings in such places, it goes every morning and evening in search of some river or lake, in which it may swim and wash itself. Notwithstanding its clumsy appearance, the Tapir swims extremely well, and dives most readily; but cannot continue longer under water than any other terrestrial quadruped, and is obliged every now and then to put out its trunk in order to respire. When pursued by dogs, it runs, if possible, to some river, which it crosses, and thus eludes their pursuit. It does not eat fish; its only nourishment being vegetables, and especially the young shoots of plants, and such fruit as it finds under the trees. It wanders chiefly by night, except in dull rainy weather, when it appears by day. It is a solitary, gentle, timid animal, flying at the least noise, and having a very quick ear."

M. Bajon kept one of these animals, which had been taken young, and which soon grew tame, and acquired a strong attachment to him, distinguishing him in the midst of many other persons, licking his hands, and following him like a dog; and would often go out alone into the woods, to a great distance, but always returned early in the evening. M. Bajon assures us he saw one which ran tame about the streets at Cayenne; but which,

on being seized, in order to be put on board a vessel, to be brought over to Europe, as soon as it was on board became so unmanageable as not to be confined, breaking the very strong cords with which it was tied; and throwing itself overboard, escaped to shore, and got to a considerable distance from the town. It was supposed to be lost, but returned into the town in the evening. As it was determined to reimbark it, great precautions were taken accordingly; but which only succeeded for a certain time; for, during the voyage, about half way between America and France, a storm happening to arise, it became again outrageous, broke its bonds, and rushing out of its place of confinement, committed itself to the ocean, and was never recovered.

From the above history of the Tapir it will sufficiently appear, that, though ranked under a distinct genus, this animal has in some particulars a considerable affinity to the Hippopotamus.

SUS. HOG.

Generic Character.

Dentes Primores superiores quatuor, convergentes.	*Front-teeth* in the upper jaw four, converging.
Inferiores sex, prominentes.	In the lower jaw six, projecting.
Laniarii superiores duo breviores.	*Canine-teeth*, or Tusks, in the upper jaw two, rather short.
Inferiores duo exserti.	In the lower jaw two, long, exserted.
Rostrum truncatum, prominens, mobile.	*Snout* truncated, prominent, moveable.
Pedes bisulci.	*Feet* cloven.

THIS genus is in some points of an ambiguous nature, being allied to the Pecora, by its cloven hoofs, and to the Feræ, in some degree, by its teeth; yet differing widely from both in many respects. The internal structure of the feet also approaches to that of the digitated quadrupeds, while that of some other parts is peculiar to this genus alone. It may, therefore, be allowed to form at once a link between the cloven-footed, the whole hoofed, and the digitated quadrupeds.

WILD BOAR.

COMMON HOG.

Sus Scrofa. *S. dorso antice setoso, cauda pilosa. Lin. Syst. Nat. p.* 102.
Hog with the body bristled in front, and with hairy tail.
Aper. *Gesn. Quadr.* 146. *Aldr. bisulc.* 1013.
Sus. *Gesn. Quadr.* 872. *Aldr. bisulc.* 937.
Sanglier, Verrat, Cochon, &c. *Buff.* 5. *p.* 99. *pl.* 14. 16. 17.
Common Hog. *Pennant Quadr.* 1. *p.* 140.

THE Wild Boar, the stock or original of the common domestic Hog, is a native of almost all the temperate parts both of Europe and Asia, and is also found in the upper parts of Africa. It is a stranger to the Arctic regions, and is not indigenous to the British isles.

The Wild Boar inhabits woods, living on various kinds of vegetables, viz. roots, mast, acorns, &c. &c. It also occasionally devours animal food*. It is, in general, considerably smaller than the domestic Hog, and is of a dark brinded grey colour, sometimes blackish; but when only a year or two old, is of a pale rufous or dull yellowish brown cast; and when quite young, is marked by alternate dusky and pale stripes disposed longitudinally on each side the body. Between the bristles, next the skin, is a finer or softer hair, of a kind of woolly or curling nature. The snout is somewhat longer in proportion than that of the domestic

* Wild Boars have often been observed devouring horse-flesh left in the woods, and the skin of the Roebuck: the claws of birds have also been found in their stomachs.—*Buffon.*

animal; but the principal difference is in the superior length and size of the tusks, which are often several inches long, and are capable of inflicting the most severe and fatal wounds.

The hunting of the Wild Boar forms one of the amusements of the great in some parts of Germany, Poland, &c. and is a chace of some difficulty and danger; not on account of the swiftness, but the ferocity of the animal.

"Wild Boars," says Buffon, "which have not passed their third year, are called by the hunters Beasts of Company; because previous to this age they do not separate, but follow their common parent. They never wander alone till they have acquired sufficient strength to resist the attacks of the Wolf. These animals, when they have young, form a kind of flocks, and it is upon this alone that their safety depends. When attacked, the largest and strongest front the enemy, and by pressing all round against the weaker, force them into the centre. Domestic Hogs are also observed to defend themselves in a similar manner. The Wild Boar is hunted with dogs, or killed by surprise, during the night, when the moon shines. As he flies slowly, leaves a strong odor behind him, and defends himself against the dogs, and often wounds them dangerously, fine hunting-dogs are unnecessary, and would have their nose spoiled, and acquire a habit of moving slowly by hunting him. Mastiffs with very little training, are sufficient. The oldest Boars, which are known by the track of their feet, should alone be hunted:

a young Boar of three years old is difficult to be attacked; because he runs very far without stopping; but the old Boars do not run far, allow the dogs to come near, and often stop to repel them. During the day the Boar commonly keeps in his soil, which is in the most sequestered part of the woods, and comes out by night in quest of food; and in summer, when the grain is ripe, it is easy to surprise him among the cultivated fields, which he frequents every night."

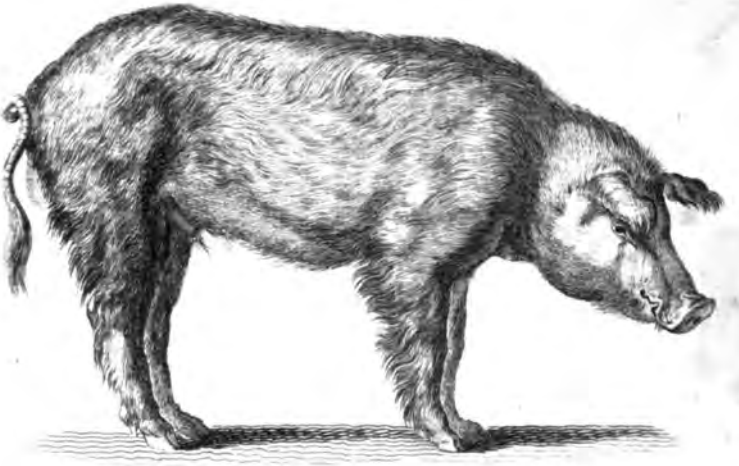
As the Wild Boar advances in age, after the period of three or four years, he becomes less dangerous, on account of the growth of his tusks, which turn up, or make so large a curve or flexure, as often rather to impede than assist his intentions of wounding with them.

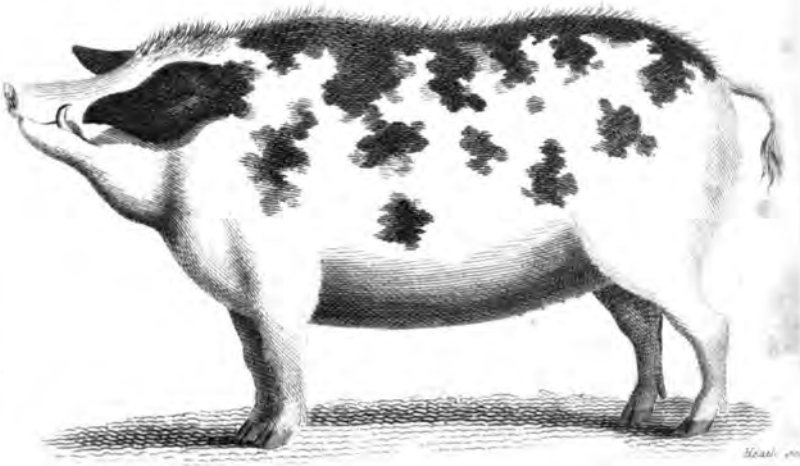
According to the French newspapers for the year 1787, a Wild Boar of most extraordinary size was killed in the neighbourhood of *Cognac* in *Angoumois*, which had escaped a great many times from the hunters, had received many gun-shot wounds, and had cost the lives of several dogs and men each time of attacking him. When this animal was at length slain, several bullets are said to have been found between his skin and flesh. Mons. Sonnini, who details this anecdote from the public papers*, observes, that if the relation had not been given by hunters of distinguished order, and too well acquainted with these

* Journal de Saintonge; Journal de Bouillon, seconde quinzaine d'Avril, 1787, &c. &c.

animals to have made any mistake, we might imagine that this formidable creature, which had long committed its ravages in the park of *Cognac*, belonged to a totally different species. It was of enormous size, with a very long head, a very sharp or pointed snout, and its mouth was armed with teeth of a very singular form. The hairs of the body were white; those of the head yellowish; the neck marked with a black band in form of a cravat, and the ears large and strait; and what appears surprising, considering its size, it was of uncommon swiftness.

To describe particularly the common or *Domestic Hog* would be superfluous. It may be sufficient to observe, that this animal principally differs from the Wild Boar in size, in having smaller tusks, and larger ears, which are also somewhat pendent, and of a more pointed form. In colour it varies very considerably, but the prevailing cast is a dull yellowish white, marked or spotted irregularly with black; sometimes perfectly plain or unspotted, sometimes rufous, and sometimes totally black. The general habits of this creature are well known. Of all quadrupeds the Hog is the most gross in his manners, and has therefore been pretty uniformly considered in all nations as the emblem of impurity. The Jews were strictly enjoined not to eat its flesh; and in many parts of the world, a similar prohibition is still in force; since the Mahometans agree in this respect with the Mosaic institution. In most parts of Europe, on the contrary, it constitutes a





COMMON HOG. *Male & Female.*

1801. Jan.ʸ 1ˢᵗ London Publish'd by G. Kearsley Fleet Street.

principal part of the food of mankind. This animal is of a remarkably prolific nature, being sometimes known to produce as many as twenty at a birth.

The Hog was unknown in America, on the discovery of that continent; but since its introduction, appears to flourish there as much as in the old world.

The varieties into which the Hog occasionally runs, chiefly relate, as before observed, to size and colour. That called the Chinese Hog is of a very small size, with a remarkably pendulous belly: its colour is commonly black, and the skin often nearly bare, or less hairy than in the European kinds.

The variety called the Guinea Hog is distinguished by having a smaller head than the common Hog, with long, slender, sharp-pointed ears, and naked tail reaching to the ground. Its colour is rufous, and its hair softer, shorter, and finer than in other kinds. It is said to be most common in Guinea, and is considered by Linnæus as a distinct species, under the title of *Sus Porcus*. S. dorso postice setoso, cauda longitudine pedum, umbilico cystifero.

But the most remarkable variety of the Hog is that in which the hoofs are entire and undivided. This is a mere accidental variety, which is, however, observed to be more common in some countries than in others, and is, according to Linnæus, not unfrequent in the neighbourhood of Upsal in Sweden. It has been noticed by Aristotle and

Pliny, and is said by the former to have been most common in Illyria and Pæonia.

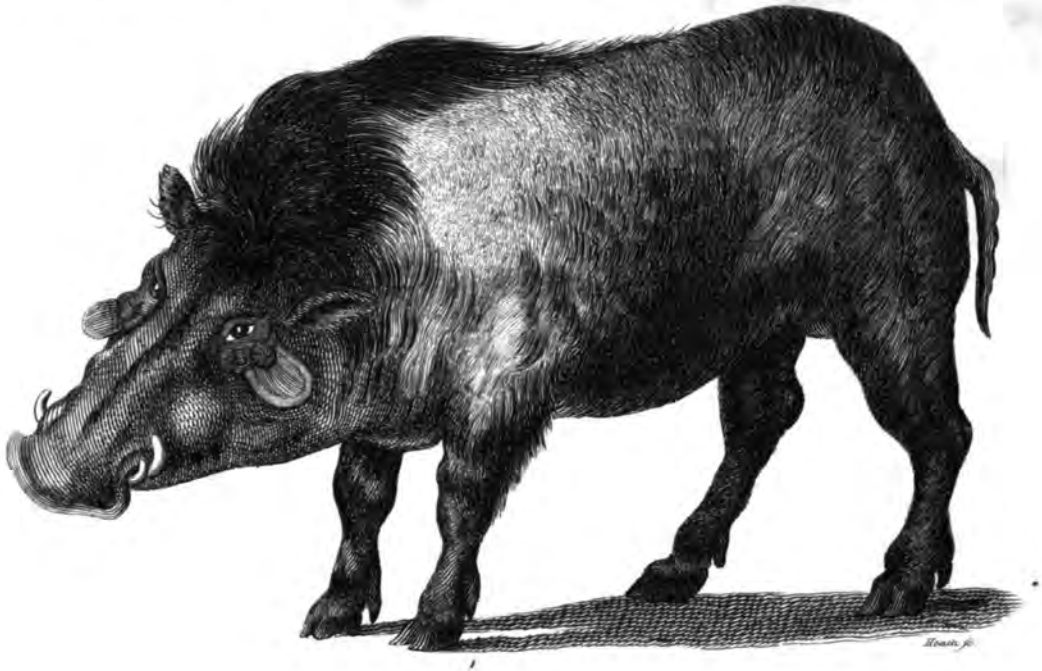
The age of the Domestic Hog is said to extend from fifteen to twenty-five years, or even more.

ÆTHIOPIAN HOG.

Sus Æthiopicus. *S. sacculo molli sub oculis. Lin. Syst. Nat. Gmel. p.* 220.
Hog with wattles beneath the eyes.
Aper Æthiopicus. *Pallas Miscell. Zool. p.* 16. *t.* 2. *Spic. Zool.* 2. *p.* 3. *t.* 11. *p.* 84. *t.* 5. *f.* 7.
Sanglier du Cap Verd. *Buff. Suppl.* 3. *p.* 76. *pl.* 11.
Æthiopian Hog. *Pennant Quadr.* 1. *p.* 144.

This animal is very much allied in its general appearance to the common Hog, but is distinguished by a pair of large, flat, semicircular lobes or wattles, placed beneath the eyes; the snout is also of a much broader form, and is very strong and callous: the ears are large and very slightly pointed: the tusks in the lower jaw are rather small; but those in the upper jaw are large, sharp, curved, and in the old animal bend upwards in a semicircular manner towards the forehead: there are no fore-teeth; their place being supplied by very hard gums*: the skin of the face, immediately below the eyes, or above the broad lobes before-mentioned, is loose and wrinkled, and on each side the corners of the mouth is a callous

* This at least was the case in the specimen at the Hague.



ÆTHIOPIAN HOG.

Mar. Jan.ʸ Published by G. Kearsley, Fleet Street London.

protuberance. The body is of a strong form; the tail slender, slightly flattened, and thinly covered with scattered hairs. The general colour of the whole animal is a dusky or blackish brown.

This species is a native of the hotter parts of Africa, occurring from Sierra Leona to Congo, and to within about two hundred leagues of the Cape of Good Hope. It also occurs in the island of Madagascar.

It is a fierce and dangerous animal, and is said to reside principally in subterraneous recesses, which it digs with its nose and hoofs. When attacked or pursued, it rushes on its adversary with great force, and strikes, like the common Boar, with its tusks, which are capable of inflicting the most tremendous wounds.

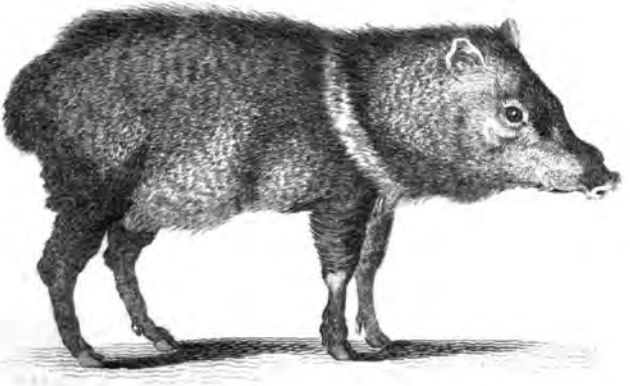
This species has long ago been mentioned by Dampier and other travellers, but was not very distinctly known to European naturalists, till brought over some years ago, in a living state, to the Hague, where it was described by Mr. Allamand, Dr. Pallas, Mr. Vosmaer, &c. and was afterwards introduced into the supplement to the Count de Buffon's Natural History.

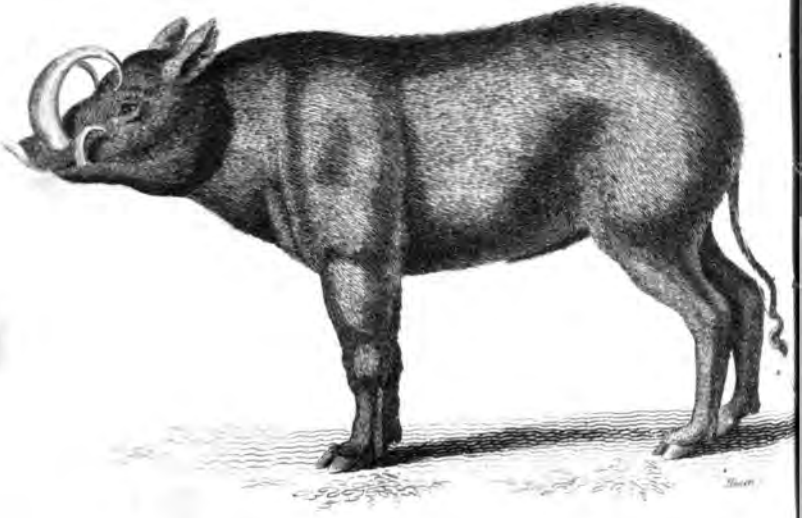
CAPE VERD HOG.

Sus Africanus. *S. dentibus primoribus duobus. Lin. Syst. Nat. Gmel, p.* 220.
Hog with two front teeth.
Sanglier de Cap Verd. *Buff.* 14. *p.* 409. 15. *p.* 148.
Cape Verd Hog. *Pennant Quadr.* 1. *p.* 146.

The Cape Verd Hog has been generally confounded with the former animal, from which, however, it appears to differ very considerably; having a head of a much longer and slenderer form, with the upper jaw extending beyond the lower. In the upper jaw are also two cutting teeth, and six in the lower: the tusks are very large and thick, but those of the lower jaw much larger than those of the upper: the ears are rather narrow, pointed, and tufted with long bristles or hairs: the whole body is also covered with long, weak, or fine bristles, of which those on the shoulders, belly, and thighs, are much longer than on other parts: the tail is thin, and terminates in a longish tuft. The colour of this animal is a palish brown. Its general size is that of a common Hog, but it is said sometimes to be found far larger. It is a native of Africa, extending from Cape Verd to the Cape of Good Hope.

PECARI.





BABYROUSSA.

BABYROUSSA.

Sus Babyrussa. *S. dentibus duobus caninis fronti innatis. Lin. Syst. Nat. p.* 104.

Hog with the two upper tusks growing from the lower part of the front.

Porcus Indicus Babyroussa dictus. *Ray. Quadr. p. 96.*

Horned Hog. *Grew. Mus. Reg. Soc. p. 27. pl. 1.*

Babiroussa. *Buff. 12. p. 379. and Suppl. 3. p. 19. pl. 12.*

Baby-Roussa. *Pennant Quadr. 1. p.* 148.

THE Babyroussa is nearly of the size of a common Hog, but of a somewhat longer form, and with more slender limbs, and is covered, instead of bristles, with fine, short, and somewhat woolly hair, of a deep brown or blackish colour, interspersed with a few bristles on the upper and hinder part of the back. It is also distinguished by the very extraordinary position and form of the upper tusks, which, instead of being situated internally on the edge of the jaw, as in other animals, are placed externally, perforating the skin of the snout, and turning upwards toward the forehead, and as the animal advances in age, become so extremely long and curved as to touch the forehead and continue their curvature downwards, by which means they must of necessity lose their power as offensive weapons, which they probably possess in the younger animal: the tusks of the lower jaw are formed as in the rest of the genus, and are also very long, sharp, and curved; but not of equal magnitude with those of the upper. The upper tusks are of a fine hard grain, like that of

ivory: the eyes are small; the ears somewhat erect, and pointed: the tail rather long, slender, and tufted at the end with long hairs.

The Babyroussa is a gregarious animal, and is found in large herds in many parts of Java, Amboina, and some other Indian islands. Their food is entirely of a vegetable nature, and they often feed on the leaves of trees. When sleeping or resting themselves in a standing posture, they are said often to hook or support themselves by placing the upper tusks across the lower branches of the trees. When pursued they will often plunge into a river, or even into the sea, if near, and can swim with great vigour and facility, and to a vast distance. The voice of the Babyroussa is said to resemble that of the common Hog, but it occasionally utters also a strong or loud growling note. It is sometimes tamed by the inhabitants of the Indian islands, and the flesh is considered as a wholesome food.

PECARY.

Sus Tajassu. *S. dorso cystifero, cauda nulla. Lin. Syst. Nat. p.* 103.
Tailless Hog, with a glandular orifice on the back.
Sues quibus umbilicus in dorso. *Aldr. bisulc. p.* 939.
Tajaçu. *Marcgr. Bras. p.* 229. *Pis. Ind. p.* 98. *Tyson Act. Ang. n.* 153. *p.* 359. *Raj. Quadr.* 97.
Pecari, ou Tajaçu. *Buff.* 10. *p.* 21. *pl.* 3, 4.
Mexican Hog. *Pennant Quadr.* 1. *p.* 147.

THE Pecary is the only animal of this genus that is a native of the new world, where it is chiefly found in the hottest regions. Its size is considerably smaller than that of a common Hog, and it is of a short compact form. The whole animal is thickly covered, on the upper parts, with very strong, dark-brown or blackish bristles, each marked by several yellowish-white rings; so that the colour of the whole appears mottled with minute freckles or specks, and round the neck is generally a whitish band or collar. The head is rather large; the snout long; the ears short and upright; the belly nearly naked: there is no tail, and at the lower part of the back, or at some little distance beyond the rump, is a glandular orifice surrounded by strong bristles in a somewhat radiated direction. From the orifice exsudes a strong-scented fluid, and this part has been vulgarly supposed to be the navel of the animal: the tusks in this species are not very large.

The Pecary is a gregarious animal, and in its wild state is fierce and dangerous; sometimes at-

tacking the hunters with great vigour, and often destroying the dogs which are employed in its pursuit. It feeds not only on vegetable substances, but occasionally on animals of various kinds, and is particularly an enemy to snakes and other reptiles; attacking and destroying even the rattle-snake, without the least dread or inconvenience, and dexterously skinning it, by holding it between its feet, while it performs that operation with its teeth. It is also remarkable that the common Hog, when translated to America, will attack and destroy the rattle-snake.

The Pecary is considered as an agreeable food; but the dorsal gland must be cut away as soon as the animal is killed; otherwise the whole flesh would be infected with an unpleasant flavour. Dr. Tyson has given an elaborate anatomical description of this species in the Philosophical Transactions; but, as has been already observed, under the article *Tapir*, appears to have entertained an erroneous idea relative to the structure of the stomach.

According to Mons. de la Borde, a correspondent of the Count de Buffon, there are two distinct races of the Pecary, one of which differs in being of smaller size, and of a lighter or more ferruginous colour.

ORDER

CETE.

WHALES,

OR

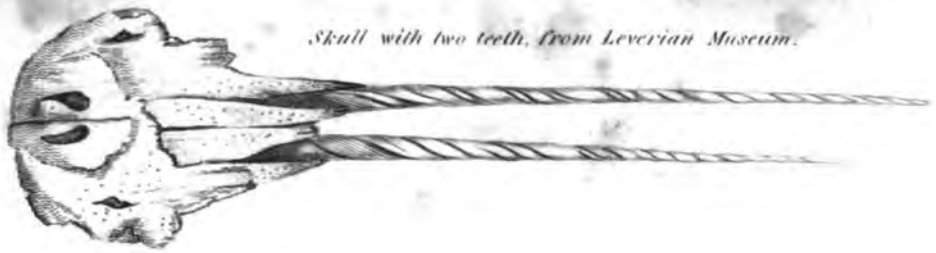
FISH-FORMED MAMMALIA.

THE Cetaceous Animals, or Whales, however nearly approximated to Fishes by external form, and residence in the waters, are in reality to be considered as aquatic Mammalia; for though from their general shape, and seeming want of feet, they appear, at first view, widely removed from that class, yet we find on examination that their whole internal structure resembles that of other Mammalia, and that their skeleton is formed on the same plan; differing only in the want of hind legs, the peculiar structure of the tail supplying that defect, being extremely strong and tendinous, and slightly divided into two horizontal lobes, but not furnished with internal bones.

Their lungs, intestines, &c. are formed on the same plan as in quadrupeds. They have also warm blood, and, like other Mammalia, suckle

their young. It is therefore unnecessary to add, that their true arrangement must be in the same class; but so strongly is the vulgar or popular idea respecting these animals impressed on the mind, that to this hour they are considered as Fishes by the mass of mankind; who, not having either time or inclination to become scientifically acquainted with the objects of creation, find some difficulty in conceiving how a Whale can be any thing but a fish. It should also be added, that in compliance with this popular prejudice, even Willoughby was induced to admit the Whales into his Ichthyology, Mr. Pennant to exclude them from his work on quadrupeds, and still more lately, Dr. Bloch to insert the Porpoise in his History of Fishes.

Much confusion and inaccuracy has prevailed with respect to the exact determination of the species in this tribe, and it is chiefly to the exertions of modern naturalists and physiologists that we owe our principal knowledge of the subject: the descriptions given by the ancient writers being often very vague and unsatisfactory. The excellent observations of the late Mr. Hunter, published in the Philosophical Transactions, have contributed much to the anatomical history of Whales; while the more exact discrimination of the species has been chiefly owing to Linnæus, Fabricius, Pallas, Schreber, &c.



Skull with two teeth, from Leverian Museum.

NARWHAL

MONODON. NARWHAL.

Generic Character.

Dens in maxilla superiore, exsertus, prælongus, rectus, spiralis.	*Tooth** projecting from the upper jaw, very long, strait, spiral.
Fistula respiratoria in vertice.	*Spiracle* on the head.

UNICORN NARWHAL.

Monodon Monoceros. *M. dente cornuformi spirali, rarius duplici, recto, prælongo, exserto in maxilla superiore. Fab. Faun. Groenland. p.* 29.

Narwhal with very long, strait, spiral, horn-like tooth (sometimes two) in the upper jaw.

Monodon Monoceros. *Lin. Syst. Nat. p.* 105.

Unicornu marinum. *Mus. Worm. p.* 282, 283.

Narwhal. *Klein. M. pisc.* 2. *p.* 18.

THE Narwhal is a native of the northern seas, where it is sometimes seen of the length of more

* There are sometimes two teeth; but as the animal is generally found with one only, and as the generic name *Monodon* is given from that very circumstance, I have taken the liberty (in order to avoid so palpable an absurdity) to alter the generic character.

than twenty feet from the mouth to the tail; and is at once distinguishable from every other kind of Whale by its very long, horn-like tooth, which is perfectly strait, of a white or yellowish-white colour, spirally wreathed throughout its whole length, and gradually tapers to a sharp point. It measures from six to nine or ten feet in length, and proceeds from a socket on one side of the upper jaw, having a large cavity at its base or root, running through the greater part of the whole length. In the young animals, and occasionally even in the full grown ones, more especially in the males, there are two of these teeth, sometimes nearly of equal length, and sometimes very unequal in this respect: they are seated very close to each other at the base, and as their direction is nearly in a strait line, they diverge but little in their progress towards the extremities. The Narwhal is however far more frequently found with only a single tooth, the socket of the other being either closed, or but obscurely visible, and now and then the appearance of a second tooth in an extremely small state, or just beginning to emerge, is perceptible; as if intended by Nature to supply the place of the other, in case of its being broken or cast. The head of the Narwhal is short, and convex above; the mouth small; the spiracle or breathing-hole duplicated within; the tongue long; the pectoral fins small; the back finless, widish, convex, becoming gradually accuminated towards the tail, which, as in other Whales, is horizontal. The

general form of the animal is rather long than thick in proportion to its size. The colour, when young, is said to be nearly black, but lighter on the belly; but as the animal advances in age, it becomes marbled or variegated with black and white on the back and sides, while the belly is nearly white. The skin is smooth, and there is a considerable depth of oil or blubber beneath it.

The Narwhal chiefly inhabits the northern parts of Davis's Streights. Its food is said to consist of the smaller kind of flat-fish, as well as of Actiniæ, Medusæ, and many other marine animals. It is principally seen in the small open or unfrozen spots towards the coasts of the northern seas. To such places it resorts in multitudes, for the conveniency of breathing, while at the same time it is sure of finding near the shores a due supply of food, and is very rarely seen in the open sea. It is taken by means of harpoons, and its flesh is eaten by the Greenlanders, both raw, boiled, and dried: the intestines and oil are also used as a food; the tendons make a good thread, and the teeth serve the purpose of hunting-horns as well as the more important ones of building tents and houses: but before this animal became distinctly known to the naturalists of Europe, they were held in high estimation as the supposed horns of unicorns. Various medical virtues were also attributed to them, and they were even numbered among the articles of regal magnificence. A throne made for the Danish monarchs is said to be still pre-

served in the castle of Rosenberg, composed entirely of Narwhal's teeth; the material being anciently considered as more valuable than gold.

A specimen of this Whale, measuring about eighteen feet, exclusive of the horn or tooth, was some time ago stranded on the coast of Lincolnshire, at no great distance from Boston, and was said to have been taken alive, so that the Narwhal might now be numbered among the animalia rariora of the British Zoology.

SPURIOUS NARWHAL.

Monodon Spurius. *M. dentibus duobus minutis in maxilla superiore, dorso pinnato. Fab. Faun. Groenland. p. 31.*
Narwhal with pinnated back, and two small teeth in the upper jaw.

A SPECIES most allied to the Narwhal, but not perhaps, strictly speaking, of the same genus: no teeth in the mouth, but from the extremity of the upper mandible project two minute, conic, obtuse teeth, a little curved at the tips, weak, and not above an inch long: body elongated, cylindric, black. Besides the pectoral fins, and horizontal tail, is also a minute dorsal fin. It must be numbered among the rarest of the Whales. Its flesh and oil are considered as very purgative: inhabits the main ocean, seldom coming towards shore: feeds on the loligo: has a spiracle like other Whales. Both flesh and oil are eaten, but

not without apprehension, for the reason beforementioned: generally found dead, being very seldom taken living.

The above is the description given by Fabricius, in his *Fauna Groenlandica,* and the animal seems to have been described by no other author.

BALÆNA. MYSTICETE.

Generic Character.

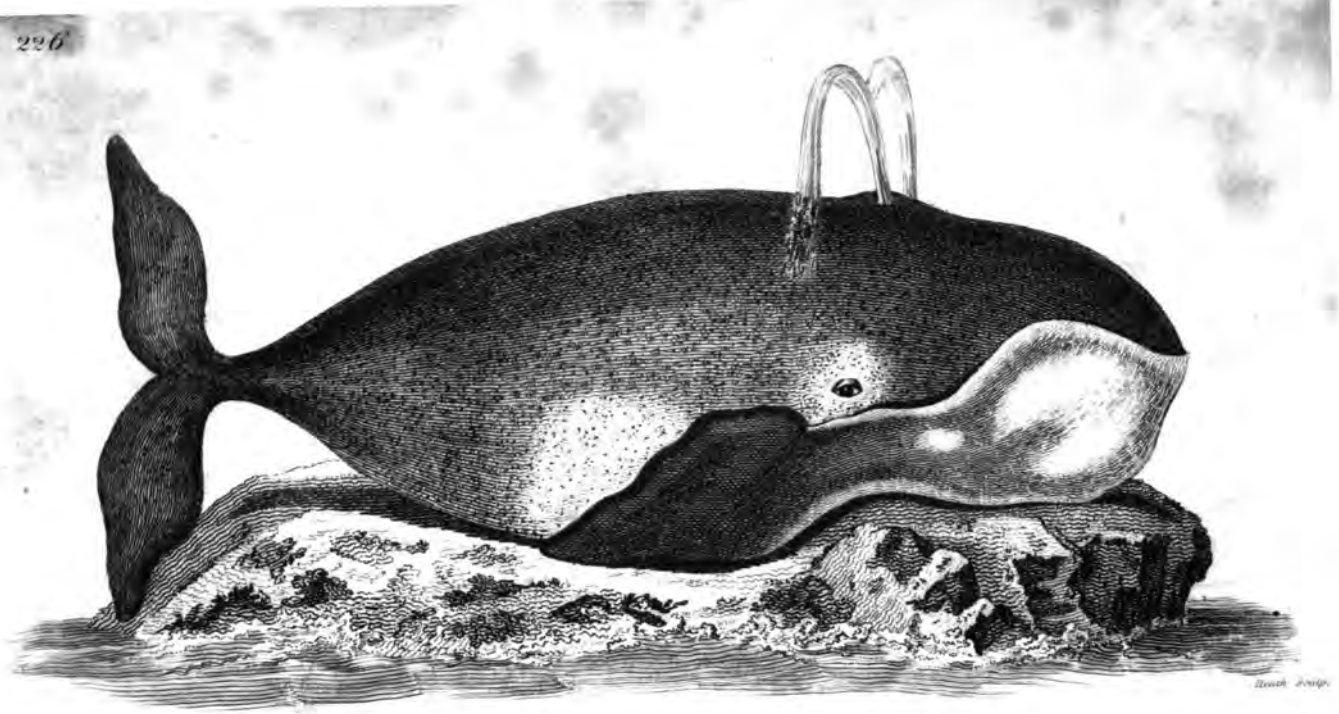
Dentium loco in maxilla superiore laminæ corneæ.
Fistula respiratoria duplici orificio externo supra caput.

Horny Laminæ in the upper jaw in place of teeth.
Spiracle with a double external orifice on the top of the head.

GREAT MYSTICETE.

Balæna Mysticetus. *B. naribus flexuosis in medio capite, dorso impinni. Lin. Syst. Nat. p.* 105.
Mysticete with flexuous spiracles on the middle of the head, and finless back.
Balæna groenlandica. *B. fistula duplici in fronte, maxilla inferiore multo latiore. Lin. Mus. Ad. Frid. 1. p.* 51.
Balæna vera Rondeletii, & Balæna Rondeletii, Gesneri & aliorum. *Willoughb. pisc. p.* 35. 38.
Wallfisch. *Martens Spitzberg. p.* 98. *t.* 9.
Common Whale. *Pennant Brit. Zool. 3. p.* 16.
Mysticetus, or Great Northern Whale. *Nat. Misc. vol. 4. pl.* 133.

THIS Whale is, as it were, the chief of the whole tribe, and, unless the Kraken be not a fabulous existence, is the largest of all animals either of land or sea. Before the northern whale-



GREAT MYSTICETE.

fisheries had reduced the number of the species, it was no very uncommon circumstance to find specimens of an hundred feet in length, or even longer. Such however are now very rarely seen, and it is not often that they are found of more than sixty or seventy feet long. In its general appearance this animal is peculiarly uncouth; the head constituting nearly a third of the whole mass: the mouth is of prodigious amplitude; the tongue measuring eighteen or twenty feet in length: the eyes are most disproportionably small: in the upper jaw is a vast number of very long and broad horny laminæ, disposed in regular series along each side: these are popularly known by the name of whalebone: on the top of the head is a double fistula or spout-hole through which the enormous animal discharges water at intervals, causing the appearance of a marine jet d'eau ascending to a vast height in the air. Its common colour is black above and white beneath, but in this circumstance it is known to vary. Its general residence is in the northern seas, where it has long constituted the principal trade of the whale or oil fishery. Its food is supposed to consist chiefly of different kinds of Sepiæ, Medusæ, and other marine Mollusca.

To the above general description of this monster of the deep, I shall annex the account given by that faithful writer Frederick Martens, in his work intitled *A Voyage to Spitzbergen*. I shall however take the liberty to give the narrative a somewhat more connected and regular form than

it bears in the original work. Its honest simplicity and accuracy must apologize for its tediousness.

"The Whale," says Martens, "for whose sake our ships chiefly undertake the voyage to Spitzbergen, differs from other whales in his fins and his mouth, which is without teeth, but instead thereof hath long, black, and somewhat broad horny flakes, all jagged like hairs. His fins are situated at some distance behind the eyes, and are of a bigness proportionable to the animal, covered with a thick black skin, delicately marbled with white or yellow strokes, or as you see in marble trees, houses, or the like things represented; or like the veins in some kinds of wood. In the tail of one of these fishes was marbled very delicately the number 1222, very even and exact, as if painted upon it on purpose. This marbling or variegation of the skin, which resembles parchment or vellum, gives the Whale an incomparable beauty and ornament. When the fins are cut, you find, underneath the skin, bones that look like unto a man's hand when it is opened and the fingers expanded. Between these joints there are stiff sinews, which fly up and rebound again if you fling them hard against the ground, as the sinews of a great fish, as of a sturgeon, or of some four-footed beast would do. You may cut pieces of these sinews of the bigness of your head; they squeeze together when thrown on the ground, and so rebound very high, and as swift as an arrow from the string of a long bow. The Whale

hath no other fins but these two, wherewith he steers himself, as a boat is rowed with two oars. The tail doth not stand up, like the tails of fish, but lieth horizontally, as that of the Dolphin, &c. and it is three and a half or four fathoms broad. The head is the third part of the whole animal, and some have it still bigger. On the upper and under lip are short hairs before. The lips are quite plain, somewhat bended like an *S*, and they end underneath the eyes, before the two fins. Above the uppermost bended lip he hath black streaks; some are darkish brown, and they are crooked as the lips are: the lips are smooth, and quite black, round, like the quarter of a circle. When they draw them together, they lock into one another. Within, on the uppermost lip, is the whalebone, of a brown, black, or yellow colour, with streaks of several colours: the whalebones of some whales are blue, and light blue, which two are reckoned to come from young whales. Just before, on the under lip, is a cavity or hole, which the upper lip fits exactly into, as a knife into a sheath. I do really believe that he draweth in the water that he bloweth out through this hole, and so I have also been informed by seamen. Within his mouth is the whalebone, all hairy as a horse's hair, and it hangs down from both sides, all about his tongue. The whalebone of some Whales is somewhat bended, like a cimeter, and others like a half-moon. The smallest whalebone is before, in his mouth, and behind towards his throat, and the middlemost is the largest and longest, being sometimes

about two or three men's length, from whence may be conjectured how large the animal must be. On one side, all in a row, there are two hundred and fifty pieces of whalebone, and as many on the other; making in all five hundred, and there are still many more, for the cutters let the least of all remain, because they cannot easily come at it to cut it out, on account of the meeting of the two lips, where the space is very narrow. The whalebone is in a flat row, one piece by the other, somewhat bending within, and towards the lips every where like a half-moon. It is broad at the top, where it sticketh fast to the upper lip, every where overgrown with hard white sinews towards the root, so that between two pieces of whalebone you may put your hand. These white sinews are of an agreeable smell, break very easily, and may be boiled and eaten. Where the whalebone is broadest, as underneath by the root, there groweth small whalebone, the other greater, as you see small and large trees one among another in a wood. I believe the small whalebone doth not grow bigger, as one might think that some of the great pieces thereof might come out, and that so this small whalebone might grow up again in the room thereof, or as in children, the hair grows again when cut; but it is not so; for it is from one end to the other of an equal thickness, and full of long jacks, like horses hair. The whalebone is underneath narrow and pointed, and all overgrown with hair, that it may not hurt that which is young; but without the whalebone

hath a cavity, for it is turned just like unto a gutter wherein the water runs, where it lieth the one over the other, like the shields or plates of Crawfish, or the pantiles of an house, that lye one over the other; for else it might easily wound or hurt the under lip.

" To cut the whalebone out is a particular trade, and abundance of iron tools are used in the process. The lower part of the whale's mouth is commonly white. The tongue, which is about the size of a great feather-bed, lyeth among the whalebone; being very closely tied to the undermost chap or lip. It is white, with black spots at the edges, and consists of a soft, spungy, fat substance, which cannot easily be cut, being at once tough and yielding; so that it is thrown away by the Whale-catchers for this reason; otherwise they might get five, six, or seven barrels of oil from it. Upon the head is the hoffel, or bump before the eyes and fins; and at the top of it are situated the spout-holes, one on each side, over against each other, shaped like the letter *S*, or the hole on each side a violin. From these holes the Whale bloweth or spouteth the water; fiercest of all when he is wounded, when it sounds like the roaring of the sea in a great storm, or as we hear the wind in very tempestuous weather: it may be heard at a league's distance, though you cannot see the fish by reason of the thick and foggy air. The head is not round at the top, but somewhat flat, and goes down sloping, like the tiling of a house, to the under lip. The under lip is broader

than any part of the body, and broadest of all in the middle. In a word, the whole fish is shaped like a shoemaker's last, if you look upon it from beneath. Behind the knob or bump, between that and the fins, are placed the eyes, which are not much bigger than those of a bullock, with eyelids and hair like the human eyes. The crystal (crystalline humour) is not much bigger than a pea, clear, and transparent as crystal. The eyes of the Whale are placed very low, almost at the end of the upper lip. Some bring with them from Spitzbergen some bones which they call the ears of the Whale, but this I can say nothing to, because I never saw any; but very well remember, that I have heard that they lie very deep. The Whale doth not hear when he spouts the water, wherefore he is easiest to be struck at that time. His belly and back* are quite red, and underneath the belly they are commonly white; yet some are coal-black. Most of those which I saw were white. They look very beautiful when the sun shines upon them, the small clear waves of the sea that are over him glistening like silver. Some of them are marbled on the back and tail. Where a Whale has been wounded there remaineth always a white scar. I understood from one of our harpooners that he once caught a Whale at Spitzbergen that was white all over. Half white

* I suspect some mistake here; the back being in most of the Whale tribe of a dark colour.

I have myself seen, but one above the rest, which was a female, was a beautiful one: she was all over marbled black and yellow. Those that are black are not all of the same colour; for some are as black as velvet, others coal-black, and others of the colour of a tench. The Whale loseth its beautiful colours when it grows dry; the black becoming brownish, and the white losing its clearness. When they are well, they are as slippery as an Eel; but one may stand upon them, because they are so soft that the flesh giveth way to our weight. The outward skin is thin, like parchment, and is easily pulled off by the hand when the flesh grows hot by the fermentation of the inward parts after the animal's death. The bones of the whale are hard, like those of large four-footed beasts, but porous, like a spunge, and filled with marrow, and when that is consumed out, they will retain a great quantity of water, for the holes are large, like those of an honeycomb. Two great and strong bones hold up the under lip: they lie one against the other, and both together make a figure like a half-moon, but one by itself is like a quarter of a circle. Some of these I have seen lying on the coasts of Spitzbergen about twenty feet long, of a white colour, as if calcined. The flesh of the Whale is coarse and hard, like that of a bull: it is intermixed with many sinews, and is very dry and lean when boiled, because the fat is only between the flesh and skin. If suffered to lie a little, it soon becomes black and tainted. That of the tail boils the tenderest, and is not

quite so dry as that of the body. When we have a mind to eat of a Whale we cut great pieces off before the tail where it is four-square, and boil it like other meat: good beef I prefer far before it, yet rather than be starved I advise to eat Whale's flesh; for none of our men dyed of it, and the Frenchmen did eat it almost daily; flinging it on the tops of their tubs, and letting it lie till it was black; and yet eating it in that condition. The flesh of the Whale, like that of Seals, is alone, or by itself; and the fat at the top thereof between the flesh and skin. The fat is about six inches thick on the back and belly; but I have also seen it a foot thick on the fins, and more than two feet on the under lip; but Whales vary in this respect, like other animals, according to size and health. In the fat are interspersed little sinews, which hold the oil, as a spunge does water, which one may squeeze out: the other strong sinews are chiefly about the tail, where it is thinnest, for with it he turns and winds himself about, as a ship is turned by the rudder; his fins being his oars, and according to his size he rows himself along with them as swiftly as a bird flies, and maketh a long track in the sea, as a great ship doth when under sail; so that it remains divided for a while. Over the fat is, besides the uppermost skin already described, another skin, about an inch thick, proportionable to the size of the Whale. It is coloured according to the colour of the animal: if the Whale be black this is black also: if on the contrary the outward or

parchment-like skin be white or yellow, the thick under skin is of a similar colour. This thick skin is not tough or tenacious, but of a fungous texture, and of no use as an article of trade.

"The food of the Whale is believed to be small sea-snails*, which float, in vast abundance, on the surface of the northern seas. Whether these afford such great nourishment I cannot tell. I have been informed by others that about Hitland a small Whale was caught, which had about a barrel of Herrings in its belly. The middling-sized Whales caught at Spitzbergen afford seventy, eighty, or ninety *cardels* of fat. Our biggest Whale was fifty-three feet long, and his tail three fathom and a half broad. The Whale swims against the wind, like most of this tribe, and indeed as most large fishes do. They are sometimes found diseased and emaciated, having their peculiar disorders like other animals. The breasts of the female resemble those of a Cow, having similar nipples: they are sometimes white, and sometimes speckled with black and blue spots, in the manner of a plover's egg. They are said never to have more than one young at a time."

I must now take the opportunity of repeating what I have advanced in the Naturalist's Miscellany, viz. "It is to be lamented that in the poetical descriptions of various striking scenes in natural history, the epithets by which many objects are distinguished, are, for want of due know-

* A species of *Clio*, the Clio limacina of Linnæus.

ledge of the subject, improperly chosen, and utterly inconsonant with the character of the things intended; by which means the description, however beautiful in point of language, fails in point of accuracy. This is no where more strikingly illustrated than in the august lines of Milton, in which the description of a sleeping whale is injured by an epithet of all others least according with the nature of the animal.

> 'That sea-beast
> Leviathan, which God of all his works
> Created hugest that swim th' ocean stream:
> Him haply slumb'ring on the Norway foam,
> The pilot of some small night-founder'd skiff
> Deeming some island, oft, as seamen tell,
> With fixed anchor in his scaly rind,
> Moors by his side under the lee, while night
> Invests the sea, and wished morn delays.'

"None of the cetaceous tribe are furnished with scales, or any thing analogous to them. It must be acknowledged however that this observation may appear in no small degree hypercritical, and that Milton by the expression of *scaly rind* might only mean rough or scaly in the same sense that those epithets are applied to the bark of a tree or any irregular surface. There can be little doubt however that real and proper scales were intended by the poet; nor is it difficult to discover the particular circumstance which impressed Milton with this erroneous idea, viz. a figure in the works of Gesner, so injudiciously expressed as

to appear on a cursory view as if coated with large scales, with a vessel near it with harpooners, &c. over which is the observation of sailors often mistaking a whale for an island, and thus endangering themselves by attempting to anchor upon it. As the general learning and extensive reading of our great poet are so well known, it can hardly be doubted that he was conversant with the writings of Gesner, whose work was then the great depository of natural knowledge, and that the figure and description there given left a lasting impression on his mind."

The Whale is taken by being struck with harpoons by several persons who pursue him in boats, arranging themselves according to circumstances, and wounding the animal repeatedly, till faint with loss of blood, he at length expires, and lies floating on the surface. The harpoon is a sharp iron in the form of an arrow head, fixed to a rod, and furnished with a vast length of line of proper strength. The wounded Whale swims away, often drawing both line and boat after him as swift as the wind, spouting the water with violence, and tinging the sea all around with his blood. The noise, says Martens, may be heard as far as a cannon, but after having received several wounds at different intervals, it grows weaker, till at length it resembles that of the wind blowing slightly into an empty vessel. This is a dangerous occupation, and requires great dexterity on the part of the adventurers. A long-boat, according to our author, "he valueth no more than dust, for

he can beat it all in shatters at a blow." The desire of gain however is a sufficient temptation to those who undertake this fishery, and the profits seldom fail to recompence their labours.

Though the chief residence of this and most other Whales is in the polar regions, yet they sometimes stray into more temperate latitudes, and are occasionally seen in very different parts of the ocean from those in which they generally reside.

The Whale is one of those animals which were once considered as royal dishes; and we are informed that in ancient times, whenever one happened to be thrown on the British coast, the King and Queen divided the spoil; the King asserting his right to the head, and her Majesty to the tail*.

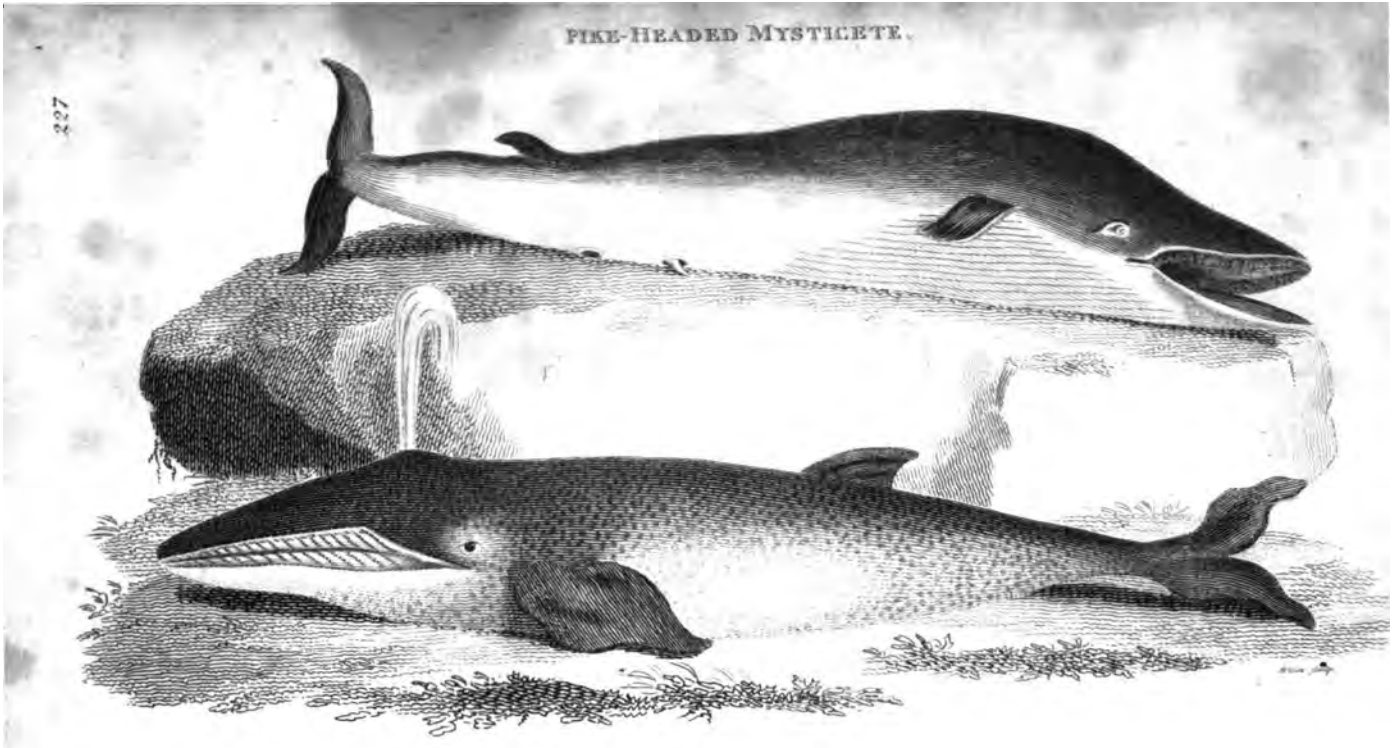
FIN-BACKED MYSTICETE.

Balæna Physalus. *B. fistula duplici in medio capite, dorso extremo pinna adiposa. Lin. Syst. Nat. p.* 106.
Mysticete with double spiracle on the head, and a fatty fin at the lower part of the back.
Balæna tripinnis ventre lævi. *Bris. Regn. Anim. p.* 352. *n.* 5.
Physalus bellua, s. Physeter. *Gesn. Aquat. p.* 851.
Finnfisch. *Mart. Spitsb. p.* 125. *t.* 2.

This species is of a much more slender form than the preceding, which it equals in length: the head is rather narrow, the mouth very wide,

* Blackst. Comm. 1. c. 4. Brit. Zool. &c.

PIKE-HEADED MYSTICETE.



FIN-BACKED MYSTICETE.

and the lips are marked by a number of oblique wrinkles or plaits in such a manner as to resemble in some degree the appearance of a large twisted rope. The upper jaw is furnished with laminæ of whalebone, on the same plan as in the great whale, but smaller and shorter in proportion, and generally of a blueish colour. The general colour of this species is a dark or blackish olive on the upper parts, and whitish beneath. Martens compares the colour to that of a Tench. On the lower part of the back is situated a small thick or fatty fin, of about three or four feet in length, and of a somewhat sharpened form. This animal swims with greater celerity and vigour than the great whale, and is considered as much more dangerous to attack, exerting such rapid and violent motions as to render the capture extremely difficult, and as the oil which it affords is much less plentiful than in the former species, it is of course less an object of pursuit. It is known to the fishers by the title of Fin-Fish, being easily distinguished by its back fin, as well as by its much more violent blowing and spouting. It inhabits the same seas with the great or common Whale.

PIKE-HEADED MYSTICETE.

Balæna Boops. *B. fistula duplici in rostro, dorso extremo protuberantia cornea. Lin. Syst. Nat. p.* 106. *Artedi. Gen.* 77. *Syn.* 107.

Whale with double spiracle on the snout, and a horny protuberance on the hind part of the back.

Balæna tripinnis, ventre rugoso, rostro acuto. *Briss. Regn. Anim. p.* 355. *n.* 7.

Jupiterfisch. *Anders. isl. p.* 220. *Cranz. Groenl. p.* 146.

Pike-headed Whale. *Pennant Brit. Zool.* 1. *p.* 50. *Dale Harw. p.* 410. *n.* 3.

THIS species measures fifty feet or more in length, and is found both in the northern and southern ocean. It is of a moderately slender form, but somewhat thick on the fore parts, and its colour is black above and white beneath: the upper part of the belly is marked by numerous longitudinal plaits or wrinkles, the insides of which are of a red colour. The head is moderately large, and of a gradually tapering form, yet ending in a somewhat broad or obtuse tip. It has a double spiracle or blow-pipe on the head, the holes of which are approximated, and which it can close in such a manner by a common operculum, as to appear single: before the nostrils, on the head, are three rows of circular convexities: the lower jaw is rather narrower than the upper: the eyes are situated beyond the spiracles, on each side the head: the ears consist of very minute apertures behind the eyes: in the upper jaw are very numerous laminæ of whalebone, not

above a foot in length; and in the lower jaw is a cavity to receive them: the tongue is large, fat, wrinkled, and liver-coloured, and from this towards the throat hangs a loose skin like an operculum. The pectoral fins are large, obovate-oblong, entire on the posterior edge, but round-crenated on the anterior. The dorsal fin is of a fatty-cartilaginous substance, and is situated on the hind part of the back, above the vent, and is nearly perpendicular. Behind the dorsal fin runs a carina, or sharp edge, as far as the tail, which is slightly divided into two somewhat pointed lobes. This species lives principally on a small species of Salmon, called the *Salmo arcticus*, as well as on the *Argonauta arctica* and the *Ammodytes Tobianus* or Launce. When in the act of opening its mouth, it dilates the abdominal plaits or furrows, which lie in pairs, and on account of the colour of their internal surface, present, at this juncture, a highly beautiful spectacle; the fore part of the belly appearing as if elegantly striped with red. This species blows less violently than others; and is often observed stationary, as it were, or as if sleeping on the surface, sometimes lying on one side, and sometimes striking out of the water, and flapping itself with its fins, as if to clear them from barnacles, &c. which occasionally adhere to them. It is a very timid animal, and always swims away from the *Physeter Microps* or *High-Finned Cachalot*, which is its great enemy. Its flesh and oil are used like those

of other whales; and from the skinny flap at the root of the tongue, as well as from the intestines, are prepared windows by the Greenlanders.

BUNCHED MYSTICETE.

Balæna Gibbosa. *B. dorso gibboso, pinna dorsali nulla. Lin. Syst. Nat. Gmel. p.* 225.

Whale with one or more gibbous excrescences on the back, and without dorsal fin.

Balæna gibbo unico prope caudam. *Klein. M. P. 2. p.* 12.

Balæna gibbis sex, balæna macra. *Klein. M. P. 2. p.* 13.

Knotenfisch oder Knobbelfisch. *Anders. isl. p.* 225. *Cranz. Groenl. p.* 146.

This species is a native of the northern seas, and is said to be of the same general form with the Great Whale, but of smaller size, and to have the back furnished with one or more tubercles: the variety with a single tubercle is found about the coasts of New England: the other, which has six tubercles along the back, is supposed to occur about the coasts of Greenland; but neither seem very accurately known: their whalebone is said to be of a pale or whitish colour.

UNDER-JAWED MYSTICETE.

Balæna Musculus. *B. fistula duplici in fronte, maxilla inferiore multo latiore. Lin. Syst. Nat. p.* 226. *Artedi. Gen.* 78. *Syn.* 107.

Whale with double spiracle on the front, and lower jaw much wider than the upper.

Balæna tripinnis, ventre rugoso, rostro rotundo. *Briss. Regn. Anim. p.* 353. *n.* 6.

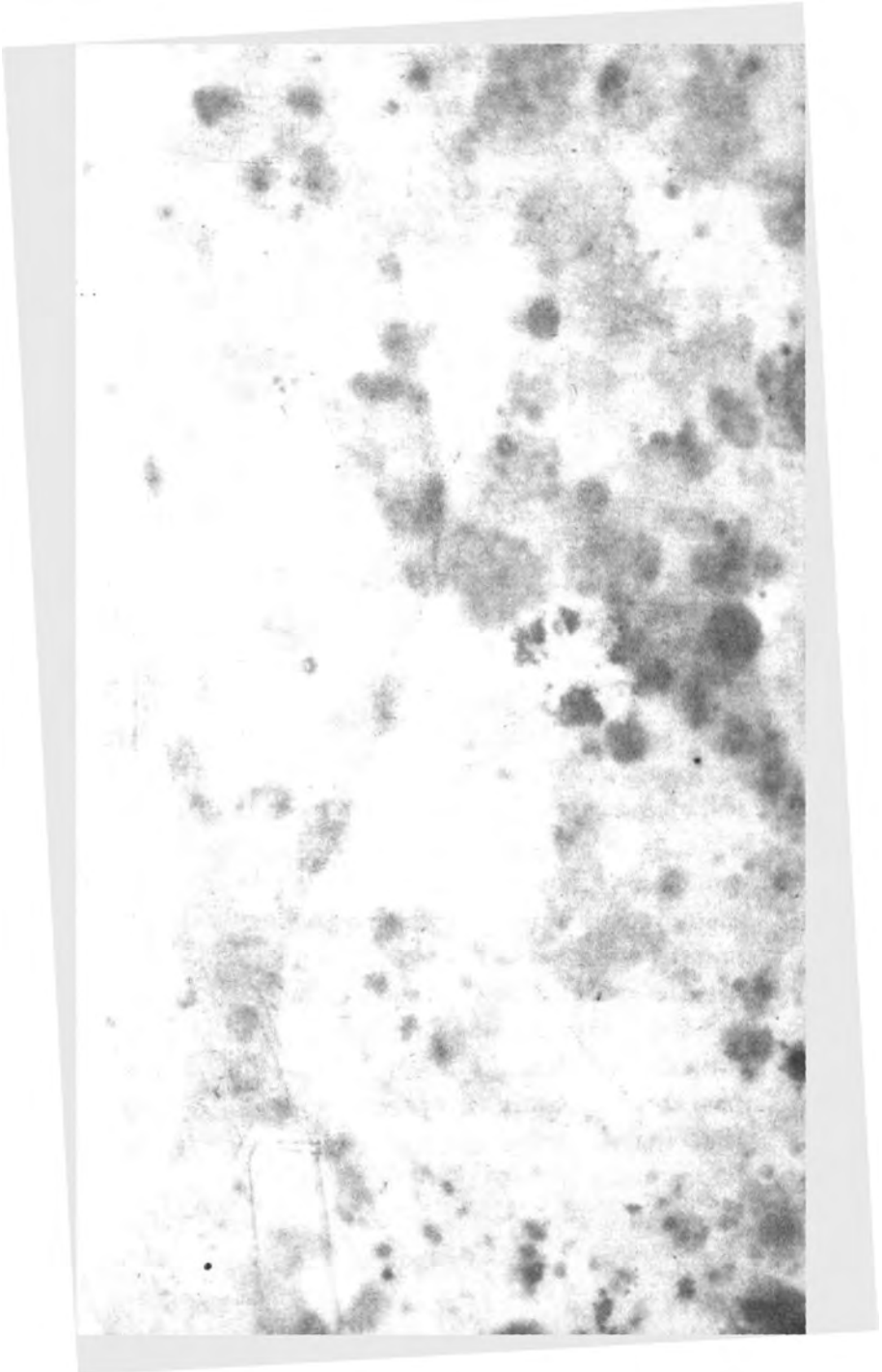
Round-lipped Whale. *Pennant Brit. Zool. p.* 52.

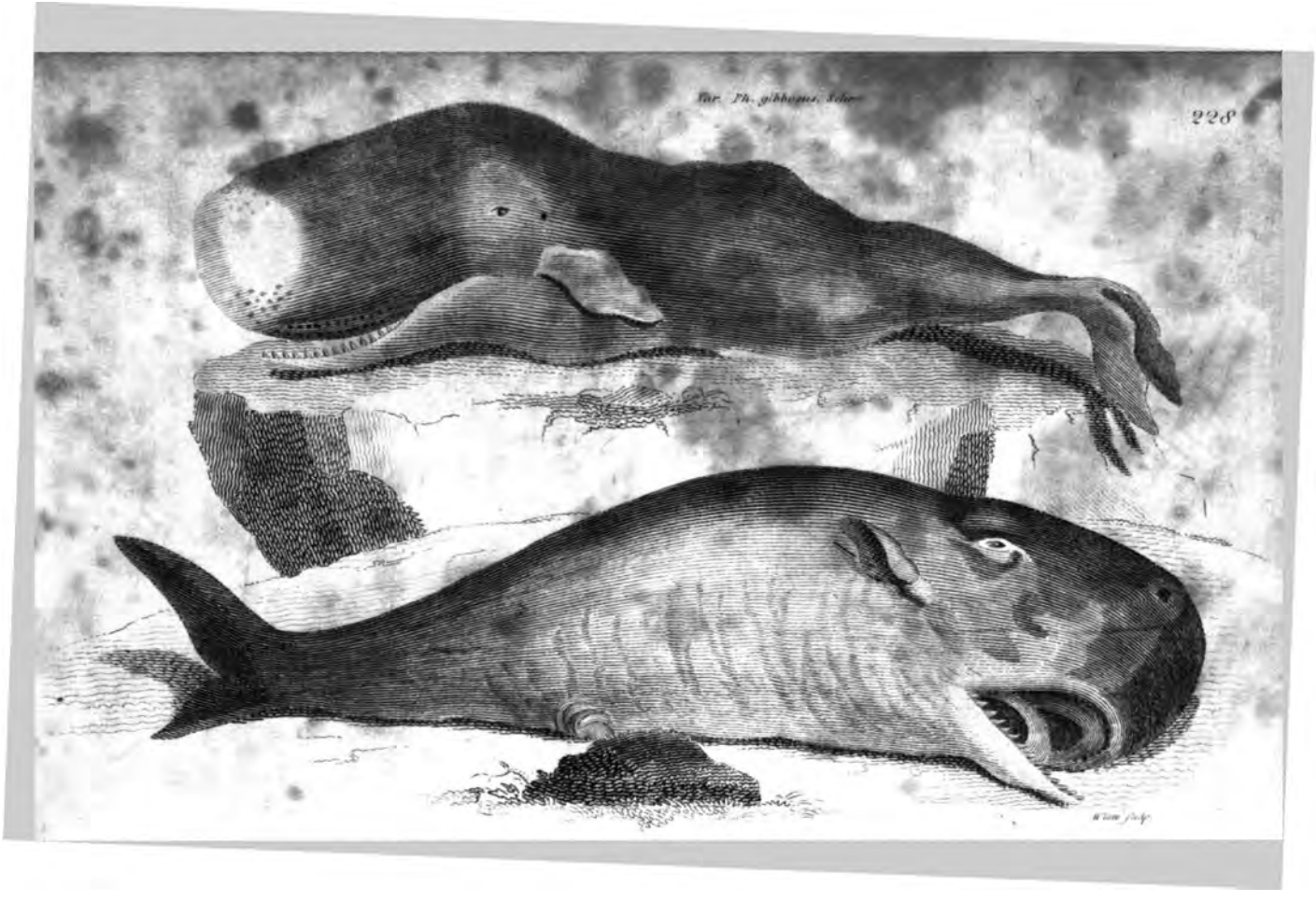
THIS is a native of the northern seas, and seems much allied to the Pike-headed Mysticete, but grows to a much larger size, having been found, it is said, of the length of seventy-eight feet, measuring thirty-five feet in girth; the head is large; the mouth very wide; the lower lip much broader than the upper, and semicircularly turned at its extremity, while the upper is somewhat sharp or pointed at the tip. The laminæ of whalebone are black, and short in proportion to the size of the animal, the longest not measuring more than three feet: the spiracle is double and placed on the front: the belly is marked by plaits or furrows as in the *Balæna Boops*, and on the lower part of the back is a fatty fin. The colour of this species is black above and white beneath. In the year 1692 a specimen was taken on the coast of Scotland. Its dimensions were as above described; the tongue measured fifteen feet and a half in length, and the two spout-holes on the forehead were of a pyramidal form; the pectoral fins ten feet long; and the tail eighteen feet broad.

ROSTRATED MYSTICETE.

Balæna Rostrata. *B. minima rostro strictiore, dorso pinnato, laminis oris albis. Fabr. Faun. Groenl. p.* 4.
Small Whale, with taper snout and adipose back fin.
Balæna rostrata. *B. ore rostrato, dorsi pinna adiposa. Lin. Syst. Nat. Gmel. p.* 226.
Balæna minima, rostro longissimo et acutissimo. *Müll. Zool. Dan. Prodr. p.* 7. *n.* 48.
Rostrated Whale. *Naturalist's Miscellany, vol.* 9. *p.* 304.

This is by far the smallest as well as the most elegant in its appearance of all the Mysticetes or Whalebone Whales, being rarely known to attain the length of twenty-five feet. The head, upper part of the back, fins, and tail, are of a dark or blueish-brown, but the sides and abdomen are of a beautiful white, with a very slight tinge of pale rose or flesh-colour, and are marked for more than half the length of the animal by very numerous longitudinal plaits or furrows: the eyes are small, as is also the head, and the snout is much more elongated than in any other species, gradually tapering to the extremity, which is slightly pointed: the back fin is small, and situated at no great distance from the tail: the pectoral fins are small and narrow, and the tail is divided into two longish and pointed lobes. The whole animal has an elegant fish-like form, and has none of that uncouth appearance which prevails in the larger species.




Var. Ph. gibbosus. Schr.
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PHYSETER. CACHALOT.

Generic Character.

Dentes in maxilla inferiore.	*Teeth* visible in the lower jaw only.
Fistula in capite s. fronte.	*Spiracle* on the head or snout.

BLUNT-HEADED CACHALOT.

Physeter Macrocephalus. *P. dorso impinni, fistula in cervice* *. *Lin. Syst. Nat. p.* 107. *Artedi. Gen.* 78. *Syn.* 108.
Cachalot with finless back, and spiracle on the neck.
Balæna. *Jonst. pisc. p.* 215. *t.* 41, 42. *Will. ichth. t. A.* 1. *f.* 3.
The Spermaceti Whale. *Brown Jam. p.* 459.
Blunt-headed Cachalot. *Pennant Brit. Zool. p.* 59.
The Parmacitty Whale, or Pot Wal Fish. *Dale Harw. p.* 413.

THIS Whale, which is one of the largest species, is scarcely inferior in size to the great Mysticete, often measuring sixty feet or more in length. The head is of enormous size, constituting more than a third of the whole animal; the mouth wide; the upper lip rounded, thick or high, and much broader than the lower, which is of a

* This expression, according to Fabricius, is not quite correct.

somewhat sharpish form, fitting, as it were, into a longitudinal bed or groove in the upper. The teeth, at least the visible ones, as mentioned in the generic character, are situated only in the lower jaw, and when the mouth is closed, are received into so many corresponding holes or cavities in the upper: they are pretty numerous, rather blunt, and of a somewhat conic form, with a very slight bend or inclination inwards: there are also, according to Fabricius, small, curved, flattish, concave, and sharp-pointed teeth, lying almost horizontally along the upper jaw, though, from their peculiar situation and size, they are not visible like those of the lower; being imbedded in the fleshy interstices of the holes which receive the lower teeth, and presenting only their internal concave surfaces to meet the latter when the mouth is closed. The front of the head is very abrupt, descending perpendicularly downwards, and on its top, which has been improperly termed the neck by some authors, is an elevation or angular prominence containing the spiracle, which appears externally simple, but is double within. The head is distinguished or separated from the body by a transverse furrow or wrinkle. The eyes are small and black; and the ears or auditory passages extremely small. About the middle of the back is a kind of spurious fin, or dorsal tubercle*, of a callous nature, not move-

* This is not constant, and seems to constitute the variety figured by Schreber under the title of Physeter gibbosus.

able, and somewhat abrupt or cut off behind. The tongue is of the shape of the lower jaw, clay-coloured externally, and of a dull red within. The throat is but small in proportion to the animal. The body is cylindrical beyond the pectoral fins, growing narrower towards the tail. The colour of the whole animal is black, but when advanced in age grows whitish beneath. It swims swiftly, and is said to be a violent enemy to the *Squalus Carcharias* or White Shark, which is sometimes driven ashore in its endeavours to escape, and according to Fabricius, will not venture to approach its enemy even when dead, though fond of preying on other dead Whales. This Whale also devours the *Cyclopterus Lumpus* or Lump-Fish, and many others. The Greenlanders use the flesh, skin, oil, tendons, &c. in the same manner as those of the Narwhal. It is reckoned very difficult to take; being very tenacious of life, and surviving for several days the wounds it receives from its pursuers.

It is in a vast cavity within the upper part of the head of this Whale that the substance called spermaceti is found, which while fresh and in its natural receptacle, is nearly fluid; but when exposed to the air concretes into opake masses: this substance being so universally known, it becomes unnecessary to describe it farther.

A more curious and valuable production, the origin of which had long eluded the investigation of naturalists, is obtained from this animal, viz. the celebrated perfume called Ambergris, which

is found in large masses in the intestines, being in reality no other than the fœces.

A very large specimen of this Whale was once stranded on the coast of Norfolk; and is particularly commemorated by Sir Thomas Brown, who seems to have been desirous of discovering Ambergris in it, but was repelled by the intolerable fœtor of the animal, which had lain several days in a state of putrefaction. Sir Thomas recites the anecdote in his usual forcible style, and appears to have been rather in doubt of what is now pretty well ascertained, viz. that this perfume has really the origin above described.

"In vain it was to rake for ambergriese in the paunch of this Leviathan, as Greenland discoverers and attests of experience dictate, that they sometimes swallow great lumps thereof in the sea, insufferable fœtor forbidding that enquiry; and yet, if, as Paracelsus encourageth, odure makes the best musk, and from the most fetid substances may be drawn the most odoriferous essences, all that had not Vespasian's nose might boldly swear, here was a fit subject for such extractions."

SMALL CACHALOT.

Physeter Catodon. *P. dorso impinni, fistula in rostro. Lin. Syst. Nat. p.* 107. *Artedi. Gen.* 78. *Syn.* 108.
Cachalot with finless back, and spiracle on the snout.
Cetus minor bipinnis, fistula in rostro. *Briss. Regn. Anim. p.* 361. *n.* 4.
Round-headed Cachalot. *Pennant Brit. Zool.* 3. *p.* 56.

THIS species is of far inferior size to the former, measuring about twenty-five feet in length. In its general structure it is allied to the preceding, but has a smaller mouth in proportion, and is without any visible protuberance on the back. It is found in the northern seas.

I must here observe that some of the species of Cachalot seem still but obscurely known, and there is a degree of confusion prevailing with respect to the synonyms of authors; the Physeter Catodon of Fabricius being a different species from this, viz. the *P. Tursio* of the Gmelinian edition of the Systema Naturæ.

SMALL EYED CACHALOT.

Physeter Microps. *P. dorso, pinna longa, maxilla superiore longiore. Lin. Syst. Nat. p.* 107. *Artedi. Gen.* 74. *Syn.* 104.
Cachalot with long dorsal fin, and upper jaw longer than the lower.
Cetus tripinnis, dentibus acutis arcuatis falciformibus. *Briss. Regn. Anim. p.* 363. *n.* 6.

THIS is of equal, and sometimes even superior size to the first described species*, and is a native of the northern seas. The head is very large, and nearly half the length of the body: the eyes extremely small, and the snout slightly obtuse: on the back is a long and somewhat upright narrow and pointed fin. This species swims swiftly, and is said to be a great enemy to the Porpoise, which it pursues and preys upon. Its colour is blackish above and whitish beneath. Some of the supposed varieties of this Whale are said to grow to the length of eighty or an hundred feet. The teeth are of a more curved form than the rest of the genus.

A variety however is mentioned by Brisson, in which the teeth are strait, or nearly so.

* Fabricius however numbers it among the smaller Whales, and adds that it is common in the Greenland seas; that it has twenty teeth in the lower jaw, which are very white, falciform, conically compressed, and sharp-pointed. The Greenlanders also affirm that there are teeth in the upper jaw.

HIGH-FINNED CACHALOT

Physeter Tursio. *P. dorsi pinna altissima, apice dentium plano. Lin. Syst. Nat. p.* 107. *Artedi. Gen.* 74. *Syn.* 104.
Cachalot with very long upright dorsal fin, and teeth flat at the tips.
Cetus tripinnis, dentibus in planum desinentibus. *Briss. Regn. Anim. p.* 364. *n.* 7.
High-finned Cachalot. *Pennant Brit. Zool.* 3. *p.* 57.

THIS is particularly distinguished by the great length and narrow form of its dorsal fin, which is placed almost upright on the back, and is said by some authors to appear at a distance like the mast of a small ship; the animal growing, if we may believe report, to the length of an hundred feet. In its general appearance it is said much to resemble the former species, of which it may perhaps be a variety rather than truly distinct; but so much obscurity still prevails with respect to the Cetaceous animals that this point must be considered as very doubtful.

DELPHINUS DOLPHIN.

Generic Character.

Dentes in maxilla utraque. || *Teeth* in both jaws.
Fistula in capite. || *Spiracle* on the head.

PORPESSE.

Delphinus Phocæna. *D. corpore subconiformi, dorso lato, rostro subobtuso. Lin. Syst. Nat. p.* 108. *Artedi Gen.* 75. *Syn.* 104.
Dolphin with subconic body, broad back, and subobtuse snout.
Phocæna. *Rond. Pisc. p.* 473. *Gesn. Aquat. p.* 837. *Aldr. Pisc. p.* 719. *Jonst. Pisc. p.* 221.
Porpess. *Pennant Brit. Zool. p.* 61.

THE Porpesse may be considered as the most common of the whole cetaceous tribe; being found in almost all parts of the European ocean, and sometimes even entering the mouths of large rivers. In its general shape it so much resembles the Dolphin or next species, as to be frequently confounded with it; and navigators in general seem to call both species indiscriminately by the same name. The Porpesse however differs in having a shorter snout, which though somewhat sharply terminated, is much less narrow or pro-

DOLPHIN.

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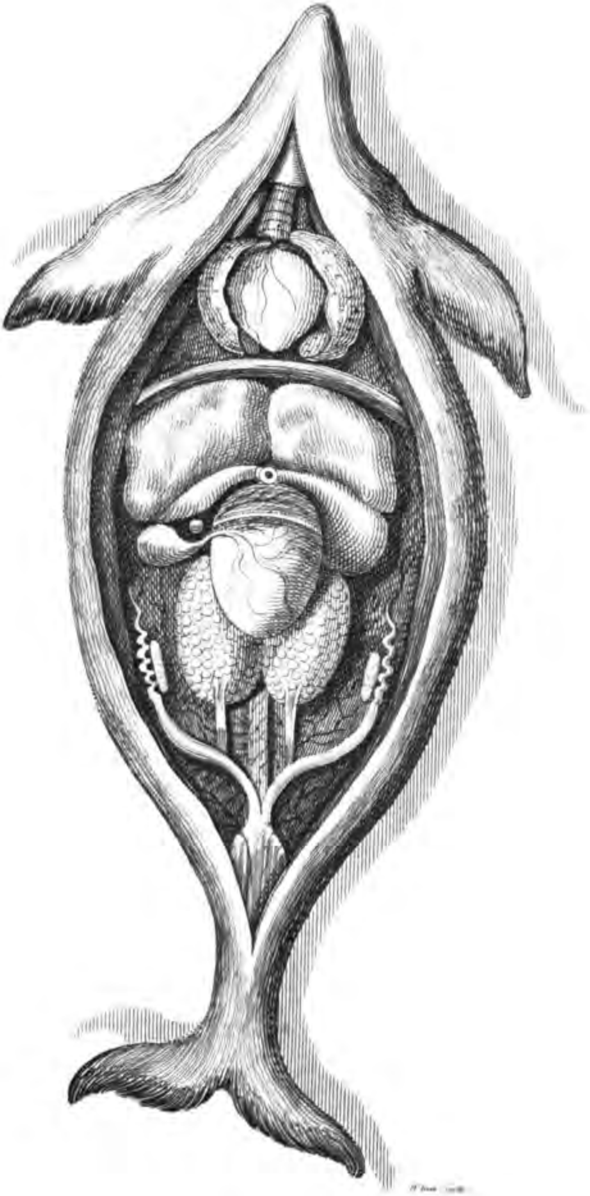


PORPESSE OPENED.

1801. Jan^y. 1. London Publish'd ... Fleet St.

duced than that of the Dolphin. The Porpesse is also, in general, the smallest animal of the two, and rarely exceeds the length of six or seven feet. It is of a thick form on the fore parts, and gradually tapers towards the tail, which is shaped like that of other Cetacea. The back fin is situated rather nearer the tail than the head, and is of a somewhat triangular outline, and placed nearly upright. In colour this animal resembles the Dolphin, being either of a blueish black or of a very dark brown above, and white or nearly white beneath: the eyes are small; behind them are situated the auditory passages, which are very small; and on the upper part of the front is the spiracle, which is somewhat in the form of a crescent: the mouth is of moderate width; the teeth small, rather sharp, and numerous; being commonly about forty-six or fifty in each jaw; the tongue is flat, rounded, notched or crenated on the edge, and pretty closely attached or confined to the surface of the under jaw.

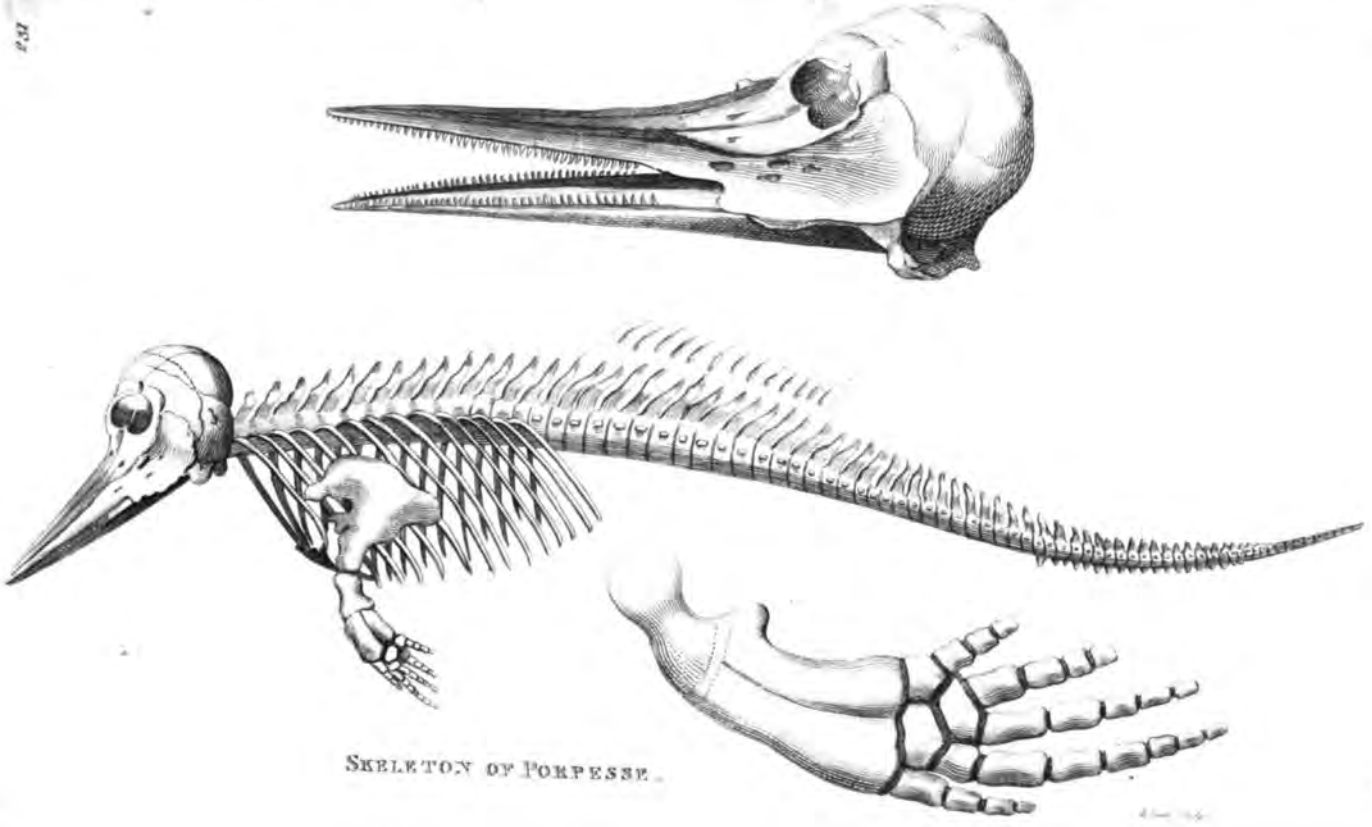
The Porpesse lives chiefly on the smaller kinds of fish, and is observed to root about the shores with its snout, in the manner of a hog, while in quest of food. Like the Dolphin it is seen to gambol about in the ocean, more especially in stormy weather.

Porpesses are also observed to congregate occasionally in vast numbers, and to pursue shoals of Herrings, Mackrel, and other fish, which they drive into the bays and close recesses, and prey upon them with vast voracity. This animal is

remarkably fat, being covered immediately under the skin with a thick coat of lard, affording a great quantity of oil.

The Porpesse was once considered as a sumptuous article of food, and is said to have been occasionally introduced at the tables of the old English nobility; and this so lately as the time of Queen Elizabeth. It was eaten with a sauce composed of crumbs of fine bread with sugar and vinegar. It is however now generally neglected even by sailors.

The Porpesse, being by far the most common, and most easily obtained of all the European Cetacea, has, of course, been more accurately examined than any other species; Belon, Rondeletius, Tyson, and others, having given very good descriptions of its internal structure; and in order to convey a general idea of the similarity of its fabric to that of the terrestrial Mammalia, a figure of an opened Porpesse is introduced into the present publication; some of the viscera being removed, in order to shew others to greater advantage. The skeleton is also represented on a separate plate.



SKELETON OF PORPESSE.

DOLPHIN.

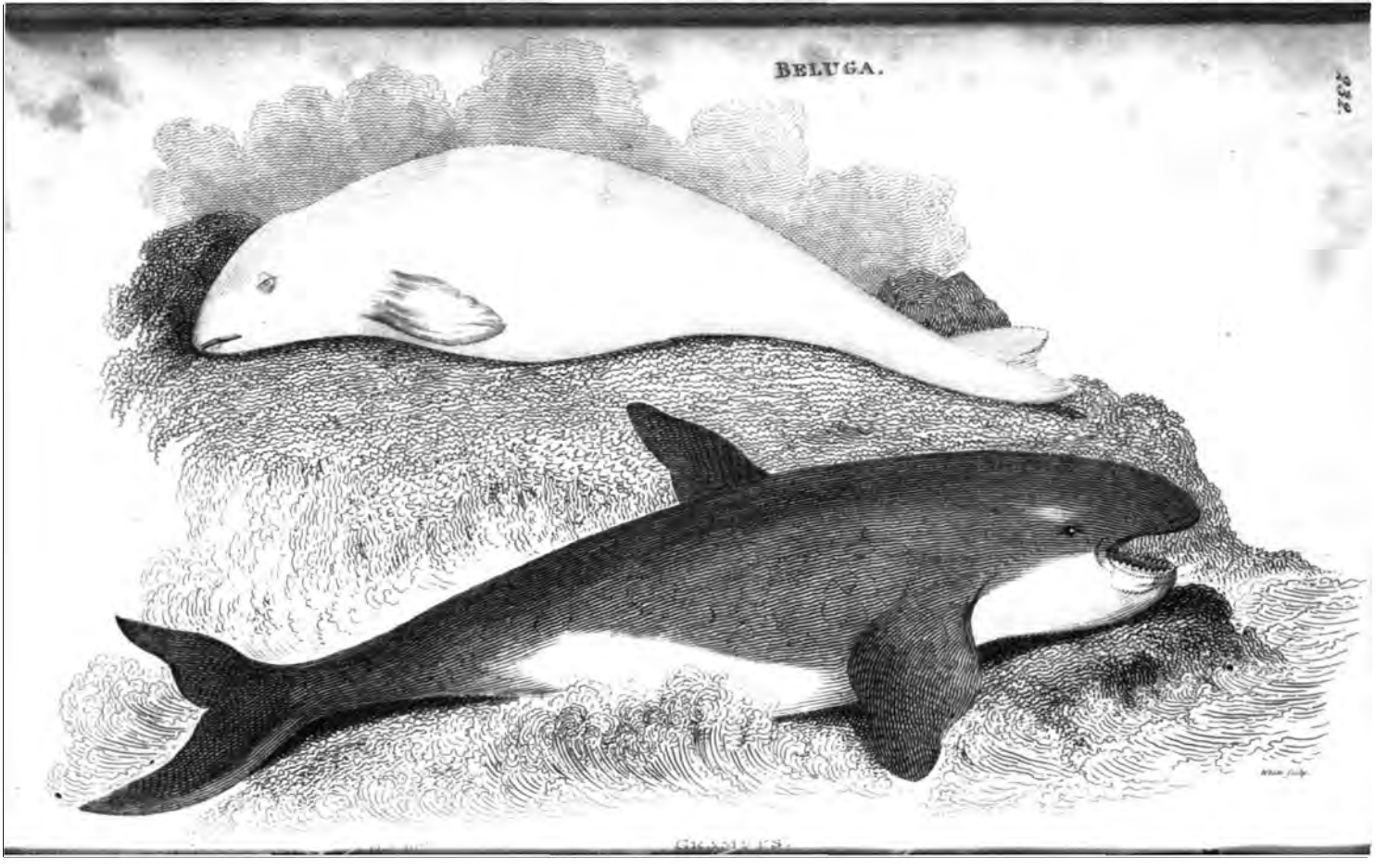
Delphinus Delphis. *D. corpore oblongo subtereti, rostro attenuato acuto. Lin. Syst. Nat. p.* 108. *Artedi. Gen. 76. Syn.* 105.
Dolphin with oblong subcylindric body, and lengthened sharpish snout.
Delphinus. *Plin. Hist. Nat.* 9. *c.* 7, 8. 11. *c.* 37. *Bellon. Aquat. p.* 7. *Rondel. Pisc. p.* 459. *Gesn. Aquat. p.* 380. *Aldr. Pisc. p.* 701. 703, 704. *Jonst. Pisc.* 218.
Porcus marinus. *Sibb. Scot. Ann. p.* 23.
Dolphin. *Pennant Brit. Zool. p.* 58.

THE Dolphin, as observed in the preceding article, bears a great resemblance to the Porpesse, but has a much longer and sharper snout, and the shape of the body is rather more slender. It also grows to a larger size, measuring eight or ten feet in length, and is black above and whitish beneath. The mouth is very wide; the teeth very numerous, small, sharp, and set, as in the Porpesse, in a strait row on each side of both jaws: the eyes are small, the back fin seated as in the former species, beyond the middle of the back. The Dolphin is found in the Mediterranean and Indian seas, and seems to be generally confounded by navigators with the Porpoise, having the same general manners and appearance. It preys on various kinds of fish, and is said to be sometimes seen attacking and wounding even the larger kind of Whales. It swims very swiftly. The appearance both of this species and the Porpesse at sea, is generally considered as one of the preludes of an approaching storm. The prejudices of the ancients were of a contrary cast: with them this animal was celebrated for its supposed affec-

tion to the human race, and its appearance regarded as a prosperous omen. "The Dolphin," says Pliny, "is friendly to man, and pleased with musick. He does not fly from the sight of mankind, but of his own accord meets their ships, gamboling before them, and accompanying their course, as if through a spirit of emulation; and always outstripping them, even when sailing with the most favourable wind."

Pliny also relates several tales relative to the affection of the Dolphin to mankind; one of which is the following, which will perhaps appear more interesting in the simple translation of Philemon Holland, than if delivered in the more elegant style of modern language.

"Divo Augusto principe, &c. &c."—"In the daies of Augustus Cæsar the Emperor, there was a Dolphin entered the gulfe or pool Lucrinus, which loved wonderous well a certain boy a poor man's sonne: who using to go every day to schoole from Baianum to Puteoli, was woont also about noone-tide to stay at the water side and to call unto the Dolphin *Simo, Simo*, and many times would give him fragments of bread, which of purpose hee ever brought with him, and by this meane allured the Dolphin to come ordinarily unto him at his call. (I would make scruple and bash to insert this tale in my storie and to tell it out, but that Mecænas Fabianus, Flavius Alfius, and many others have set it downe for a truth in their Chronicles.) Well, in processe of time, at what houre soever of the day, this boy lured for


BELUGA.
232.

him, and called *Simo*, were the Dolphin never so close hidden in any secret and blind corner, out he would and come abroad, yea and scud amaine to this lad: and taking bread and other victuals at his hand, would gently offer him his back to mount upon, and then down went the sharp-pointed * prickes of his finnes, which he would put up as it were within a sheath, for fear of hurting the boy. Thus when he had him once on his back he would carry him over the broad arme of the sea, as far as Puteoli to schoole; and in like manner convey him back again home: and thus he continued for many yeeres together, so long as the child lived. But when the boy was falne sicke and dead, yet the Dolphin gave not over his haunt, but usually came to the woonted place, and missing the lad, seemed to be heavy and mourne again, untill for verie griefe and sorrow (as it is doubtless to be presumed) he also was found dead upon the shore."

The voice of the Dolphin is, according to Pliny, a sound resembling a human groan; and Willoughby quotes, from *Gillius*, a passage illustrative of this circumstance.

"A captis delphinis, &c. &c."—"In a vessel where several Dolphins were confined, I passed a night of great uneasiness, so feelingly did these poor animals express the misery of their condition by cries and lamentations resembling the human.

* From this observation it should seem that Pliny had not very accurately examined the Dolphin.

Their sufferings forced from me tears of compassion; and while the fisherman was asleep, I threw one, which seemed to suffer most, into the sea. But this act of tenderness availed me nothing; for the moanings of those that remained, seemed only to be increased, and they seemed by signs too plain to be misunderstood, to wish for a similar deliverance."

It appears, from the testimony of the accurate Fabricius, in his Fauna Groenlandica, that the D. Phocæna or Porpoise constantly swims in a curved posture, depressing very considerably both head and tail during that action; and it is highly probable that the Dolphin swims in the same manner; thus justifying, in some degree, the representations of the ancients; who appear indeed to have been guilty of some aggravation in this respect, in their poetical and sculptorial representations, while the moderns, on the contrary, have been somewhat too severe in condemning them.

The learned Sir Thomas Brown has a short chapter on this subject in his celebrated work the Pseudodoxia Epidemica, which I shall here introduce, as at once comprising the principal remarks which have been made on the subject, and at the same time as a good example of that author's peculiar style.

"That Dolphins are crooked, is not only affirmed by the hand of the painter, but commonly conceived their natural and proper figure; which is not only the opinion of our times, but seems the belief of elder times before us. For beside the

expressions of *Ovid* and *Pliny*, the pourtraicts in some ancient coyns are framed in this figure, as will appear in some thereof in *Gesner*, others in *Goltzius*, and *Lævinus Hulsius* in his description of coyns, from *Julius Cæsar* unto *Rudolphus* the second. Notwithstanding, to speak strictly, in their natural figure they are streight, nor have their spine convexed, or more considerably embowed than Sharks, Porpoises, Whales, and other cetaceous animals, as *Scaliger* plainly affirmeth: *Corpus habet non magis curvum quam reliqui pisces.* As ocular enquiry informeth; and as, unto such as have not had the opportunity to behold them, their proper pourtraicts will discover in *Rondeletius*, *Gesner*, and *Aldrovandus*. And as indeed is deducible from pictures themselves; for though they be drawn repandous, or convexedly crooked, in one piece, yet the Dolphin that carrieth *Arion* is concavously inverted, and hath its spine depressed in another. And answerably hereunto we may behold them differently bowed in medals, and the Dolphins of *Tarus* and *Fulius* do make another flexure from those of *Commodus* and *Agrippa*. And therefore what is delivered of their incurvity must either be taken emphatically, that is, not really, but in appearance; which happeneth when they leap above water, and suddenly shoot down again; which is a fallacy in vision, whereby streight bodies in a sudden motion protruded obliquely downward, appear unto the eye crooked; and this is the construction of *Bellonius*: or, if it be taken really, it must not be universally and

perpetually; that is, not when they swim and remain in their proper figures, but only when they leap, or impetuously whirl their bodies any way; and this is the opinion of *Gesnerus.* Or lastly, it may be taken neither really nor emphatically, but only emblematically: for being the hieroglyphic of celerity, and swifter than other animals, men best expressed their velocity by incurvity, and under some figure of a bow: and in this sense probably do Heralds also receive it, when from a Dolphin extended they distinguish a Dolphin embowed. And thus also must that picture be taken of a Dolphin clasping an anchor; that is, not really, as is by most conceived, as out of affection unto man, conveighing the anchor unto the ground; but emblematically, according as *Pierius* hath expressed it, the swiftest animal conjoyned with that heavy body, implying that common moral, *Festina lente;* and that celerity should always be contempered with cunctation."

GRAMPUS.

Delphinus Orca. *D. rostro sursum repando, dentibus latis serratis* *. *Lin. Syst. Nat. p.* 108. *Artcd. Gen.* 76. *Syn.* 106.
Delphinus corpore crasso, dorso pinnato, rostro sursum repando, dentibus obtusis. *Fabr. Faun. Groenl. p.* 49.
Dolphin with thick body, snout spreading upwards, and obtuse teeth.
Butskopf. *Mart. Spitzb. p.* 93. *Cranz. Groenl. p.* 151.

THE Orc or Grampus is by far the largest animal of this genus, arriving at the length of twenty-five feet, and is of an extremely fierce and predacious disposition, feeding on the larger fishes, and even on the Dolphin and Porpesse. It is also said to attack other Whales, and to devour Seals, which it occasionally finds sleeping on the rocks, dislodging them by means of its back fin, and precipitating them into the water. In its general form and colour it resembles the rest of this genus; but the lower jaw is much wider than the upper, and the body somewhat broader and deeper in proportion: the back-fin sometimes measures not less than six feet in length from the base to the tip. The Grampus is found in the Mediterranean and Atlantic seas, as well as in both the polar regions. It is emphatically styled by Fabricius *Balænarum Tyrannus*, and is considered as one of the most ferocious inhabitants of the ocean.

* This appears to be an error, none of the Whales having serrated teeth.

BIDENT DOLPHIN.

Delphinus Bidens. *D. dentibus duobus in fronte maxillæ superioris.*
Dolphin with two teeth in the front of the upper jaw.
Bottle-nose Whale of Dale. *Hunter Phil. Trans. vol. 77. pl. 19.*

THIS is introduced by Mr. Hunter into the Philosophical Transactions, and is the Bottle-nosed Whale of Dale *. It has the general appearance of the Dolphin, but has a much shorter snout, the front bulging out very much above, and has only two teeth, which are situated in front of the upper jaw. The specimen mentioned by Mr. Hunter measured twenty-one feet, in length. The pectoral and back fins are small, and the latter placed pretty low on the back.

NARROW-SNOUTED DOLPHIN.

Delphinus Rostratus. *D. rostro attenuato.*
Dolphin with greatly attenuated snout.

KNOWN only from the head, or bones of the jaws. Supposed to inhabit the Indian seas. The jaws are extremely narrow in proportion to their length, which is about two feet: the teeth are small, not numerous, distant, and shaped somewhat like the molares of quadrupeds.

* Dale's Harwich.

BELUGA.

Delphinus Leucas. *D. rostro conico obtuso, deorsum inclinato, pinna dorsali nulla. Lin. Syst. Nat. Gmel. p.* 232. *Pall. it. 3. p.* 84. *t.* 4.
White Dolphin, without dorsal fin.
Delphinus pinna in dorso nulla. *Briss. Regn. Anim. p.* 374. *n.* 5.
Beluga. *Stell. Camtsch. p.* 106.

This is a species which appears to have been not very distinctly known till within a few years past. It is a native of the northern seas, and, like the Porpesse, sometimes enters into rivers. It has been well described both by Fabricius and Pallas. It is of a more elegant appearance than the rest of this tribe, and when full grown is entirely milk-white, in some specimens tinged very slightly with rose-colour, and in others with blueish. It measures from twelve to eighteen feet in length, and sometimes even more, and preys upon all kinds of middle sized fish; as herrings, cod, flat-fish, &c. &c. It is a gregarious species, and is often observed swimming in large shoals, the young accompanying their parents, and the whole forming a beautiful spectacle, from the unusual colour. They are also sometimes observed to follow boats for a considerable time together. The head of this species is rather small than large; and is joined to the body by a kind of almost imperceptible neck or contracted part: the spiracle is situated on the top of the head, and is internally double: the eyes are very small, blueish, and the opening of the mouth by no means wide: the

the teeth are rather blunt, small, not very numerous, being about ten on each side, in both jaws: the auditory passages are situated a little behind the eyes: the body is fish-shaped, thick in the middle, and tapering towards the tail, which is slightly lobed or divided.: the back has a kind of longitudinal ridge on the lower part, as in the Balæna Mysticetus. The pectoral fins are thick and fatty, and are marked at the edge into five slight divisions; they contain the bones of the five fingers, which may be easily felt within the fin: there is no back fin. The skin, on every part, is smooth and slippery, and the animal is generally very fat.

When this animal swims, says Dr. Pallas, it bends the tail inwards in the manner of a craw-fish, by which means it possesses the power of swimming extremely fast, by the alternate incurvation and extension of that part. It has so great a general affinity with the Seals, that the *Samoids* consider it as a kind of aquatic quadruped. It produces only one young at a birth, which is at first of a blue tinge, and sometimes grey, or even blackish; acquiring as it advances in age the pure milk-white colour.

APPENDIX

TO

WHALES.

AS an appendix to the history of this extraordinary tribe, and in order to convey as much general information as possible on so interesting a subject, I shall avail myself of Mr. Hunter's excellent paper in the Philosophical Transactions, in which an accurate description is given both of the external and internal appearance of several of the principal species. I shall give the observations chiefly in Mr. Hunter's own words, with some occasional abridgements and omissions. The whole must necessarily appear somewhat tedious to common readers, but those who know how to appreciate its importance will highly approve of its insertion.

THIS order of animals has nothing peculiar to fish, except living in the same element, and being endowed with the same powers of progressive motion as those fish which are intended to move with a considerable velocity.

Although inhabitants of the waters, they belong to the same class as quadrupeds; breathing air, being furnished with lungs, and all other parts peculiar to the œconomy of that class, and having warm blood; for we may make this general remark, that in the different classes of animals there

is never any mixture of those parts which are essential to life, nor in their different modes of sensation.

The external form of this order of animals is such as fits them for dividing the water in progressive motion, and gives them the power to produce that motion in the same manner as those fish which move with a considerable degree of velocity. On account of their inhabiting the water, their external form is more uniform than in animals of the same class which live upon land; the surface of the earth, on which the progressive motion of the quadruped is to be performed, being various and irregular, while the water is always the same.

The form of the head or anterior part of this order of animals is commonly a cone, or an inclined plane, except in the Spermaceti Whale, in which it terminates in a blunt surface. This form of head increases the surface of contact to the same volume of water which it removes, lessens the pressure, and is better calculated to bear the resistance of the water through which the animal is to pass: probably on this account the head is larger than in quadrupeds, having more the proportion observed in fish, and swelling out laterally at the articulation of the lower jaw: this may probably be for the better catching their prey, as they have no motion of the head on the body; and this distance between the articulations of the jaw is somewhat similar to the Swallow, Goat-sucker, Bat, &c. which may also be accounted

for, from their catching their food in the same manner as fish; and this is rendered still more probable, since the form of the mouth varies according as they have or have not teeth. There is however in the Whale tribe more variety in the form of the head than of any other part, as in the Whalebone, Bottle-nose, and Spermaceti Whales; though in this last it appears to owe its shape, in some sort, to the vast quantity of spermaceti lodged there, and not to be formed merely for the catching of its prey. From the mode of their progressive motion they have not the connexion between the head and body that is called the neck, as that would have produced an inequality inconvenient to progressive motion.

The body behind the fins or shoulders diminishes gradually to the spreading of the tail; but the part beyond the opening of the vent is to be considered as tail, although to appearance it is a continuation of the body. The body itself is flattened laterally, and I believe the back is much sharper than the belly.

The projecting part, or tail, contains the power that produces progressive motion, and moves the broad termination, the motion of which is similar to that of an oar in sculling a boat: it supersedes the necessity of posterior extremities, and allows of the proper shape for swimming.

The tail is flattened horizontally, which is contrary to that of fish, this position of tail giving the direction to the animal in the progressive motion of the body.

The two lateral fins, which are analogous to the anterior extremities in the quadruped, are commonly small, varying however in size, and seem to serve as a kind of oars.

To ascertain the use of the fin on the back is probably not so easy, as the large Whalebone and Spermaceti Whales have it not; one should otherwise conceive it intended to preserve the animal from turning.

I believe, like most animals, they are of a lighter colour on their belly than on their back: in some they are entirely white on the belly; and this white colour begins by a regular determined line, as in the Grampus, Piked Whale, &c. in others the white on the belly is gradually shaded into the dark colour of the back, as in the Porpoise. I have been informed that some of them are pied upwards and downwards, or have the divisions of colour in a contrary direction.

The element in which they live renders some parts which are of importance in other animals useless to them, gives to some parts a different action, and renders others of less account.

The tongue is flat, and but little projecting, as they neither have voice, nor require much action of this part in applying the food between the teeth for the purpose of mastication or deglutition, being nearly similar to fish in this respect as well as in their progressive motion.

In some particulars they differ as much from one another as any two genera of quadrupeds I am acquainted with.

The larynx, size of trachea, and number of ribs, differ exceedingly. The coecum is only found in some of them. The teeth in some are wanting. The blow-holes are two in number in many; in others only one. The Whalebone and Spermaceti are peculiar to particular genera; all which constitute great variations. In other respects we find an uniformity, which would appear to be independent of their living and moving only in the water, as in the stomach, liver, kidneys, &c.

From the tail being horizontal, the motion of the animal, when impelled by it, is up and down: two advantages are gained by this; it gives the necessary opportunities of breathing, and elevates them in the water; for every motion of the tail tends to raise the animal; and that this may be effected, the greatest motion of the tail is downwards, those muscles being very large, making two ridges in the abdomen: this motion of the tail raises the anterior extremity, which always tends to keep the body suspended in the water.

The bones alone, in many animals, when properly united into what is called the skeleton, give the general shape and character of the animal. Thus a quadruped is distinguished from a bird, and even one quadruped from another, it only requiring a skin to be thrown over the skeleton to make the species known; but this is not so decidedly the case in this order of animals, for the skeleton in them does not give us the true shape. An immense head, a small neck, few ribs, and in many a short sternum and no pelvis, with a long

spine, terminating in a point, require more than a skin being laid over them in order to give the regular and characteristic form of the animal.

The bones of the anterior extremity give no idea of the shape of a fin, the form of which depends wholly upon its covering. The different parts of the skeleton are so inclosed, and the spaces between the projecting parts are so filled up, as to be altogether concealed, giving the animal externally an uniform and elegant form, resembling an insect enveloped in its chrysalis coat.

The bones of the head are in general so large, as to render the cavity which contains the brain but a small part of the whole; while in the human species, and in birds, this cavity constitutes the principal bulk of the head*. This is, perhaps, most remarkable in the Spermaceti Whale; for on a general view of the bones of the head, it is impossible to determine where the cavity of the skull lies, till led to it by the foramen magnum occiptale. The same remark is applicable to the large Whalebone and Bottle-nose Whale; but in the Porpoise, where the brain is larger in proportion to the size of the animal, the skull makes the principal part of the head.

Some of the bones in one genus differ from those of another. The lower jaw is an instance

* In the Porpoise however, the head of which bears a considerable resemblance to that of a bird, the brain is extremely large, and much resembles the human.

of this. In the Spermaceti Whale, the Bottle-nose, the Grampus, and the Porpoise, the lower jaws, especially at the posterior ends, resemble each other; but in both the large and small Whalebone Whales, the shape differs considerably: the number of some particular bones likewise differs very much.

The Piked Whale has seven vertebræ in the neck, twelve which may be reckoned to the back, and twenty-seven to the tail, making forty-six in the whole.

In the Porpoise there are five cervical vertebræ, and one common to the neck and back, fourteen proper to the back, and thirty to the tail, making in the whole fifty-one.

The small Bottle-nose Whale, in the number of cervical vertebræ, resembles the Porpoise; it has seventeen in the back, and thirty-seven in the tail, in all sixty.

In the Porpoise, four of the vertebræ of the neck are anchylosed; and in every animal of this order, which I have examined, the atlas is by much the thickest, and seems to be made up of two joined together, for the second cervical nerve passes through a foramen in this vertebra. There is no articulation for a rotatory motion between the first and second vertebræ of the neck.

The small Bottle-nose Whale has eighteen ribs on each side; the Porpoise sixteen. The ends of the ribs that have two articulations, in the whole of this tribe, I believe, are articulated with the body of the vertebræ above, and with the trans-

verse processes below by the angles; so that there is one vertebra common to the neck and back. In the large Whalebone Whale the first rib is bifurcated, and consequently articulated to two vertebræ.

The sternum is very flat in the Piked Whale; it is only one very short bone; and in the Porpoise it is a good deal longer. In the small Bottle-nose it is composed of three bones, and is of some length. In the Piked Whale the first rib, and in the Porpoise the three first, are articulated with the sternum.

As a contraction, corresponding to the neck in quadrupeds, would have been improper in this order of animals, the vertebræ of the neck are thin, to make the distance between the head and shoulders as short as possible, and in the small Bottle-nose Whale are only six in number.

The structure of the bones is similar to that of the bones of quadrupeds; they are composed of an animal substance, and an earth that is not animal: these seem only to be mechanically mixed, or rather the earth thrown into the interstices of the animal part. In the bones of fishes this does not seem to be the case, the earth in many fish being so united with the animal part, as to render the whole transparent, which is not the case when the animal part is removed by steeping the bone in caustic alkali; nor is the animal part so transparent when deprived of the earth. The bones are less compact than those of quadrupeds that are similar to them.

Their form somewhat resembles what takes place in the quadruped, at least in those of which the uses are similar, as the vertebræ, ribs, and bones of the anterior extremities have their articulations in part alike, although not in all of them. The articulation of the lower jaw, of the carpus, metacarpus, and fingers, are exceptions. The articulation of the lower jaw is not by simple contact either single or double, joined by a capsular ligament, as in the quadruped; but by a very thick intermediate substance of the ligamentous kind, so interwoven that its parts move on each other, in the interstices of which is an oil. This thick matted substance may answer the same purpose as the double joint in the quadruped.

The two fins are analogous to the anterior extremities of the quadruped, and are also somewhat similar in construction. A fin is composed of a scapula, os humeri, ulna, radius, carpus, and metacarpus, in which last may be included the fingers, because the number of bones are those which might be called fingers, though they are not separated, but included in one general covering with the metacarpus. They have nothing analogous to the thumb, and the number of bones in each is different: in the fore-finger there are five bones; in the middle and ring-finger seven, and in the little finger four. The articulation of the carpus, metacarpus, and fingers, is different from that of the quadruped, not being by capsular ligament, but by intermediate cartilages connected to each bone. These cartilages between the

different bones of the fingers are of considerable length, being nearly equal to one half of that of the bone; and this construction of the parts gives firmness, with some degree of pliability, to the whole.

As this order of animals cannot be said to have a pelvis, they of course have no os sacrum, and therefore the vertebræ are continued on to the end of the tail; but with no distinction between those of the loins and tail. But as those vertebræ alone would not have had sufficient surface to give rise to the muscles requisite to the motion of the tail, there are bones added to the fore-part of some of the first vertebræ of the tail, similar to the spinal processes on the posterior surface.

From all these observations we may infer, that the structure, formation, arrangement, and the union of the bones, which compose the forms of parts in this order of animals, are much upon the same principle as in quadrupeds.

The flesh or muscles of this order of animals is red, resembling that of quadrupeds, perhaps more like that of the Bull or Horse than any other animal: some of it is very firm; and about the breast and belly it is mixed with tendon.

Although the body and tail is composed of a series of bones connected together and moved as in fish, yet it has its movements produced by long muscles, with long tendons; which renders the body thicker, while the tail at its stem is smaller than that of any other swimmer, whose principal motion is the same. Why this mode of applying

the moving powers should not have been used in fish, is probably not so easily answered; but in fish the muscles of the body are of nearly the same length as the vertebræ.

The depressor muscles of the tail, which are similar in situation to the psoæ, make two very large ridges on the lower part of the cavity of the belly, rising much higher than the spine, and the lower part of the aorta passes between them.

These two large muscles, instead of being inserted into two extremities as in the quadruped, go to the tail, which may be considered in this order of animals as the two posterior extremities united into one.

Their muscles, a very short time after death, lose their fibrous texture, and become as uniform in texture as clay or dough, and even softer. This change is not from putrefaction, as they continue to be free from any offensive smell, and is most remarkable in the psoæ muscles, and those of the back.

The mode in which the tail is constructed is perhaps as beautiful, as to the mechanism, as any part of the animal. It is wholly composed of three layers of tendinous fibres, covered by the common cutis and cuticle: two of these layers are external; the other internal. The direction of the fibres of the external layers is the same as in the tail, forming a stratum about one third of an inch thick; but varying in this respect as the tail is thicker or thinner. The middle layer is composed entirely of tendinous fibres, passing directly

across, between the two external ones above described, the length being in proportion to the thickness of the tail: a structure which gives amazing strength to this part.

The substance of the tail is so firm and compact, that the vessels retain their dilated state, even when cut across, and this section consists of a large vessel surrounded by as many small ones as can come in contact with its external surface; which of these are arteries and which veins I do not know.

The fins are merely covered with a strong, condensed, adipose membrane.

The fat of this order of animals, except the spermaceti, is what we generally term oil. It does not coagulate in our atmosphere, and is probably the most fluid of animal fats. The fat is differently situated in different orders of animals; in those which are the subject of the present paper it is found principally on the outside of the muscles, immediately under the skin, and is in considerable quantity: it is rarely to be met with in the interstices of the muscles, or in any of the cavities, such as the abdomen, or about the heart: the small quantity found in the cavities of the body and interstices of parts is in general disposed in the same way as in quadrupeds; but the external, which includes the principal part, is inclosed in a reticular membrane, apparently composed of fibres passing in all directions, which seem to confine its extent, allowing it little or no motion on itself; the whole, when distended,

almost forming a solid body. This however is not always the case, in every part of animals of this order, for under the head, or what may be rather called neck, of the Bottle-nose Whale the fat is confined in larger cells, admitting of motion. This reticular membrane is very fine in some, and very strong and coarse in others, and even varies in different parts of the same animal. It is fine in the Porpoise, Spermaceti, and large Whalebone Whale, and coarse in the Grampus and small Whalebone Whale. In all of them it is finest on the body, becoming coarser towards the tail, which is composed of fibres without any fat, which is also the case in the covering of the fins.

In this order of animals the internal fat is the least fluid, and is nearly of the consistence of hog's lard; the external is the common train oil: but the Spermaceti Whale differs from every other animal I have examined; having the two kinds of fat just mentioned, and another which is totally different, called spermaceti. This is found every where in the body in small quantities, mixed with the common fat, to which it bears a very small proportion; but in the head it is the reverse, for there the spermaceti is large in quantity compared with the oil, although they are mixed, as in other parts of the body. As the spermaceti is found in the largest quantity in the head, and in what would appear on a slight view to be the cavity of the skull, from a peculiarity of the shape of that bone, it has been imagined by some to be the brain.

These two kinds of fat in the head are contained in cells or cellular membrane, in the same manner as the fat in other animals; but besides the common cells there are larger ones, or ligamentous partitions going across, the better to support the vast load of oil, of which the bulk of the head is principally made up.

There are two places in the head where this oil lies; these are situated along its upper and lower parts: between them pass the nostrils, and a vast number of tendons going to the nose and different parts of the head.

The purest spermaceti is contained in the smallest and least ligamentous cells: it lies above the nostrils, all along the upper part of the head, immediately above the skin and common adipose membrane. These cells resemble those which contain the common fat in the other parts of the body nearest the skin. That which lies above the roof of the mouth, or between the nostrils, is more intermixed with a ligamentous cellular membrane, and lies in chambers whose partitions are perpendicular. These chambers are smaller the nearer the nose, becoming larger towards the back part of the head, where the spermaceti is more pure.

This spermaceti, when extracted cold, has a good deal the appearance of the internal structure of a water-melon, and is found in rather solid lumps.

About the nose or anterior part of the nostril, I discovered a great many vessels, having the appearance of a plexus of veins, some as large as a

finger. On examining them I found them loaded with the spermaceti and oil; and some had corresponding arteries. They were most probably lymphatics; and I should therefore suppose that their contents had been absorbed from the cells of the head. We may the more readily suppose this, from finding many of the cells or chambers almost empty; and as we may reasonably believe that this animal had been some time out of the seas in which it could procure proper food, it had perhaps lived on the superabundance of its oil.

The solid masses are what are brought home in casks for spermaceti.

The skin in this order of animals consists of a cuticle and cutis. The cuticle is somewhat similar to that on the sole of the human foot, and appears to be made up of a number of layers, which separate by slight putrefaction; but this I suspect arises in some degree from there being a succession of cuticles formed. It has no degree of elasticity or toughness, but tears easily; nor do its fibres appear to have any particular direction. The internal stratum is tough and thick, and in the Spermaceti Whale its internal surface, when separated from the cutis, is just like coarse velvet, each pile standing firm in its place; but this is not so distinguishable in some of the others, although it appears rough from the innumerable perforations.

It is the cuticle that gives colour to the animal; and in parts that are dark I think I have seen a dirty-coloured substance washed away in the separation of the cuticle from the cutis, which must

be a kind of rete mucosum. The cutis in this tribe is extremely villous on its external surface, answering to the rough surface of the cuticle, and forming in some parts small ridges, similar to those on the human fingers and toes. These villi are soft and pliable; they float in water, and each is longer or shorter according to the size of the animal. In the Spermaceti Whale they were about a quarter of an inch long: in the Grampus, Bottle-nose, and Piked Whales much shorter: in all they are extremely vascular.

The mouths of animals are the first parts to be considered respecting nourishment or food, and are so much connected with every thing relative to it, as not only to give good hints whether the food is animal or vegetable, but also respecting the particular kinds of either, and especially of animal food. The mouth in this tribe is well adapted for catching the food: the jaws spread as they go back, making the mouth proportionally wider than in many other animals. In the formation of the mouth in Whales, there is a very great variety. Some catch their food by means of teeth, as in the Porpoise and Grampus: in others they are only in one jaw, as in the Spermaceti Whale; and in the large Bottle-nose Whale described by Dale, there are only two small teeth in the anterior part of the lower jaw; while in some others there are none at all. In those which have teeth in both jaws the number varies very considerably: the small Bottle-nose has forty-six in the upper, and fifty in the lower: and in the jaws of others

there are only five or six in each. The teeth are not divisible into different classes, as in quadrupeds, but are all pointed teeth, and are commonly a good deal similar. Each tooth is a double cone, one point being fastened into the gum, the other projecting: they are however not all of exactly this shape. In some species of Porpoise the fang is flattened, and thin at its extremity: in the Spermaceti Whale the body of the tooth is a little curved towards the back part of the mouth; as is also the case with some others. The teeth are composed of animal substance and earth, similar to the bony part of the teeth in quadrupeds.

It would appear that these animals do not shed their teeth, nor have they new ones formed similar to the old, as is the case with most other quadrupeds, and also with the Alligator. I have never been able to detect young teeth under the roots of the old; and indeed the situation in which they are formed makes it in some degree impossible, if the young teeth follow the same rule in growing with the original ones, as they probably do in most animals.

Some genera of this tribe have another mode of catching their food, and retaining it till it is swallowed; which is by means of the substance called Whalebone. Of this there are two kinds known: one very large; probably from the largest of all Whales yet discovered; the other from a smaller species. The whalebone, which is placed on the inside of the mouth, and attached to the upper jaw,

constitutes one of the most singular circumstances belonging to this species, as they have most other parts in common with quadrupeds. It is a substance, I believe, peculiar to the Whale, and of the same nature as horn; or similar to that which constitutes hair, nails, claws, feathers, &c. It is wholly composed of an animal substance, and extremely elastic.

Whalebone consists of thin plates, of some breadth, and in some of very considerable length, the breadth and length in some degree corresponding with one another; and when longest they are commonly broadest, but not always so. These plates are very different in size in different parts of the same animal's mouth; more especially in the large Whalebone Whale, whose upper jaw does not pass parallel upon the under, but makes an arch, the semidiameter of which is about one fourth of the length of the jaw. The head in my possession is nineteen feet long, the semidiameter not quite five feet: if this proportion is preserved, those Whales which have whalebone fifteen feet long must be of an immense size.

These plates are placed in several rows, encompassing the outer skirts of the upper jaw, similar to teeth in other animals. They stand parallel to each other, having one edge towards the circumference of the mouth, and the other towards the centre or cavity. They are placed near together in the Piked Whale, not being a quarter of an inch asunder at the greatest distance, yet differ-

ing in this respect in different parts of the same mouth; but in the great Whale the distances are more considerable.

The outer row is composed of the longest plates; and these are in proportion to the different distances between the two jaws, some being fourteen or fifteen feet long, and twelve or fifteen inches broad; but towards the anterior and posterior part of the mouth they are very short: they rise for half a foot or more, nearly of equal breadths, and afterwards shelve off from their inner side until they come near to a point at the outer: the exterior of the inner rows are the longest, corresponding at the termination of the declivity of the outer, and become shorter and shorter till they hardly rise above the gum. The inner rows are closer than the outer, and rise almost perpendicularly from the gum, being longitudinally strait, and have less of the declivity than the outer. The plates of the outer row laterally are not quite flat, but make a serpentine line, more especially in the Piked Whale: the outer edge is thicker than the inner. All round the line made by their outer edges, runs a small white bead, which is formed along with the whalebone, and wears down with it. The smaller plates are nearly of an equal thickness upon both edges. In all of them the termination is in a kind of hair, as if the plate was split into innumerable small parts, the exterior being the longest and strongest.

The two sides of the mouth composed of these rows meet nearly in a point at the tip of the jaw,

and spread or recede laterally from each other as they pass back; and at their posterior ends, in the Piked Whale, they make a sweep inwards, and come very near each other, just before the opening of the œsophagus. In the Piked Whale there were above three hundred in the outer rows on each side of the mouth. Each layer terminates in an oblique surface, which obliquity inclines to the roof of the mouth, answering to the gradual diminution of their length; so that the whole surface, composed of these terminations, forms one plane, rising gradually from the roof of the mouth: from this obliquity of the edge of the outer row, we may in some measure judge of the extent of the whole base, but not exactly, as it makes a hollow curve, which increases the base. The whole surface resembles the skin of an animal covered with strong hair, under which surface the tongue must immediately lie when the mouth is shut: it is of a light-brown colour in the Piked Whale, and of a darker colour in the large Whale. In the Piked Whale, when the mouth is shut, the projecting whalebone remains entirely on the inside of the lower jaw, the two jaws meeting every where along their surface; but how this is effected in the large Whale I do not certainly know, the horizontal plane made by the lower jaw being strait, as in the Piked Whale; but the upper jaw being an arch cannot be hid by the lower. I suppose therefore that a broad upper lip, meeting as low as the lower jaw, covers the whole of the outer edges of the exterior rows. The whalebone is

continually wearing down, and renewing in the same proportion, except that when the animal is growing it is renewed faster, and in proportion to its growth. The use of the whalebone, I should believe, is principally for the retention of the food till swallowed, and do suppose that the fish they catch are small when compared with the size of the mouth.

The œsophagus is larger in proportion to the bulk of the animal than in the quadruped, although not so much so as it usually is in fish, which we may suppose swallow their food much in the same way. In the Piked Whale it was three inches and a half wide. The stomach, as in other animals, lies on the left side of the body, and terminates in the pylorus towards the right.

The Duodenum passes down on the right side, very much as in the human subject, excepting that it is more exposed, from the colon not crossing it: it lies on the right kidney, and then passes to the left side behind the ascending part of the colon and root of the mesentery, comes out on the left side, and getting on the edge of the mesentery becomes a loose intestine, forming the jejunum. In this course, behind the mesentery it is exposed, as in most quadrupeds, not being covered by it as in the human. The jejunum and ilium pass along the edge of the mesentery downwards to the lower part of the abdomen. The ilium near the lower end makes a turn towards the right side, and then mounting upwards, round the edge of the mesentery, passes a little way on the right, as

high as the kidney, and there enters the colon, or cœcum: the cœcum lies on the lower end of the kidney, considerably higher than in the human body, which renders the ascending part of the colon short. The cœcum is about seven inches long, and more like that of the Lion or Seal than any other animal I know.

The colon passes obliquely up the right side, a little towards the middle of the abdomen, and when as high as the stomach, crosses to the left, and acquires a broad mesocolon: at this part it lies upon the left kidney, and in its passage down gets more and more to the middle line of the body. When it has reached the lower part of the abdomen it passes behind the other viscera, bending down to open on what is called the belly of the animal, and in its whole course it is gently convoluted. In those which have no cœcum, and therefore can hardly be said to have a colon, the intestine before its termination in the rectum makes the same kind of sweep round the other intestines as the colon does where there is a cœcum.

The intestines are not large for the size of the animal, not being larger in those of eighteen or twenty-four feet long than in the Horse, the colon not much more capacious than the jejunum and ilium, and very short; a circumstance common to carnivorous animals. In the Piked Whale the length from the stomach to the cœcum is twenty-eight yards and a half, length of cœcum seven inches, of the colon to the vent two yards and three quarters. The small intestines are just

five times the length of the animal, the colon with the cœcum a little more than one half the length.

Those parts that respect the nourishment of this tribe do not all so exactly correspond as in land animals; for in these one in some degree leads to the other. Thus the teeth in the ruminating tribe point out the kind of stomach, cœcum, and colon; while in others, as the Horse, Hare, Lion, &c. the appearances of the teeth only give us the kind of colon and cœcum; but in this tribe, whether teeth or no teeth, the stomachs do not vary much, nor does the circumstance of the cœcum seem to depend on either teeth or stomach. The circumstances by which from the form of one part we judge what others are, fail us here; but this may arise from not knowing all the circumstances. The stomach, in all that I have examined, consists of several bags, continued from the first on the left, towards the right, where the last terminates in the duodenum. The number is not the same in all; for in the Porpoise, Grampus, and Piked Whale, there are five; in the Bottle-nose seven. Their size respecting one another differs very considerably, so that the largest in one species may in another be only the second. The two first in the Porpoise, Bottle-nose, and Piked Whale, are by much the largest; the others are smaller, though irregularly so.

The first stomach has, I believe, in all very much the shape of an egg, with the small end

downwards. It is lined every where with a continuation of the cuticle from the œsophagus. In the Porpoise the œsophagus enters the superior end of the stomach. In the Piked Whale its entrance is a little way on the posterior part of the upper end, and is oblique.

The second stomach in the Piked Whale is very large, and rather longer than the first. It is of the shape of an Italic *S*, passing out from the upper end of the first on its right side, by nearly as large a beginning as the body of the bag. In the Porpoise it by no means bears the same proportion to the first, and opens by a narrower orifice; then passing down along the right side of the stomach, it bends a little outwards at the lower end, and terminates in the third. Where this second stomach begins, the cuticle of the first ends. The whole of the inside of this stomach is thrown into unequal rugæ, appearing like a large irregular honey-comb. In the Piked Whale the rugæ are longitudinal, and in many places very deep, some of them being united by cross bands; and in the Porpoise the folds are very thick, massy, and indented into one another. This stomach opens into the third by a round contracted orifice, which does not seem to be valvular.

The third stomach is by much the smallest, and appear to be only a passage between the second and fourth. It has no peculiar structure on the inside, but terminates in the fourth by nearly as

large an opening as at beginning. In the Porpoise it is not above one, and in the Bottle-nose about five inches long.

The fourth stomach is of considerable size; but a good deal less than either first or second. In the Piked Whale it is not round, but seems flattened between the second and fifth. In the Porpoise it is long, passing, in a serpentine course, almost like an intestine. The internal surface is regular but villous, and opens on its right side into the fifth, by a round opening smaller than the entrance from the third.

The fifth stomach is in the Piked Whale round, and in the Porpoise oval: it is small, and terminates in the pylorus, which has little of a valvular appearance. Its coats are thinner than those of the fourth, having an even inner surface, which is commonly tinged with bile.

The Piked Whale, and, I believe, the large Whalebone Whale, have a cœcum; but it is wanting in the Porpoise, Grampus, and Bottle-nose Whale.

The structure of the inner surface of the intestine is in some very singular, and different from that of the others.

The inner surface of the duodenum in the Piked Whale is thrown into longitudinal rugæ or valves, which are at some distance from each other, and these receive lateral folds.

The duodenum in the Bottle-nose swells out into a very large cavity, and might almost be

reckoned an eighth stomach; but as the gall-ducts enter it, I shall call it duodenum.

The inner coat of the jejunum and ilium appears in irregular folds, which may vary according as the muscular coat of the intestine acts: yet I do not believe that their form depends entirely on that circumstance, as they run longitudinally, and take a serpentine course when the gut is shortened by the contraction of the longitudinal muscular fibres. The intestinal canal of the Porpoise has several longitudinal folds of the inner coat passing along it, through the whole of its length. In the Bottle-nose the inner coat, through nearly the whole track of the intestine, is thrown into large cells, and these again subdivided into smaller, the axis of which cells is not perpendicular to a transverse section of the intestine, but oblique, forming pouches with mouths downwards, and acting almost like valves, when any thing is attempted to be passed in a contrary direction: they begin faintly in the duodenum, before it makes its quick turn, and terminates near the vent. The colon and rectum have the rugæ very flat, which seems to depend entirely on the contraction of the gut. The rectum, near the vent, appears, for four or five inches, much contracted, is glandular, covered by a soft cuticle, and the vent is small.

I never found any air in the intestines of this tribe, nor indeed in any of the aquatic animals.

The mesenteric artery anastomoses by large branches.

There is a considerable degree of uniformity in the liver of this tribe of animals. In shape it nearly resembles the human, but is not so thick at the base, nor so sharp at the lower edge, and is probably not so firm in its texture. The right lobe is the largest and thickest, its falciform ligament broad, and there is a large fissure between the two lobes, in which the round ligament passes. The liver towards the left is very much attached to the stomach, the little epiploon being a thick substance. There is no gall-bladder: the hepatic duct is large, and enters the duodenum about seven inches beyond the pylorus.

The pancreas is a very long, flat body, having its left end attached to the right side of the first cavity of the stomach: it passes across the spine at the root of the mesentery, and near to the pylorus joins the hollow curve of the duodenum along which it is continued, and adheres to that intestine, its duct entering that of the liver near the termination in the gut.

Although this tribe cannot be said to ruminate, yet in the number of stomachs they come nearest to that order; but here I suspect that the order of digestion is in some degree inverted. In both the ruminants, and in this tribe, I think it must be allowed that the first stomach is a reservoir. In the ruminants the precise use of the second and third stomachs is perhaps not known; but digestion is certainly carried on in the fourth; while in this tribe, I imagine, digestion is per-

formed in the second, and the use of the third and fourth is not exactly ascertained.

The cœcum and colon do not assist in pointing out the nature of the food and mode of digestion in this tribe. The Porpoise, which has teeth, and four cavities to the stomach, has no cœcum, similar to some land animals, as the Bear, Badger, Raccoon, Ferret, Polecat, &c. neither has the Bottle-nose a cœcum, which has only two small teeth in the lower jaw; and the Piked Whale, which has no teeth, has a cœcum, almost exactly like the Lion, which has teeth, and a very different kind of stomach.

The food of the whole of this tribe is, I believe, fish: probably each may have a peculiar kind of which it is fondest; yet does not refuse variety. In the stomach of the large Bottle-nose I found the beaks of some hundreds of Cuttle-fish. In the Grampus I found the tail of a Porpoise; so that they eat their own genus. In the stomach of the Piked Whale I found the bones of different fish, but particularly those of the Dog-fish. From the size of the œsophagus we may conclude, that they do not swallow fish so large in proportion to their size as many fish do which we have reason to believe take their food in the same way: for fish often attempt to swallow what is larger than their stomachs can at one time contain, and part remains in the œsophagus till the rest is digested.

The epiploon, on the whole, is a thin membrane: on the right side it is rather a thin net-

work, though on the left is a complete membrane, and near to the stomach of the same side becomes of a considerable thickness, especially between the two first bags of the stomach. It has little or no fat, except what slightly covers the vessels in particular parts. It is attached forwards, all along, to the lower part of the different bags which constitute the stomach, and on the right to the root of the mesentery, between the stomach and transverse arch of the colon, first behind the transverse arch of the colon and root of the mesentery, then to the posterior surface of the left or first bag of the stomach, behind the anterior attachment. In some of this tribe there is the usual passage behind the vessels going to the liver, common to all quadrupeds I am acquainted with; but in others, as the small Bottle-nose, there is no such passage, which by the cavity behind the stomach in the epiploon of this animal becomes a circumscribed cavity.

The spleen is involved in the epiploon, and is very small for the size of the animal. There are in some, as in the Porpoise, one or two small ones, about the size of a nutmeg, often smaller, placed in the epiploon behind the other. These are sometimes met with in the human body.

The kidneys in the whole of this tribe of animals are conglomerated, being made up of smaller parts, which are only connected by cellular membrane, blood-vessels, and ducts or infundibula; but not partially connected by continuity of substance, as in the human body, the ox, &c. every

portion is of a conical figure, whose apex is placed towards the centre of the kidney, the base making the external surface; each is composed of a cortical and tubular substance, the tubular terminating in the apex, which apex makes the mamilla. Each mamilla has an infundibulum, which is long, and at its beginning wide, embracing the base of the mamilla, and becoming smaller. The whole kidney is an oblong flat body, broader and thicker at the upper end than the lower, and has the appearance of being made up of different parts placed close together, almost like the pavement of a street.

Whether being inhabitants of the water makes such a construction of the kidney necessary I cannot say; yet one must suppose it to have some connection with such a situation, since we find it almost uniformly take place in animals inhabiting the water, whether wholly, as this tribe, or occasionally, as the Manatee, Seal, and white Bear: there is however the same structure in the black Bear, which, I believe, never inhabits the water. This perhaps should be considered in another light, as Nature keeping up to a certain degree of uniformity in the structure of similar animals; for the black bear in construction of parts is, in every other respect as well as this, like the white bear.

The capsulæ renales are small for the size of the animal, when compared to the human, as indeed they are in most animals. They are flat, and of an oval figure: the right lies on the lower and pos-

terior part of the diaphragm, somewhat higher than the kidney; the left is situated lower down, by the side of the aorta, between it and the left kidney. They are composed of two substances; the external having the direction of its fibres or parts towards the centre; the internal seeming more uniform, and not having so much of the fibrous appearance.

The blood of animals of this order is, I believe, similar to that of quadrupeds; but I have an idea that the red globules are in larger proportion. I will not pretend to determine how far this may assist in keeping up the animal heat; but as these animals may be said to live in a very cold climate or atmosphere, and such as readily carries off heat from the body, they may want some help of this kind.

It is certain that the quantity of blood in this tribe and in the Seal is comparatively larger than in the quadruped, and therefore probably amounts to more than that of any other known animal.

This tribe differs from fish in having the red blood carried to the extreme parts of the body, similar to the quadruped.

The cavity of the thorax is composed of nearly the same parts as in the quadruped; but there appears to be some difference, and the varieties in the different genera are greater.

The general cavity is divided into two, as in the quadruped, by the heart and mediastinum.

The heart in this tribe, and in the Seal, is probably larger in proportion to their size than in the

quadruped, as also the blood-vessels, more especially the veins.

The heart is inclosed in its pericardium, which is attached by a broad surface to the diaphragm, as in the human body. It is composed of four cavities, two auricles, and two ventricles: it is more flat than in the quadruped, and adapted to the shape of the chest. The auricles have more fasciculi, and these pass more across the cavity from side to side than in many other animals; besides, being very muscular, they are very elastic, for being stretched they contract again very considerably. There is nothing uncommon or particular in the structure of the ventricles, in the valves of the ventricles, or in that of the arteries.

The general structure of the arteries resembles that of other animals; and where parts are nearly similar, the distribution is likewise similar. The aorta forms it usual curve, and sends off the carotid and subclavian arteries.

Animals of this tribe, as has been observed, have a greater proportion of blood than any other known; and there are many arteries apparently intended as reservoirs, where a larger quantity of arterial blood seemed to be required in a part, and vascularity could not be the object. Thus we find, that the intercostal arteries divide into a vast number of branches, which run in a serpentine course between the pleura, ribs, and their muscles, so as to form a pretty thick substance. Those vessels, every where lining the

sides of the thorax, pass in between the ribs near their articulation, and also behind the ligamentous attachment of the ribs, and anastomose with each other. The medulla spinalis is surrounded with a net-work of arteries in the same manner, more especially where it comes out from the brain, where a thick substance is formed by their ramifications and convolutions; and these vessels most probably anastomose with those of the thorax.

The subclavian artery in the Piked Whale, before it passes over the first rib, sends down into the chest arteries which assist in forming the plexus on the inside of the ribs; I am not certain but the internal mammary arteries contribute to form the anterior part of this plexus. The motion of the blood in such must be very slow; the use of which we do not readily see. The descending aorta sends off the intercostals, which are very large, and give branches to this plexus; and when it has reached the abdomen, it sends off, as in the quadruped, the different branches to the viscera, and the lumbar arteries, which are likewise very large, for the supply of that vast mass of muscles which moves the tail.

In our examination of particular parts, the size of which is generally regulated by that of the whole animal, if we have been accustomed to see them in those which are small or middle-sized, we behold them with astonishment in animals so far exceeding the common bulk as the Whale. Thus the heart and aorta of the Spermaceti Whale appeared prodigious, being too large to be contained in a

wide tub, the aorta measuring a foot in diameter. When we consider these as applied to the circulation, and figure to ourselves, that probably ten or fifteen gallons of blood are thrown out at one stroke, and moved with an immense velocity through a tube of a foot diameter, the whole idea fills the mind with wonder.

The veins, I believe, have nothing particular in their structure, excepting in parts requiring a peculiarity, as in the folds of the skin on the breast in the Piked Whale, where their elasticity was to be increased.

The lungs are two oblong bodies, one on each side of the chest, and are not divided into smaller lobes, as in the human subject. They are of considerable length, but not so deep between the fore and back part as in the quadruped, from the heart being broad, flat, and of itself filling up the fore part of the chest. They pass farther down on the back than in the quadruped, by which their size is increased, and rise higher up in the chest than the entrance of the vessels, coming to a point at the upper end. From the entrance of the vessels they are connected downwards, along their whole inner edge, by a strong attachment (in which there are in some lymphatic glands) to the posterior mediastinum. The lungs are extremely elastic in their substance, even so much so as to squeeze out any air that may be thrown into them, and to become almost at once a solid mass, having a good deal the appearance, consistence, and feel of an ox's spleen. The branches of the

bronchiæ which ramify into the lungs have not the cartilages flat, but rather rounded; a construction which admits of greater motion between each. The pulmonary cells are smaller than in quadrupeds, which may make less air necessary, and they communicate with each other, which those of the quadruped do not; for by blowing into one branch of the trachea, not only the part to which it immediately goes but the whole lungs are filled.

The parts immediately concerned in inspiration are extremely strong; the diaphragm remarkably so. The reason of this must at once appear; it necessarily requiring great force to expand in a dense medium like water, especially too when the vacuity is to be filled with one which is rarer, and is to water a species of vacuum, the pressure being much greater on the external surface than than the counter-pressure from within. But expiration on the other hand must be much more easily performed; the natural elasticity of the parts themselves, with the pressure of the water on the external surface of the body, being greater than the resistance of the air from within, will both tend to produce expiration without any immediate action of the muscles.

The blow-hole or passage for air is next to be described. As the nose in every animal that breathes air is a common passage for the air, and is also the organ of smelling, I shall describe it in this tribe as instrumental to both those purposes.

There is a variety in some species of these animals, which is, I believe, peculiar to this order, viz. the want of the sense of smelling; none of those which I have yet examined having that sense, except the two kinds of Whalebone Whale: such of course have neither the olfactory nerves nor the organ: therefore in them the nostrils are intended merely for respiration; but others have the organ placed in this passage as in other animals.

The membranous portion of the posterior nostrils is one canal; but when in the bony part, in most of them, it is divided into two; the Spermaceti Whale however is an exception. In those which have it divided, it is in some continued double through the anterior soft parts, opening by two orifices, as in the Piked Whale; but in others it unites again in the membranous part, making externally only one orifice, as in the Porpoise, Grampus, and Bottle-nose Whale. At its beginning in the fauces, it is a roundish hole, surrounded by a strong sphincter muscle, for grasping the epiglottis: beyond this the canal becomes larger, and opens into the two passages in the bones of the head. This part is very glandular, being full of follicles, whose ducts ramify in the surrounding substance, which appears fatty and muscular like the root of the tongue, and these ramifications communicate with each other, and contain a viscid slime. In the Spermaceti Whale, which has a single canal, it is thrown a

little to the left side. After these canals emerge from the bones near the external opening, they become irregular, and have several sulci passing out laterally, of irregular forms, with corresponding eminences. The structure of these eminences is muscular and fatty, but less muscular than the tongue of a quadruped. In the Porpoise there are two sulci on each side: two large and two small, with corresponding eminences of different shapes, the larger ones being thrown into folds. The Spermaceti Whale has the least of this structure; the external opening in it comes farther forwards towards the anterior part of the head, and is consequently longer than in others of this order. Near to its opening externally, it forms a large sulcus, and on each side of this canal is a cartilage, which runs nearly its whole length. In all that I have examined, this canal, forwards from the bones, is entirely lined with a thick cuticle of a dark colour. In those which have only one external opening, it is transverse, as in the Porpoise, Grampus, Bottle-nose, and Spermaceti Whale, &c. where double, they are longitudinal, as in the Piked Whale, and the large Whalebone Whale. These openings form a passage for the air in respiration to and from the lungs; for it would be impossible for these animals to breathe air through the mouth: indeed I believe the human species alone breathe by the mouth, and in them it is mostly from habit; for in quadrupeds the epiglottis conducts the air into the nose. In the whole of this tribe the situation of the opening

on the upper surface of the head is well adapted for that purpose, being the first part that comes to the surface of the water in the natural progressive motion of the animal; and therefore it is to be considered principally as a respiratory organ, and where it contains the organ of smell, that is only secondary.

The size of the brain differs much in different genera of this tribe, and likewise in the proportion it bears to the bulk of the animal. In the Porpoise, I believe, it is largest, and in that respect comes nearest to the human. The size of the cerebellum, in proportion to that of the cerebrum, is smaller in the human subject than in any animal with which I am acquainted. In many quadrupeds, as the Horse, Cow, &c. the disproportion between the cerebellum and cerebrum is not great, and in this tribe it is still less; yet not so small as in the bird, &c. The whole brain in this tribe is compact, the anterior part of the cerebrum not projecting so far forwards as in either the quadruped or in the human subject; neither is the medulla oblongata so prominent, but flat, lying in a kind of hollow made by the two lobes of the cerebellum.

The brain is composed of cortical and medullary substances, very distinctly marked; the cortical being, in colour, like the tubular substance of a kidney; the medullary very white. The substances are nearly in the same proportion as in the human brain. The two lateral ventricles are large, and in those that have olfactory nerves are

not continued into them, as in many quadrupeds; nor do they wind so much outwards as in the human subject, but pass close round the posterior ends of the thalami nervorum opticorum. The thalami themselves are large, the corpora striata small; the crura of the fornix are continued along the windings of the ventricles, much as in the human subject. The plexus choroides is attached to a strong membrane, which covers the thalami nervorum opticorum, and passes through the whole course of the ventricle, much as in the human subject. The substance of the brain is more visibly fibrous than I ever saw it in any other animal, the fibres passing from the ventricles as from a centre to the circumference, which fibrous texture is also continued through the cortical substance. The whole brain in the Piked Whale weighed four pounds ten ounces.

The nerves going out from the brain, I believe, are similar to those of the quadruped, except in the want of the olfactory nerves in the genus of the Porpoise.

The medulla oblongata is much smaller in proportion to the size of the body than in the human species, but still bears some proportion to the quantity of brain; for in the Porpoise, where the brain is largest, the medulla spinalis is largest; yet this did not hold good in the Spermaceti Whale, the size of the medulla spinalis appearing to be proportionally larger than the brain, which was small when compared to the size of the animal. It has a cortical part in the centre, and

terminates about the twenty-fifth vertebra, beyond which is the cauda equina, the dura mater going no lower. The nerves which go off from the medulla spinalis are more uniform in size than in the quadruped, there being no such inequality of parts, nor any extremities to be supplied, except the fins. The medulla spinalis is more fibrous in its structure than in other animals; and when an attempt is made to break it longitudinally, it tears with a fibrous appearance, but transversely it breaks irregularly. The dura mater lines the skull, and forms in some the three processes answerable to the divisions of the brain, as in the human subject; but in others this is bone. Where it covers the medulla spinalis, it differs from all the quadrupeds I am acquainted with, inclosing the medulla closely, and the nerves immediately passing out through it at the lower part, as they do at the upper, so that the cauda equina, as it forms, is on the outside of the dura mater.

The cutis in this tribe appears, in general, particularly well calculated for sensation; the whole surface being covered with villi, which are so many vessels, and we must suppose, nerves. Whether this structure is only necessary for acute sensation, or whether it is necessary for common sensation, where the cuticle is thick and consisting of many layers, I do not know. We may observe, that where it is necessary the sense of touch should be accurate, the villi are usually thick and long, which probably is necessary, because in most parts of the body, where the more

acute sensations of touch are required, such parts are covered by a thick cuticle; of this the ends of our fingers, toes, and the foot of the hoofed animals, are remarkable examples. Whether this sense is more acute in water, I am not certain, but should imagine it is.

The tongue, which is the organ of taste, is also endowed with the sense of touch. It is likewise to be considered, in the greatest number of animals, as an instrument for mechanical purposes; but probably less so in this tribe than any other. However, even in these, it must have been formed with this view, since, merely as an organ of taste, it would only have required surface, yet is a projecting body, endowed with motion. In the Spermaceti Whale the tongue is almost like a feather-bed. In the Piked Whale it is but gently raised, having hardly any lateral edges, and its tip projecting but little, yet, like every other tongue, composed of muscle and fat.

The tongue of the large Whalebone Whale, I should suppose, rose in the mouth considerably; the two jaws at the middle being kept at such a distance on account of the whalebone, so that the space between, when the mouth is shut, must be filled up by the tongue.

In this tribe of animals there is something very remarkable in what relates to the sense of smelling; nor have I been able to discover the particular mode by which it is performed. In many of this tribe there is no organ of smell at all; and in those which have such an organ, it is not

that of a fish, and therefore probably not calculated to smell water. It therefore becomes difficult to account for the manner in which such animals smell the water; and why others should not have had such an organ, which, I believe, is peculiar to the large and small Whalebone Whales.

The organ of smell would appear to be less necessary in these animals than in those which live in air, since some are wholly deprived of it; and the organ in those which have it is extremely small, when compared with that of other animals, as well as the nerve which is to receive the impression.

The ear is constructed much upon the same principle as in quadrupeds. The organ consists of the same parts as in the quadruped; an external opening, with a membrana tympani, an Eustachian tube, a tympanum with its processes, and the small bones. There is no external projection forming a funnel, but merely an external opening. We can easily assign a reason why there should be no projecting ear, as it would interfere with progressive motion; but the reason why it is not formed as in birds, is not so evident; whether the percussions of water could be collected into one point as air, I cannot say. The tympanum is constructed with irregularities, so much like those of an external ear, that I could suppose it to have a similar effect. The immediate organ is, in point of situation, to that of the tympanum, superior and internal as in the quadruped. The tympanum is open at the

anterior end, where the Eustachian tube begins. The whole function of the Eustachian tube is perhaps not known; but it is evidently a duct from the cavity of the ear, or a passage to the mucus of those parts: the external opening having a peculiar form, would lead us to believe that something was conveyed to the tympanum.

The part containing the tympanum is a thin bone, coiled upon itself, attached by one end to the portion which contains the organ; and this attachment in some is by close contact only, as in the Narwhal; in others the bones run into one another, as in the Bottle-nose and Piked Whales.

The immediate organ of hearing is contained in a round bony process, and consists of the cochlea and semicircular canals, which somewhat resemble the quadruped; but besides the two spiral turns of the cochlea, there is a third, which makes a ridge within that continued from the foramen rotundum, and follows the turns of the canal.

The eye in this tribe of animals is constructed upon nearly the same principle as that of quadrupeds, differing however in some circumstances; by which it is probably better adapted to see in the medium through which the light is to pass. The crystalline humour resembles that of a quadruped, but whether it is very convex, or flattened, I cannot determine; those I have exa-

mined having been kept too long to preserve their exact shape and size. The vitreous humour adhered to the retina at the entrance of the optic nerve. The optic nerve is very long in some species, owing to the vast width of the head.

END OF VOLUME II.

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