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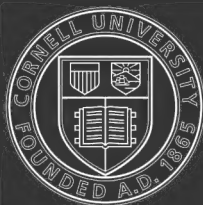
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CATALOGUE

OF

SEALS AND WHALES

IN THE

BRITISH MUSEUM.

BY

JOHN EDWARD GRAY, F.R.S., V.P.Z.S., F.L.S., &c.

*SECOND EDITION.*

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## PREFACE.

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THIS Catalogue contains an account of all the specimens of Seals and Cetacea, and their bones, that are contained in the British Museum, and a description of the specimens which are contained in other collections, in order to show what are the species which are desiderata to the Museum Collection.

Many of the woodcuts are the same as were prepared to illustrate papers published in the 'Proceedings of the Zoological Society,' which have been kindly lent by the Council of that Society for the purpose.

JOHN EDWARD GRAY.

British Museum,  
Dec. 15, 1865.



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# CATALOGUE

OF

## SEALS AND WHALES.

### Family PHOCIDÆ.

Cutting-teeth  $\frac{6}{4}$  or  $\frac{6}{2}$  or  $\frac{4}{4}$  or  $\frac{2}{2}$ , conical or truncated; canines conical, sometimes elongated; grinders  $\frac{6.6}{6.6}$  or  $\frac{5.5}{5.5}$ , more or less lobed or plaited. Head rounded; face more or less produced; ears, very small, rudimentary, or none external; eyes large, only slightly convex. Body elongate, hairy, attenuated behind; teats 2 or 4, ventral. Feet short, enveloped in the body; the fore feet short; fingers five-clawed; the hind feet directed backwards, and close together; toes five-clawed. Tail very short, depressed, sharp-edged on each side.

Fera (partim), *Linn. S. N.* i. 55.

Bruta (part.), *Linn. S. N.* i. 48.

Phoca, *Linn. S. N.* i. 55; *Pennant, Syn. Quad.* 330; *Gray, Griffith's A. K.* v. 175.

Phocadæ et Trichecidæ, *Gray, Lond. Med. Repos.* 1821, 302.

Phocidæ et Trichechidæ, *Gray, Ann. Phil.* 1825, 340.

Phocidæ; *Gray, Zool. Ereb. & Terror; Cat. Seals B. M.* 1, 1850.

Mammifères à nageoires, Amphibies, *Desm. N. Dict. Hist. Nat.* xxiv. 34, 1804.

Amphibia, *Gray, Lond. Med. Repos.* 1821, 302; *Latr. Fam. R. A.* 51, 1830.

Phocacæerna, *Nilsson, Vetensk. Akad. Handl.* 1837, 235; *Illum. Figurer Skand. Fauna*, 1840, transl. by Dr. Peters, *Wieg. Arch.* vii. 301.

(Pinnipedia) Ruderfüsse, *Illiger, Prodr.* 138, 1811; *Rüppell, Verz. Senck. Samml.* 167, 1845.

Les Phoques et les Morses, *F. Cuv. Dict. Sci. Nat.* lix. 463, 465, 1829; *Duvernoy, Tab. R. A.*

Tetrapterygia, *J. Brookes, Catal. Mus.* 36, 1828.

Ursi (part.), *Wagler, N. S. Amph.* 27, 1830.

Cynomorpha (Phoca et Otaria), *Latr. Fam. R. A.* 51, 1825.

Brocha (Morse), *Latr. Fam. R. A.* 52, 1825.

Phoques, *F. Cuv. Dents des Mamm.* 113, 1825.

Amphibies quadrirèmes, *Duvernoy, Tab. Anim. Vert.*

Quadrupeda Nectopoda seu Plectropoda, *G. Fischer, Zoognom.* 12.

Nectopoda, § 2. Pinnipeda (part.), *G. Fischer, Zoognom.* 15.

Phocidæ seu Brachiodontia, *J. Brookes, Catal. Mus.* 36, 1828.

Trichechidæ seu Campodontia, *J. Brookes, Catal. Mus.* 37, 1828.

• Otariadæ, *J. Brookes, Catal. Mus.* 37, 1828.

Their limbs are short and fin-like, supported by the same number of bones as those of other carnivorous mammalia; the arm and leg bones are much shorter; the fingers and toes are armed with claws, and are webbed together. They swim with facility, and dive for a long period. On land they scarcely use their limbs in walking, the fore arms resting inactive on the sides, and the hind feet close together, parallel on the sides of the tail; they move, by the action of the ventral muscles, in short jumps, or by wriggling themselves alternately from side to side. They have very large, scarcely convex eyes; the nostrils are closed by their own elasticity, and opened at the will of the animal; their sense of smell is very acute, and the convolutions of the bones and membranes of the nose are much developed.

Of all the families of Mammalia the species composing that of the Seals (*Phocidæ*) are the most difficult of determination, partly on account of their great resemblance to one another in external characters, and the changes which they undergo in colour and form during their growth, but more especially on account of the difficulty of observing them in their natural habitations.

The labours of M. de Blainville, the two brothers Cuvier, and especially of Professor Nilsson of Lund, have done much to elucidate the characters of the European species and those frequenting the eastern coast of North America; the species found in the North Pacific are only known by the descriptions of Steller, Pallas, and Temminck. Many naturalists have been inclined to consider them as identical with those found in the southern part of the Pacific Ocean, believing that the species migrate from one half of the world to the other, though we have the testimony of most voyagers that Seals are very rarely found between the equatorial line and 21° north latitude.

The Seals of the Southern hemisphere have not been so well studied, from the want of sufficient materials. Cuvier, when he wrote the 'Ossemens Fossiles,' possessed only eight skulls, belonging to four species (viz. 1. *Phoca Leptonyx*, 2. *P. elephantina*, 3. *P. pusilla*, 4. *P. leonina*?); but as several of these had been brought home without the skins, he could only refer them doubtfully to established species. Indeed, almost the only knowledge that we have of the Seals of the Pacific is derived from the observations of Cook, and the Forsters, who accompanied that intrepid navigator as naturalists; and the materials which they brought home were well collated by Pennant in his 'History of Quadrupeds,' a work of very extraordinary merit considering the date of its publication. England might then fairly be described as taking, as she should do, the lead in

scientific zoology. This period has not been fairly estimated by the modern school of zoologists, who, at the opening of the Continent after the war, appear to have been so dazzled by the brilliant progress made by the Professors appointed by Napoleon, that they overlooked the fact that these men were only following in the footsteps of Pennant, Latham, Solander, the Forsters, Fabricius, and others (who were either Englishmen, or had been fostered by the scientific men of this country), as Linnæus followed in the footsteps of Ray.

Besides the particulars given by Cook and Forster in the account of their voyages, Forster communicated to Buffon the figures of two of the species he had observed, accompanied by details of their organization and habits, which were printed in the supplementary volumes of Buffon's 'Natural History,' and form the most complete and best account we have yet had of the history of these species.

Péron and Lesueur, in their record of Baudin's voyage, indicate some Seals found in the South Sea, and give fuller details of the Sea Elephant, they having been so fortunate as to fall in with some males of that species; but the Natural History of the voyage was never published, so that we are indebted to Cuvier (Oss. Foss. v.) for the description of the only Seal they brought home, which appears to have been the Fur Seal of commerce.

In the Zoology of Captain Duperrey's 'Voyage of the Coquille,' a Seal is figured under the name of *Phoca molossina*; but the skull and skin now in the Paris Museum, as Nilsson has correctly observed, are only the young Sea Lion's. In the 'Voyage of the Astrolabe' two other southern Seals are figured; one called *Otaria cinerea*, Péron, which appears to be the Fur Seal of commerce, and the *Otaria australis*, which is very like the *Arctocephalus lobatus*, described from a skull in Mr. Brookes's collection many years previously. It is to be regretted that the figures here referred to, especially of the skull, are so bad as to be utterly useless for the determination of the species without comparison of the original specimens.

In the French 'Voyage to the South Pole,' figures are given of the Sea Leopard and the common White Antarctic Seal, the two most common species found everywhere in these regions on the packed ice; the latter is named *Phoca carcinophaga*.

Mr. W. Hamilton has given an account of the Seals and other marine mammalia, in Sir W. Jardine's 'Naturalist's Library,' which contains a carefully compiled account of these animals, and some original figures from the specimens in the Edinburgh and Liverpool Museums; but, unfortunately, Mr. Stewart, the draughtsman, has been more intent on giving them an artistic effect than on attending to their zoological characters. Thus, some which should have no claws on their hind feet have large ones, and sometimes one too many for any mammal; and the toe-membranes of all the Eared Seals or Otaries are represented as hairy instead of bald. The same author has given an account of the Fur Seal in the 'Annals of Natural History,' which he considers as different from the Sea Bear of Forster

and other South-Sea navigators. According to Dr. Hooker, the Fur Seals of the Falklands rarely exceed  $3\frac{1}{2}$  or 4 feet in length.

Seamen have long divided the Seals, on account of the great difference in their form, into the Earless and Eared Seals. Buffon adopted the division; and Péron, in his account of Baudin's Voyage (ii. 37), gave the name of *Otaria* to the Eared Seals. Cuvier and most naturalists have adopted this name.

In the 'Medical Repository' for 1821, p. 302, I considered the Seals as forming an order, named *Amphibia*, containing two families: *Phocadæ* for *Phoca* and *Otaria*, and *Trichecidæ* for *Trichecus*.

Dr. Fleming, in 1822, placed the Otters (*Lutra*), Sea Otters (*Enhydra*), Seals (*Phoca*), Ursine Seals (*Otaria*), and Walrus (*Trichecus*) in a single group, which he called *Palmata*.—*Phil. Zool.* ii. 187.

Dr. W. Vrolik, in 1822, in his 'Thesis de Phocis,' divides the Seals into five tribes:—I. *Phocæ sine auriculis*: *Tribus prima*, *P. vitulina*; *Tribus secunda*, *P. monachus*; *Tribus tertia*, *P. mitrata*; *Tribus quarta*, *P. proboscidea*. II. *Otariæ (Phocæ auriculatæ)*: *Tribus quinta*, *P. leonina*, &c.

In the 'Annals of Philosophy' for 1825, I considered the genera *Phoca* and *Trichecus* as each forming a family, and proposed to divide the Seals thus:—I. Grinders many-rooted; ears none; nose simple. 1. *Stenorhynchina*, *Pelagius* and *Stenorhynchus*. 2. *Phocina*, *Phoca*.—II. Grinders with simple roots, or with divided roots, and with distinct ears. 3. *Enhydrina*, *Enhydra*. 4. *Otariina*, *Otaria* and *Platyrrhynchus*. 5. *Stemmatopina*, *Stemmatopus* and *Macrorhinus*.

M. F. Cuvier, in 1825, in the 'Dents des Mammifères,' 118, divides the Seals into those which have many roots to the grinders, including *P. vitulina*, *P. Leptonyx*, and *P. mitrata*, and those with simple-rooted grinders, as *P. ursina* and *P. proboscidea*. In 1829, in the article ZOOLOGIE in the 'Dict. Sci. Nat.' lix. 367, he divides them into—1. *Les Phoques* proprement dits, including the genera *Callocephalus*, *Stenorhynchus*, *Pelagius*, *Stemmatopus*, *Macrorhinus*, *Arctocephalus*, and *Platyrrhynchus*, and 2. *Les Morses*, for the genus *Trichecus*. In a paper on the genus, in 'Mém. Mus.' xi. 1827, 208, he proposed to divide them into the following subgenera placed in three sections:—

SECT. 1. Grinders similar, double-rooted.—1. *Callocephalus* (*vitulinus*); 2. *Stenorhynchus* (*leptonyx*); 3. *Pelagius* (*monachus*).

SECT. 2. Grinders simple-rooted; cutting-teeth  $\frac{1}{2}$ .—4. *Stemmatopus* (*cristatus*); 5. *Macrorhinus* (*proboscidalis*).

SECT. 3. Grinders simple-rooted; cutting-teeth  $\frac{3}{4}$ .—6. *Arctocephalus* (*ursinus*); 7. *Platyrrhynchus* (*leoninus*). An abstract of this paper is given in Fischer, *Syn. Mamm.* 230.

Mr. Joshua Brookes, in the Catalogue of his Anatomical and Zoological Museum, 36, 1828, divides the *Tetrapterygia*, or Seals, into three families: viz. 1. *Phocidæ* or *Brachiodontia*; 2. *Otariadæ*; and 3. *Trichechidæ* or *Campodontia*.

Latreille (Fam. Règ. Anim.), in 1825, proposed to form the Seals into an order, *Amphibia*, containing two families:—1. *Cynomorpha*, for *Phoca* and *Otaria*; 2. *Brocha*, for *Trichechus*.

Wagler (Natürl. Syst. Amphibien), in 1830, places the Seals in the order *Ursi*, and divides them into three genera:—1. *Phoca* (monachus); 2. *Rhinophoca* (proboscideus); 3. *Trichechus* (rosmarus).

Professor Nilsson, in 1837, in a monograph of the species of Seals, proposed to divide them into seven genera, distributed in two sections, thus:—

SECT. I.—1. *Stenorhynchus* (leptonyx); 2. *Pelagius* (monachus); 3. *Phoca* (vitulina).

SECT. II.—4. *Halichoerus* (grypus); 5. *Trichechus* (rosmarus); 6. *Cystophora* (proboscidea and cristata); 7. *Otaria* (jubata and ursina). See Vetensk. Akad. Handl. 1837, 235; Skand. Fauna, no. 20, 1840. This essay is translated into German by Dr. Peters in Wiegmann's Arch. vii. 301.

In Loudon's 'Magazine of Natural History' for 1837 (i. 583) and in the 'Zoology of the Erebus and Terror' is proposed the arrangement which is followed in this Catalogue.

Mr. Turner, in 1848, proposed the following arrangement of the family *Phocidæ* from the study of skulls:—

I. *Arctocephalina*: 1. *Otaria*; 2. *Arctocephalus*. II. *Trichecina*: 3. *Trichechus*. III. *Phocina*: 4. *Morunga*; 5. *Cystophora*; 6. *Halichoerus*; 7. *Ommatophora*; 8. *Lobodon*; 9. *Leptonyx*; 10. *Stenorhynchus*; 11. *Phoca*.—*Proc. Zool. Soc.* 1848, 88; *Ann. & Mag. Nat. Hist.* 1848, iii. 422.

#### SYNOPSIS OF THE TRIBES AND GENERA.

A. *Grinders two-rooted; ears none; toes simple, of fore feet short, of hind feet unequal, the outer on each side longest, the middle shortest; the palms and soles hairy.*

a. *Cutting-teeth  $\frac{4}{3}$ ; hind feet nearly clawless; muffle hairy on the edge and between the nostrils; fore feet triangular; wrist very short. Stenorhynchina.*

\* *First, second, and third front upper and the first front lower grinders single-rooted, the rest two-rooted; lower jaw moderate.*

1. LOBODON. Skull and muzzle elongate; grinders unequally lobed.

\*\* *The front grinders of each jaw single-rooted, the rest two-rooted.*

† *Lower jaw weak, with obtuse angle; orbits very large.*

2. LEPTONYX. Skull broad, depressed behind; muzzle short, broad; grinders subcompressed, with a small subcentral conical tubercle and a very small posterior one; lower jaw narrow behind, without any hinder angle; fore feet clawed.

3. OMMATOPHOCA. Skull broad, depressed behind; muzzle very short, broad; orbits very large; grinders small, compressed, with a central incurved lobe, and a small lobe on each side of it; fore feet very slightly clawed.

†† *Lower jaw strong, with an acute angle; orbits moderate.*

4. STENORHYNCHUS. Skull and muzzle elongate; grinders compressed, with three cylindrical elongated lobes, the centre one longest and largest.
5. MONACHUS. Skull broad, depressed behind; muzzle short, broad; orbits large; grinders small, conical, thick, with a small anterior and posterior lobe; lower jaw broad, with a distinct posterior angle; upper cutting-teeth transversely notched; palate angularly notched behind.
  - b. *Cutting-teeth  $\frac{5}{4}$ ; the first grinder in each jaw single-rooted, the rest two-rooted; muzzle bald, callous between and above the nostrils, and divided by a central groove; wrist rather exerted; fingers subequal; claws five, large. Phocina.*
  - \* *Branches of lower jaw diverging; lower edge of lower jaw rounded, simple; palate angularly arched behind; angle of lower jaw blunt, sloping behind.*
6. CALLOCEPHALUS. Muzzle rather narrow; whiskers waved; toes gradually shorter; web between the hind toes hairy; hair subcylindrical; under-fur thin.
  - \*\* *Branches of lower jaw diverging; lower edge of lower jaw dilated on the inner side.*
7. PAGOMYS. Palate angularly notched behind; angle of lower jaw blunt, sloping behind.
8. PAGOPHILUS. Palate truncated behind; angle of lower jaw acute, erect behind, with a notch above the basal tubercle; muzzle rather produced; whiskers waved; toes gradually shorter; web between hind toes baldish; hair dry, flat, close-pressed, without any under-fur.
  - \*\*\* *Branches of lower jaw arched on the side and wide apart; lower edge produced on the inner side behind the symphysis; palate arched.*
9. HALICYON. Tubercle on inner edge of front part of lower jaw elongate, sharp-edged; teeth moderate; angle of lower jaw simple, with a distinct notch above it.
10. PHOCA. Tubercle on inner edge of front part of lower jaw blunt, rugulose; teeth small; angle of lower jaw with a rounded lobe on inner side above the basal tubercle; muzzle broad, short; forehead convex; whiskers smooth, simple; ear-hole large; fingers unequal, the third longest, second and fourth long, the first and fifth shorter, nearly equal.
  - B. *Grinders with single root (except the two hinder grinders of Halichoerus).*
  - c. *Ears without any coch; toes simple, of fore feet exerted, of hind feet large, the inner and outer ones large and long, the three middle ones shorter; palm and soles hairy, sometimes chaffy and callous from wear; muffle hairy to the edge and between the nostrils.*
  - \* *Muzzle large, truncated, simple; canines large; grinders lobed, when old truncated. Trichechina.*
11. HALICHÆRUS. Muzzle broad, rounded; cutting-teeth  $\frac{5}{4}$ ; grinders  $\frac{5.5}{5.5}$ , conical, the two hinder of the upper and hinder one of the lower jaw



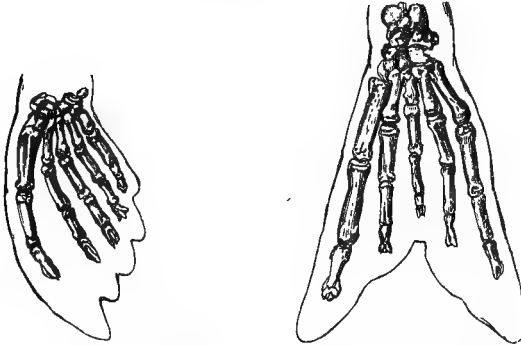
double-rooted, the rest simple; canines moderate; whiskers crenulated; muffle hairy; palm and soles hairy; claws 5·5, elongate.

12. **TRICHECHUS.** Muzzle very broad, truncated, swollen and convex above; muffle, palm, and soles chaffy, callous, with the hair more or less worn off in the adult (hairy when young?); cutting-teeth  $\frac{1}{2}$  in youth,  $\frac{2}{3}$  in adult; grinders 4·4, truncated, all single-rooted; canines of upper jaw very large, exerted.
- \*\* *Muzzle of the male with a dilatible appendage; cutting-teeth  $\frac{1}{2}$ ; grinders with a large swollen root and a small, compressed, simple, plaited crown; muffle hairy.* Cystophorina.
13. **MORUNGA.** Nose transversely wrinkled above, exsertile; muzzle of the skull broad, truncated in front; forehead convex; hinder palatine bone short, transverse; hair flat, truncated, close-pressed; whiskers round, rather waved, thick; front claws obsolete; crown of grinders finely plaited.
14. **CYSTOPHORA.** Nose of male with a large compressed hood extending to the back of the head; muzzle very broad, hairy; nostrils large; muzzle of skull broad, narrowed on each side in front; forehead flat; palatine bone broad, square; hair elongate, cylindrical; whiskers flat, waved; claws 5·5, distinct; crown of grinders strongly wrinkled.
- d. *Ears with a subcylindrical distinct external conch; toes of the hind feet subequal, short, with long membranaceous flaps at the end; fore feet fin-like; palm and soles bald, longitudinally grooved; nose simple, with a rather large callous muffle above and between the nostrils; cutting-teeth  $\frac{2}{3}$ , upper often bifid; grinders  $\frac{6\cdot6}{6\cdot6}$ .* Arctocephalina.
15. **CALLORHINUS.** Cutting-teeth subequal; face of skull short; forehead convex, regularly rounded from the end of the nasal bone to the middle of the vertex; nasal opening small; palate rather concave, contracted behind, short, nearly reaching the middle of the zygomatic arch; lower jaw short, thick, flattened, expanded beneath just in front of the condyle.
16. **ARCTOCEPHALUS.** Cutting-teeth subequal; face of skull elongate; forehead flattened, and nearly horizontal from the nasal bone to the vertex; nasal opening large, high; palate rather narrower behind than in front, rather concave, short, not reaching behind the middle of the zygomatic arch; lower jaw narrow, with a crest-like ridge behind, beneath, just in front of the condyle.
17. **OTARIA.** Muzzle broad, high in front; forehead rather convex; occiput high; cutting-teeth  $\frac{2}{4}$ , upper and outer one very large, like canines; grinders of adult with very large roots and small, compressed, lobed crown; palate-bone rather wider behind than in front, long, extending nearly to the articulation of the jaws behind; lower jaw broad, dilated in front and behind at the angle; upper jaw elongate, and dilate with age.

SECT. I. Grinders  $\frac{5.5}{5.5}$ , two-rooted; ears none; toes simple, of the fore feet short, of the hind feet unequal, the outer on each side longest, the middle shortest; the palms and soles hairy. (See fig. 1.)

The skull has no postorbital process nor alisphenoid canal. The mastoid process is swollen, and seems to form part of the auditory bulla.—Turner.

Fig. 1.



Monachus albiventer. Fore and hind feet.

Phoca, Gray, Griffith's *A. K.* v. 175, 1827.

Phoca, Sect. I., F. Cuvier, *Mém. Mus.* xi.; Nilsson, *Wieg. Arch.* vii. 306; *Skand. Fauna*, n. xx.

Phocidæ seu Brachiodontia, J. Brookes, *Cat. Mus.* 36, 1828.

Phoques, les dents ont les racines multiples, F. Cuvier, *Dents des Mamm.* 116. t. 38, 1825.

Phocina (part.), Turner, *Proc. Zool. Soc.* 1848, 88.

Phocidæ, § 1, Gray, *Cat. Seals B. M.* 5-8.

### Subfamily 1. STENORHYNCHINA.

Cutting-teeth  $\frac{4}{4}$ ; hind feet nearly clawless; muffle hairy to the edge and between the nostrils; fore feet triangular; wrist very short.

Stenorhynchina, Gray, *Ann. Phil.* 1825, 340; *Mag. N. H.* i. 583, 1837; *Zool. Erebus & Terror*; *Cat. Seals B. M.* 5, 8, 1850.

\* The first, second, and third front upper and the first front lower grinders single-rooted, the rest two-rooted; lower jaw moderate, rather weak; orbits large.

#### 1. LOBODON.

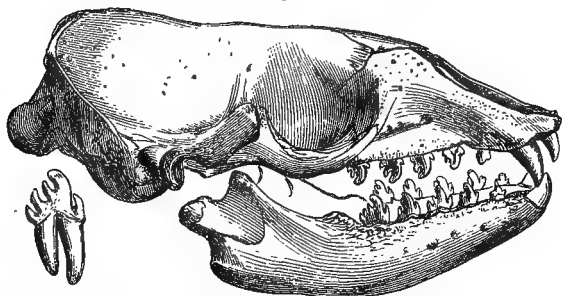
Skull elongate; muzzle elongate; grinders rather compressed, with a large lobe in front, and three lobes behind the larger central one.

Head elongate; ear-conch none externally; muzzle broad; nostrils ovate, hairy to the edge; whiskers rigid, tapering, waved. Skull elongate, rather depressed; nose broad, rather produced; orbits

moderate; the petrose portion of the temporal bone very convex, nearly hemispherical.

Cutting-teeth  $\frac{4}{4}$ ; the upper middle ones moderate, with a smaller, rather compressed crown; the two others large, conical, like the canines; the lower pair small; the two middle ones subcylindrical, rather internal, projecting forwards and rounded at the end; the outer ones rather larger, blunt. Canines  $\frac{11}{11}$ , conical, curved, small, the upper largest. Grinders  $\frac{55}{55}$ , with large swollen roots; the crown triangular, subtrigonal, lobed; lobes rather recurved at the tip, the

Fig. 2.



Lobodon carcinophaga. Skull and hinder grinder.

larger lobe with one, or sometimes a second, small lobe in front, and with three lobes behind; the first upper one smaller, with a single large root, the second, third, and fourth nearly equal, and the fifth smaller and more compressed; the second and third have the root only divided at the base, the fourth and fifth have the root divided nearly to the crown, and diverging; the first under is smallest and single-rooted, the rest are all similar, 2-rooted, the third being the largest, and the fifth most compressed in the crown. The symphysis of the lower jaw is very long.

The teeth of the younger animals have a rather broader crown, with rather shorter tubercles, a rugose surface with some smaller tubercles on the inner side, near the base of the hinder lobes, but separated from them by a groove.

Body tapering behind. The fore limbs moderate, rather elongate, triangular, hairy above and below; toes 5, tapering, with a narrow, thick, hairy web between them; claws 5, elongate, acute, subequal. The hind limbs large, broad, triangular, hairy above and below; the outer toes on each side of the foot very large, broad, rounded at the end; the three middle ones smaller, narrow, tapering, with a thick hairy web between them; the central one smaller and shorter; all clawless. Tail short, conical, depressed.

Fur close-set, rather rigid, directed backwards, soft at the end; the hairs flat at the base, tapering to a fine point, without any under-fur at the roots.

Inhab. Antarctic Ocean.

Lobodon, *Gray, Zool. Erebus & Terror; Cat. Seals B. M.* 5, 9.  
*Phoca*, sp., *Homb. & Jacq. Voy. Pole Sud* (no description).  
*Stenorhynchus* (part.), *Owen, Ann. & Mag. N. H.* 1843, xii. 331.  
*Halichoerus*, sp., *T. Peale.*

This genus is more nearly allied to *Stenorhynchus* than to *Phoca*, to which the French surgeons have referred it; but still it differs so much from that genus in the conformation of the skull and in the lobing and rooting of the teeth, that it can scarcely be left in it. The latter peculiarity appears to have escaped Prof. Owen's research, as in his generic character of *Stenorhynchus* he says, "Anterior molars with one root, the rest with two roots," while in this genus the three front upper molars are single-rooted, a character by which it differs from all the other genera in the family.

### 1. *Lobodon carcinophaga*. *Crab-eating Seal.*

Head, back, hind feet, and upper part of the tail pale olive; fore feet, side of the face, body, and tail beneath yellowish white; the hinder part of the sides of the body and the base of the hind fins yellow-spotted, spots unequal, often confluent; whiskers white, the upper ones smaller, dusky.

*Phoca carcinophaga*, *Homb. & Jacq. Voy. Pole Sud*, t. (skull, good: not described); *Fucheran, Voy. d'Urville*, t. 10, 10 a.  
*Lobodon carcinophaga*, *Gray, Zool. Erebus & Terror, Mammalia*, 2. t. 1, t. 2 (skull); *Cat. Osteol. Spec. B. M.* 32; *Cat. Seals B. M.* 10.  
*Stenorhynchus serridens*, *Owen, Ann. & Mag. N. H.* 1843, xii. 331; *Proc. Zool. Soc.* 1843, 131; *Cat. Ost. Mus. Coll. Surg.* 641.  
*Halichoerus antarctica*, *T. Peale, U. S. Explor. Exped.* 30. t. 5, skull, fig. p. 31, 1848; ed. *Cassin*, 25, 1858, fig. skull, not good.  
 See *Stenorhynchus vetus*, *Leidy, Proc. Acad. Nat. Sci. Philad.* vi. 377, fig. tooth, said to be found in the greensand of New Jersey.

Inhab. Antarctic Ocean, on the packed ice.

- a. Skull: three-parts grown. Antarctic Seas. Presented by the Lords of the Admiralty, from the Antarctic Expedition.—Skull figured 'Zool. Erebus & Terror,' t.
- b. Skull: adult. Antarctic Seas. Antarctic Expedition. Presented by the Lords of the Admiralty.
- c. Skull: adult. Antarctic Seas. Antarctic Expedition. Presented by Lieut. W. Smith, R.N.
- d. Skull: adult. Antarctic Seas. Antarctic Expedition. Presented by Lieut. W. Smith, R.N.
- e. Skull: adult. Antarctic Seas. Antarctic Expedition. Presented by Lieut. W. Smith, R.N.—See Fig. 2, p. 9.
- f. Skull: young. Antarctic Seas. Antarctic Expedition. Presented by the Lords of the Admiralty.
- g. Skeleton. Antarctic Seas. Antarctic Expedition. Presented by the Lords of the Admiralty.
- h. Skull. Antarctic Seas. Antarctic Expedition. Presented by the Lords of the Admiralty.

The skeleton and skull of this animal are described in detail by Prof. Owen, *Cat. Osteol. Mus. Coll. Surg.* 641. no. 3937.

- \*\* *The first front grinder in each jaw single-rooted, the rest two-rooted.*  
 † *Lower jaw weak, with an obtuse angle behind; orbits very large.*

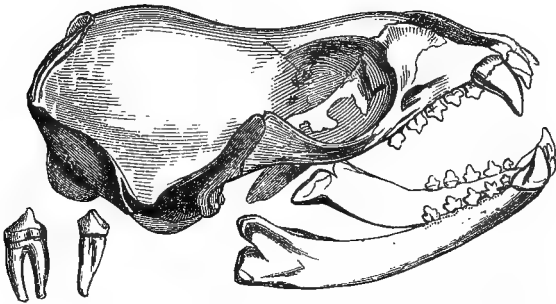
## 2. LEPTONYX.

Skull broad, depressed behind; muzzle short, broad; grinders subcompressed, with a small subcentral conical tubercle and a very small posterior one; the lower jaw narrow behind, without any hinder angle; fore feet clawed.

Head flattened; muzzle broad, rather short, rounded; muffle hairy between and to the edge of the nostrils; nostrils ovate; whiskers compressed, slightly waved; ears, no external conch. Skull slightly depressed, expanded behind; nose rather short, broad, high above; orbits rather large; the petrose portion of the temporal bone convex, hemispherical.

Cutting-teeth  $\frac{4}{4}$ , conical, rather recurved, those of the upper jaw largest; the middle in each jaw smaller; the outer upper much larger. Canines  $\frac{1.1}{1.1}$ , large, conical, curved, rather compressed, upper largest. Grinders  $\frac{5.5}{5.5}$ , moderate, rather far apart, parallel to the edge of the jaw, compressed, with subcentral, conical, prominent tubercle; the second, third, and fourth, in the more perfect specimens, with a small conical tubercle on the hinder edge, and a sharp-edged ridge round the inner side of the base; the front grinder in each jaw smaller, and with a single conical root, the rest all 2-rooted nearly to the crown. Lower jaw slender, with a short symphysis in front, and narrow, without any angle at the hinder part of the lower edge.

Fig. 3.



*Leptonyx Weddellii.* Skull, and first and last grinder.

Fore feet small, elongate, triangular, hairy above and below, with five graduated, distant, marginal claws: hind feet moderate; the two marginal toes largest, rounded at the end; claws small, rudimentary, two middle largest.

Fur short, adpressed, without any under-fur; hair slender, tapering, slightly flattened.

The skull of this genus resembles in many respects Cuvier's figure of a skull of *Phoca bicolor*; but it differs from it in all the grinders

being placed more longitudinally, and in the lower jaw being slender, and without any angle on the hinder part of the lower edge. It is far more nearly allied to that genus than to *Stenorhynchus*, to which Prof. Owen (Ann. N. H. 1843, xii. 331, 332) has referred it; observing that his *Sten. serridens* (our *Lobodon cancrivora*) shows modifications of the molar teeth which would give it a better claim to subgeneric distinction than the *Sten. Weddellii* (which, he observed, is the type of the subgenus *Leptonyx* of Mr. Gray) has been supposed to possess.

Prof. Owen made this remark, and drew up his specific character, without having seen the teeth of this species; for the skull was not then removed from the skin, and the specimens in the British Museum were stuffed with the mouth nearly closed.

This animal is easily known from *Stenorhynchus* by the shortness of the wrist and the triangular form of the fore feet, being intermediate in this respect between that genus and *Ommatophoca*.

Mr. Swainson, in 1832, applied the name of *Leptonyx* to a genus of birds, and in 1837 the same name to a second; but the former had before been named *Pteroptochos*, and the latter *Coryphospiza*, so that the name may still be used for the Seal.

Inhab. Antarctic Ocean.

*Leptonyx*, Gray, *Mag. N. H.* 1836; *Zool. Voy. Erebus & Terror*, *Mamm.*; *Cat. Seals B. M.* 6, 14; not Swainson.

### 1. *Leptonyx Weddellii*. *False Sea Leopard*.

Fulvous, with the front of the back and a line down the back blackish grey; whiskers brown, tapering.

Female and young blackish grey above; sides with a series of longitudinal yellowish spots.

*Phoca Leopardina*, Jameson, *Weddell, Voy. South Pole*, i. 22, 24, 134, t. , not good; *Spec. Mus. Edin.*

Sea Leopard, or Leopard Seal, *Weddell, Voy. S. Pole*, i. 22, 134.

Otaria? *Weddellii*, Lesson, *Bull. Sci. Nat.* vii. 343, 438, 1826.

*Stenorhynchus Weddellii*, Lesson, *Mamm.* 200; Owen, *Ann. & Mag. N. H.* 1843, xii. 333.

Leopard Seal, *Hamilton, Nat. Libr.* 183. t. 12 (*from Capt. Weddell's specimen*).

*Leptonyx Weddellii*, Gray, *Mag. N. H.* 1836; *Zool. Voy. Erebus & Terror*, t. 5 (animal), t. 6 (skull); *Cat. Seals B. M.*

Inhab. Antarctic Ocean. South Orkney, *Weddell*.

*a, b.* Skins: adult: stuffed. Santa Cruz. Presented by Capt. Fitzroy, R.N., 1833.—The specimens described as *Leptonyx Weddellii*, Gray, *Mag. N. H.* 1836; *Cat. Osteol. Spec. B. M.* 31.

N.B. When this species was first described, I thought it was the *Leopard Seal* of Weddell. I was afterwards induced to believe that I was mistaken, as the name *Sea Leopard* was applied by the whalers to *Stenorhynchus Leptonyx*; but it would appear that they used the same name for the two Seals; and I have convinced myself, by examining the teeth of Weddell's specimen in the Museum of the University of Edinburgh, that my first opinion was correct.

- c. Skin: stuffed: small. Antarctic Sea. Presented by the Lords of the Admiralty.—Specimen described and figured in 'Zool. Erebus and Terror.'
- d. Skull. River Santa Cruz, east coast of Patagonia. Presented by Capt. Fitzroy.  
Skull of specimen a.
- e. Skull. River Santa Cruz, east coast of Patagonia. Presented by Capt. Fitzroy.  
Skull of specimen b.
- f. Skull. Antarctic Seas. Antarctic Expedition. Presented by the Lords of the Admiralty.—The skull figured in 'Zool. Erebus and Terror,' t. .
- g. Skull. Antarctic Seas. Antarctic Expedition. Presented by the Lords of the Admiralty.

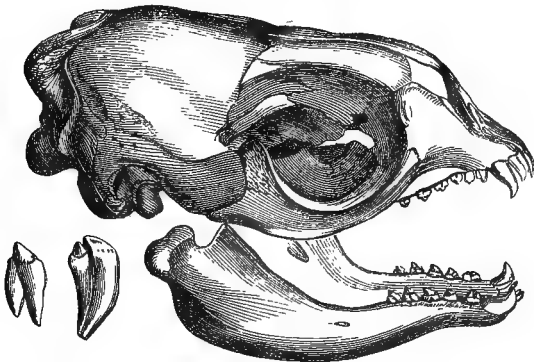
### 3. OMMATOPHOCA.

Skull broad, depressed behind; muzzle very short, broad; orbits very large; grinders small, compressed, with a central incurved lobe, and a small lobe on each side of it; fore feet very slightly clawed..

Head short, broad; ears small, with no internal conch; muzzle very short, rounded; muffle hairy between and to the edge of the nostrils; nostrils ovate; whiskers tapering, conical. Skull depressed, expanded behind; orbits very large; nose very short, broad, truncated in front, high behind; petrose portion of the temporal bone convex.

Cutting-teeth  $\frac{1}{4}$ , small, conical, sharply recurved at the tip. Grinders small, compressed, with a subcentral, rather large, broad, slightly incurved lobe, having a very small lobe on the inner side of

Fig. 4.



Ommatophoca Rossii. Skull and hinder grinders.

its front, and a larger conical one in the middle of its hinder edge; the front grinder of each jaw is smaller and thicker, with a single conical root, the rest all with two diverging roots to the crown.

Lower jaw rather slender, with a short symphysis in front, and rather narrow, with a thick rounded edge in the hinder part of the lower edge in the place of the angle.

Fore feet moderate, elongate, triangular, hairy above and below; toes 5·5, tapering, subequal, separated by a thick, narrow, hairy web; claws two or three, very small, rudimentary, horny, acute. Hind feet large, broad, triangular, hairy above and below; the outer toes on each side of the foot very large, broad, rounded at the end; the middle ones small, narrow, tapering, with a thick hairy web between them; the central one smaller and shortest; all clawless. Tail short, conical.

Fur very close-set, rather rigid.

Inhab. Antarctic Ocean.

*Ommatophoca*, *Gray, Zool. Erebus & Terror, Mamm.; Cat. Seals B. M.* 6, 18.

*Ommatophora*, *Turner, Proc. Zool. Soc.* 1848, 88, misprint.

### 1. *Ommatophoca Rossii*. *Ross's Large-eyed Seal*.

Greenish yellow, with close oblique yellow stripes on the side, pale beneath.

*Ommatophoca Rossii*, *Gray, Zool. Erebus & Terror, Mamm.* t. 7 (animal), t. 8 (skull and teeth); *Cat. Osteol. Spec. B. M.* 31; *Cat. Seals B. M.* 19.

Inhab. Antarctic Ocean.

a. Stuffed skin. Antarctic Ocean. Presented by the Lords of the Admiralty. From the Antarctic Expedition.

b. Skull of a. Figured in 'Zool. Erebus & Terror,' t. 8. f. 1, 2 & 4.

The first and second grinders of the upper jaw are small, with a single conical root; on the right side both these teeth are united together in one cavity; and as there are four other grinders on each side, it would appear as if there were front grinders of two sets. The third, fourth, fifth, and sixth of the same jaw have a compressed, single, tapering root, with a deep central groove nearly dividing it into two parts, the groove being deepest and most distinguishable on their outer side. In the lower jaw the front grinder has a double crown, with a thick single root, tapering below, as if formed of two teeth united together by their roots; the second and third grinders have a broad, compressed, single root, divided by a rather deep, central, longitudinal groove on each side; and the fourth and fifth grinders each have two tapering, nearly parallel roots, well separated at the base from each other. In this skull the palate is rounded behind, and the suture between the two bones is much more nearly in its centre. I do not recollect to have observed such a malformation, or soldering together of the roots of the teeth, in any other Seal.

c, d. Skull and skeleton.

The skull has the first upper and lower grinder with a single large subcylindrical root, tapering to a point beneath, and each of the other grinders has two conical separate roots diverging nearly from the collar. The palate is broad and rather truncated behind, and



the transverse suture between the two bones in the palate is rather more than two-thirds the distance from the inner edge of the cutting-teeth.

e. Skull. Figured in 'Zool. Erebus & Terror,' t. 8. f. 3, 5. Antarctic Ocean. Presented by the Lords of the Admiralty.

These skulls differ considerably from one another in the form of the palate and in the teeth; but it is probable that the teeth of the skull (b) belonging to the skin (Zool. Erebus & Terror, t. 8. f. 1, 2, 4) are a malformation.

†† *Lower jaw strong, with an acute angle behind; orbits moderate.*

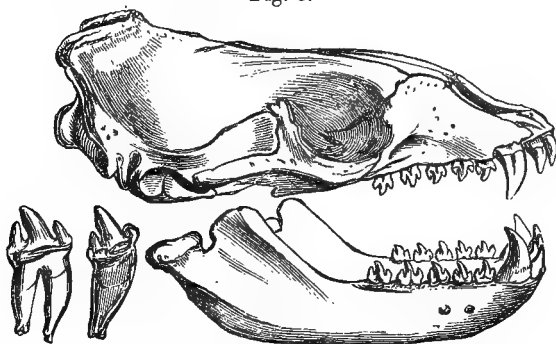
#### 4. STENORHYNCHUS.

Skull elongate; muzzle elongate; grinders compressed, with three cylindrical elongate lobes, the centre one longest and largest.

Head elongate; ear-conch none externally; muzzle broad, elongate; muffle hairy to the edge and between the nostrils; nostrils acute; whiskers slightly waved. Face elongate, rather compressed; nose tapering, rather produced and compressed on each side; orbits moderate; the petrose portion of the temporal bone rather convex.

Cutting-teeth  $\frac{4}{4}$ , conical, acute, incurved, granular, and with a cutting-edge on each side in a regular row; the two outer larger; the upper much larger than the lower, and separated from the canines by a broad space. Canines conical, with sharp cutting-edges within and on the sides, the upper largest. Grinders  $\frac{5.5}{5.5}$ , with moderate roots, separated from the crown by a narrow groove; the crown compressed, divided into three elongate lobes, the centre lobe much the largest, longest, and subcylindrical, the anterior and posterior lobes conical;

Fig. 5.



*Stenorhynchus Leptonyx.* Skull and grinders.

the bases of the lobes are surrounded by a sharp-edged ridge, with two small, short, conical tubercles on the inner side, the larger one being at the base of the separation of the hinder from the middle lobe: the front grinder in each jaw is rather the thickest, with a

single thick conical root; all the rest have two rather diverging roots, divided nearly to the crown; the hinder tooth in each jaw is rather the smallest. Symphysis of the lower jaw short.

Body tapering behind. The fore limbs moderate, rather elongate; the toes are rather larger than the wrist, and each furnished with a small nearly terminal claw. The hind limbs are rather large, of two nearly equal lobes, destitute of any claws; the three middle toes small, tapering.

The fur close-set, short, without any under-fur; hairs flattened, tapering at the tip to a point.

In the young skull the grinders are well developed, while the cutting-teeth are small and far apart; the hinder grinders have four lobes where they have only three in the adult.

Mr. MacMurtrie, in his translations of Cuvier, erroneously adds to the generic character in the text of the author, "but with single roots;" this is repeated in the reprint of the American edition published by Orr, i. 98.

Dr. Knox observes, "Teeth,  $\frac{4}{4} \cdot \frac{2}{2} \cdot \frac{10}{10} = 32$ : the two lower middle incisors peculiar. Vertebræ:—cranial, 4; cervical, 7; dorsal, 14; lumbar, 6; sacral, 3; coccygeal, 13=47.

"The nostrils opened much after the manner of the Cetacea, in the form of elongated fissures, one inch from the extremity of the snout; the pelvic extremities very large and far back; tail extremely short. The skin was hairy. The stomach contained numerous fish-bones, a few feathers (gulls'), and some considerable portions of a pale-green, broad-leaved, marine Fucus; thousands of a small, hard, round, white worm (parasitical) pervaded all parts of the intestines. The intestinal tube measured 71 feet 10 inches: caput cæcum, 1 inch 9 lines: diameter of small intestines, 1 inch; of large intestines, 1 inch 6 lines. Liver weighed 14 lbs.; kidneys, 2 lbs. each; spleen, 1 lb.; heart, 6 lbs. The arch of the aorta gave off an extremely short *innominata*, which divided it into a right carotid and subclavian, and left carotid; the left subclavian came off separately. It resembles Tiedemann's third variety, pl. 3 (copy published in Edinburgh)."

Inhab. Antarctic Ocean.

*Stenorhynchus* (*Stenorhynque*), *F. Cuv. Dict. Hist. Nat.* xxxix.; *Mém. Mus.* xi. 190; *Dict. Sci. Nat.* lix. 463 (1829); *Nilsson, Wiegmann. Arch.* vii. 307; *Skand. Fauna*; *Gray, Zool. Ereb. & Terror, Mamm.*; *Cat. Seals B. M.* 6, 11.

*Phoca*, sp., *Home*; *Blainville*; *F. Cuv. Dents des Mamm.* t. .

### 1. *Stenorhynchus Leptonyx*. *Sea Leopard*.

Grey, paler beneath, with small black spots on the sides of the neck and body, and with a few smaller white spots on the sides; upper part of the hinder limbs dark, pale-marbled.

*Phoca Leptonyx*, *Blainv. Journ. Phys.* xci. 288, 1820; *Desm. Mamm.* 247, from *Home's specimen*; *Cuv. Oss. Foss.* v. 208. t. 18. f. 2; *Gray, Griffith's A. K.* v. 178; *Blainv. Ostéogr. Phoca*, t. 1, & t. 4. f. , skull (*Mus. Paris*); *F. Cuvier, Dents des Mamm.* 118. t. 38 A.

Seal from New Georgia, *Home, Phil. Trans.* 1822, 240. t. 29, skull.

Phoque quatrième, *Blainv. in Desm. Mamm.* 243, note; see *Cuv. Oss. Foss.* v. 207.

*Stenorhynchus Leptonyx*, *F. Cuv. Dict. Sc. Nat.* xxxix. 549. t. 44; *Mém. Mus.* xi. 190. t. 13. f. 1; *Dents des Mamm.* 118. t. 38 A; *Nilsson, Wiegmann, Arch.* vii. 307; *Skand. Fauna*, t. ; *Gray, Zool. Erebus & Terror, Mamm.* t. 3 (animal); t. 4 (skull); *Cat. Osteol. Spec. B. M.* 31; *Cat. Seals B. M.* 13; *Blainv. Ostéogr. Phoca*, t. 5. f. 9 (teeth and skull); *Owen, Ann. N. H.* 1843, xii. 332.

*Phoca Homei*, *Lesson, Dict. Class. H. N.* xiii. 417.

*Phoca (Stenorhynche) Leptonyx*, *Blainv.; Pucheran, Dumont d'Urville, Zool.* t. 9.

The Small-nailed Seal, *Hamilton, Nat. Lib.* 180. t. 11 (nails too large).

*Stenorhynchus aux petits ongles*, *Hombr. & Jacq. Voy. à Pole Sud*, t. 9.

Sea Leopard of the *Whalers*.

Sea Bear of New Zealand, *Knox, in letter*.

*Phoca ursina*, or Sea Bear, *Pollach, New Zealand*.

Inhab. Antarctic Ocean, on the packed ice. North shore, Newcastle, N. S. W., *G. Bennett*. Drawn by *Angas*.

- a. Skin: adult: stuffed. Antarctic Ocean. Antarctic Expedition. Presented by the Lords of the Admiralty.
- b. Skin: adult: unstuffed.
- c. Skull.
- d. Skull. Antarctic Seas. Antarctic Expedition. Presented by the Lords of the Admiralty.  
Skull figured in 'Zool. Erebus & Terror,' t. . f. .
- e. Skull. Presented by the Lords of the Admiralty.
- f. Skeleton. Port Nicholson, New Zealand. Presented by Dr. Frederick Knox.
- g. Skull. Antarctic Seas. Presented by the Lords of the Admiralty.
- h. Skull and bones of the body. Antarctic Seas. Presented by the Lords of the Admiralty.
- i. Skull. Antarctic Seas.

The skull of this Seal is described by Prof. Owen in *Cat. Osteol. Mus. Coll. Surg.* 642. nos. 3938-3941, and in *Ann. N. H.* 1843, xii. 331, he says the Sea Leopard is distinguished from it "by the spotted hide."

## 5. MONACHUS.

Skull broad, depressed behind; muzzle short, broad; orbits large; grinders small, conical, "thick, with a small anterior and posterior lobe;" lower jaw broad, with a distinct posterior angle; "upper cutting-teeth transversely notched;" cutting-teeth  $\frac{4}{4}$ .

Inhab. Mediterranean.

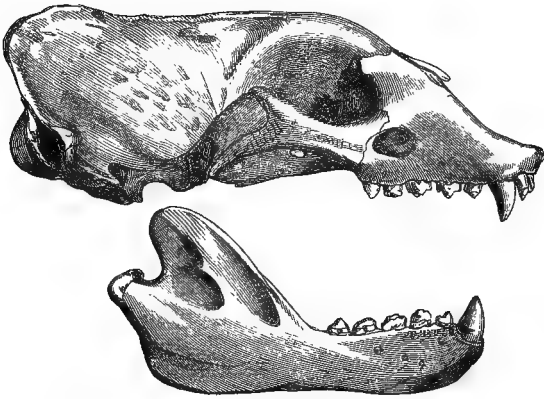
*Monachus*, *Fleming, Phil. Zool.* ii. 187, 1822; *Nilsson, Vet. Akad. Handl.* 1837, 235; *Gray, Cat. Seals B. M.* 17.

*Pelagios (Pelage)*, *F. Cuv. Mém. Mus.* xi. 193, 196. t. 13, 1827; *Gray, Zool. Erebus & Terror, Mamm.* 3.

*Pelagius*, *F. Cuv. Dict. Sci. Nat.* lix. 463, 1829; *Fischer, Syn. Mamm.* 230; *Wiegmann, Arch.* vii. 308; *Nilsson, Vet. Akad. Handl.* 1837, 235; *Skand. Fauna*, xx. t.

*Heliophoca*, *Gray, Ann. & Mag. N. H.* 1854, xiii. (from young animal).

Fig. 6.



Monachus albiventer. Skull. From Cuvier, *Oss. Foss.*

Muzzle rather elongate, broad, hairy, with a slight groove between the nostrils; whiskers small, quite smooth, flat, tapering. Fore feet short; fingers gradually shorter to the inner one; claws 5, flat, truncate. Hind feet hairy between the toes; claws very small; hair short, adpressed, with very little or no under-fur. Skull depressed; nose rather depressed, rather elongate, longer than the length of the zygomatic arch; palate angularly notched behind. Cutting-teeth  $\frac{4}{4}$ , large, notched within, the middle upper much smaller, placed behind the intermediate ones. Canines large, conical, sharp-edged. Grinders  $\frac{5.5}{5.5}$ , large, crowded, placed obliquely with regard to the central palatine line; crown large, conical, with several small conic rhombic tubercles. Lower jaw angulated in front below, with diverging branches, the lower edge of the branches rounded, simple. The grinders, except the two first in both jaws, are implanted by two roots; their crown is short, compressed, conical, with a cingillum strongly developed on their inner side, and developing a small anterior and posterior accessory cusp; the upper jaw is much less deep than in *Halichoerus*; the canines are relatively large, and the nasal bones are much shorter.

The feet, palate, and teeth resemble those of the genus *Callocephalus* (*C. communis*), but the grinders are larger and less deeply lobed; and it has the smooth whiskers of the restricted genus *Phoca* (*P. barbata*). It differs from the latter genus in the depressed form of the skull, the large tubercular grinders, and the angular termination to the palate.

As the other subtropical Seal, *Phoca tropicalis* (Gray, Cat. Seals, B. M. 28), from Jamaica, described from an imperfect skin without a skull, has similar small smooth whiskers, it may very probably, when its skull has been examined, be found to belong to this genus, which will then prove to be a subtropical form of the family.

1. *Monachus albiventer*. *Monk Seal*.

- Phoque à ventre blanc, *Buffon, H. N. Supp.* vi. t. 44; *Cuv. R. A.* i. 166; *Oss. Foss.* v. 208. t. 17. f. 1 (skeleton), f. 2, 3, 4, 5 (skull); *Lobstein, Obs. Anat. Comp.*; *Ranzani, Opusc. Scient.*
- Phoca *Monachus*, *Herm. Berl. Abh.* 1779, iv. t. 12, 13; *Desm. Mamm.* 241.
- Phoca *Hermanni*, *Lesson, Dict. Class. H. N.* xiii.
- Pelagios Monachus*, *F. Cuv. Dict. Sci. Nat.* xxxix. 550; *Ann. Mus.* 1813, xx. 38; *Mém. Mus.* xi. 193. t. 13 (skull); *Blainv. Ostéog. Phoca*, t. 5, 7, 8, 9; *Owen, Cat. Osteol. Mus. Coll. Surg.* 643.
- Pelagius Monachus*, *Nilsson, Skand. Fauna*; *Wieg. Arch.* viii. 309; *Gray, Zool. Erebus & Terror.*
- Monachus Mediterraneus*, *Nilsson, Vet. Akad. Handl.* 1837, 235.
- Phoca albiventer*, *Bodd. Elench.* 170.
- Phoca bicolor*, *Shaw, Zool.* i. 254. t. 70, 71.
- Phoca leucogaster*, *Péron.*
- Phoca vitulina*, *Wolf, Abbild.* i. 18. t. 4 (good).
- Phoque Moine, *F. Cuv. Ann. Mus.* xx. 38.
- Pied Seal, *Penn. Quad.* ii. 173.
- Heliophoca Atlantica*, *Gray, Ann. & Mag. N. H.* 1854, xiii. 200; *P. Z. S.* 1854.
- Phoca leporina*, *Verreaux*, not *Lepechin.*
- Mediterranean Seal, *Shaw, Zool.* i. 255.

Inhab. Mediterranean, Algiers. S. Atlantic, Madeira, *MacAndrew.*  
In Cumara das Lobos, Funchal, *Knight.* Canaries, Isle Lobos?

- a. Young animal. N. Atlantic, Deserta Grande Island.
- b. Adult animal. N. Atlantic, Deserta Grande Island. Presented by R. MacAndrew, Esq., F.R.S. Specimens described as *Heliophoca Atlantica.*

An imperfect skull of this Seal is described in *Cat. Osteol. Coll. Mus. Coll. Surg.* 643.

The Trustees of the British Museum purchased the dead body of a Seal which had been exhibited in London as the "Talking Fish." The proprietor, an Italian, at first said that it was from the coast of South America, but afterwards admitted that it was from one of the ports on the north side of the Mediterranean; and on examination it proved to be the Monk Seal (*Phoca albiventer*), the type of the genus *Monachus* of Fleming and *Pelagios* of F. Cuvier, a genus which was one of the desiderata in the Museum Collection.

The comparison of the skull of this animal with the skulls of the Seal from Madeira, which I described in the 'Annals and Magazine of Natural History' for March 1854, under the name of *Heliophoca Atlantica*, has shown that the latter animal is the same as the Mediterranean Seal.

The British Museum has since received from M. Verreaux a very good skeleton of a Seal from Algiers, under the name of *Phoca leporina*, which is evidently the same as the *Phoca albiventer* of Cuvier (*Oss. Foss.* v. t. 17).

These facts are interesting as showing that the Seal which was formerly believed to be confined to the north shore of the Medi-

terranean is also found on the southern one and on the islands of the Atlantic.—*P. Z. S.* 1864.

## 2. *Monachus tropicalis*. *Jamaica Seal*.

Grey-brown; hair very short, strap-shaped, closely adpressed, black with a slight grey tip; whiskers short, thick, cylindrical, regularly tapering, without any appearance of wave or twist; fingers gradually shorter.

*Phoca tropicalis*, *Gray, Cat. Seals B. M.* 28.

Inhab. Jamaica.

a. Skin, imperfect, without skull.

Skin referred to in description of *Cystophora Antillarum*, *Gray, Proc. Zool. Soc.* 1849, 93.

## Subfamily 2. PHOCINA.

*Cutting-teeth*  $\frac{3}{4}$ ; the first front grinder in each jaw single-rooted, the rest two-rooted; muzzle bald and callous between and above the nostrils, and divided by a central groove; wrist rather exserted; fingers subequal; claws 5·5, large.

*Phocina*, *Gray, Ann. Phil.* 1825, 340; *Mag. Nat. Hist.* 1837, i. 583; *Zool. Erebus & Terror*, 3; *Cat. Phocidæ B. M.* 20.

*Phocaceerna*, § 1, *Nilsson, Vet. Akad. Handl.* 1837; *Wieg. Arch.* vii.; *Skand. Fauna*, t. , 1840.

*Phoca*, *Nilsson, Vet. Akad. Handl.* 1837; *Wieg. Arch.* vii.; *Skand. Fauna*, xx. 1840.

*Callocephalus*, *F. Cuv. Mém. Mus.* xi. 1827.

## 6. CALLOCEPHALUS.

Muzzle rather narrow; whiskers waved; fingers gradually shorter; palate angularly notched behind; hair subcylindrical; under-fur thin; web between the hind toes hairy. The branches of the lower jaw diverging; the lower edge of the lower jaw rounded, simple, the angle blunt, sloping behind; grinders large, crowded. (Fig. 7.)

Inhab. Northern Ocean.

*Callocephalus* (*Callocephale*), pt., *F. Cuv. Mém. Mus.* xi. 182, 1827; *Dict. Sci. Nat.* lix. 463, 1829; *Fischer, Syn.* 230; *Gray, Zool. Erebus & Terror, Mamm.*

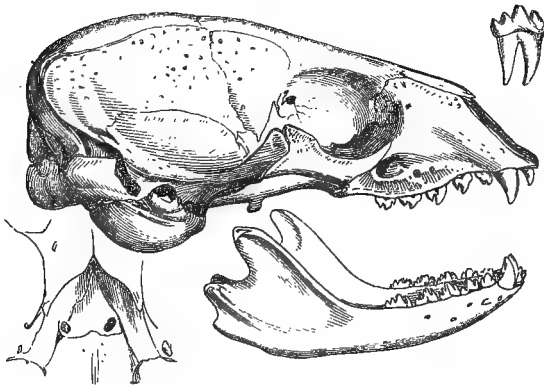
*Callocephalus*, § \*, *Cat. Phoc. B. M.* 21.

*Phoca*, sp., *Linn.*; *Fleming, Phil. Zool.* ii. 187; *Nilsson, Skand. Fauna*, xx.

## 1. *Callocephalus vitulinus*. *Common Seal*.

Finely sprinkled with blackish and whitish, and with greyish brown and yellowish grey along the back, usually unspotted and blackish; the underside of the body whitish; a widish, paler, unspotted ring round each eye, and over each eye a small roundish spot, from which a bristle proceeds. Edge of lower jaw rounded below in front, with a short symphysis. Grinders large, rather crowded and oblique.

Fig. 7.



Callocephalus vitulinus. Skull, grinder, and palate.

*Phoca vitulina*, Linn.; Nilsson, *Vet. Akad. Handl.* 1837; *Skand. Fauna*; Wiegmann, *Arch.* vii. 316; Gray, *Griffith's A. K.* v. 176; Blainv. *Ostéog. Phoca*, t. 2, 5, 9; Gaimard, *Voy. Islande*, t. 11. f. 1, 2 (skull); Ball, *Trans. Roy. Irish Acad.* xviii. t. 4. f. 11-13, t. 5, t. 6; *Sketches Brit. Seals*, t. 8. f. 23-25 (animal), t. 9. f. 26-32 (anat.).

*Phoca communis*, Linn. *Mus. Ad. Frid.* i. 5.

*Phoca canina*, Pallas, *Zool. Rosso-Asiat.* 114.

*Phoca littorea*, Thienem. *Nat. Bemerk.* 61. t. 6, 7, 8; *Bull. Sci. Nat.* v. 216.

Phoque commune, var., F. Cuvier, *Mamm. Lith.* ix. t. ; *Mém. Mus.* xi. 182. t. 12. f. 1a, b, c.

*Phoca variegata*, Nilsson, *Skand. Fauna*, i. 359.

*Callocephalus vitulinus*, F. Cuvier, *Dict. Sci. Nat.* xxxix. 540; Gray, *Zool. Erebus & Terror*, 3; *Cat. Osteog. Spec. B. M.* 32; *Cat. Phoc. B. M.* 21.

Seal, Penn. *Brit. Zool.* i. 71. t. 48.

Common Seal, Parsons, *Phil. Trans.* xlvii. 120. t. 6; Penn. *Syn.* 339; Bell, *Brit. Quad.* 263.

*Phoca Linnæi*, Lesson, *Dict. Class. H. N.* xiii. 414.

See Hund, *Blumenb. Abbild.* t. 73.

Veau marin, Perrault, *Anim.* i. 187. t. 97.

Phoque commune, Buffon, *H. N.* xiii. 333. t. 45; *Suppl.* vi. t. 46; *Cuv. R. A.* i. 165; *Oss. Foss.* iv. 278, v. 200; F. Cuvier, *Ann. Mus.* xvii. 377; *Mamm. Lith.* t. .

Var. ? *Phoca communis octonotata*, Kutorga, *Bull. Soc. Imp. Nat. Mosq.* 1839, 189. t. 13. f. 1, t. 14. f. 1, 2, 3, t. 15. f. 1, 2 & 5, t. 16. f. 1-4, and t. 18. f. 1-4 (skull).

Var. ? *Phoca communis undulata*, Kutorga, *Bull. Soc. Imp. Nat. Mosq.* 1839, 189. t. 13. f. 2, t. 14. f. 4-6, t. 15. f. 3, 4, t. 17, t. 18. f. 2.

Var. ? Phoque à fortes moustaches, *Mus. Paris*; fide Nilsson, Wiegmann, *Arch.* vii. 311.

Inhab. North Sea. Caspian Sea. Baikal.

a. Skin: stuffed. Belfast. From Mr. W. Thompson's Collection.

b, c. Skins: stuffed.

d. Skull. Greenland. From Dr. Moller's Collection.

- e. Skeleton: young. Coast of England. From Dr. Mantell's Collection.
- f. Skull. Greenland.—(Fig. 7, p. 21.)
- g. Skull.
- h. Skull of specimen from coast of Europe.
- i. Skeleton of specimen from coast of Holland. Presented by the Zoological Society.
- j. Skeleton. Greenland. From Mr. Warwick's Collection.—“*Phoca hispidus* or *P. annulatus*,” Warwick.

Middle toe of the fore flipper the largest, the others on each side decreasing in length, so that the two outer are half an inch shorter than the middle one; the hind flipper with the outer toes largest and connected by a thick membrane, containing three of the slender and shorter toes.—*Sabine, Ross's Voy.* 12.

A young Seal became so entirely domesticated and attached to the ship, that it was frequently put into the sea and suffered to swim at perfect liberty, and when tired would return of itself to the boat's side to be taken in.—*Sabine, Ross's Voy.* 13.

*Lower jaw not observed.*

### 2. *Callocephalus?* *Caspicus.* *Caspian Seal.*

Back and sides grey-brown, decorated with irregular, thickish, yellowish rings; the sides of the mouth gradually of a pale yellowish; hairs of the beard thick, pale. Length 4 feet.

*Phoca Caspica, Nilsson, Vetensk. Akad. Handl.* 1837; *Skand. Fauna; Wiegman, Arch.* vii. 313.

*Phoca canina*, var. *Caspica, Pallas, Zool. Rosso-Asiat.*

*Phoca vitulina*  $\beta$ . *Caspia, Gmelin, S. N.; Fischer, Syn.* 675; *Gray, Griffith's A. K.* v. 173.

*Callocephalus Caspicus, Gray, Zool. E. & T.* 3; *Cat. Phoc. B. M.* 24.

Inhab. Caspian Sea.

### 3. *Callocephalus?* *dimidiatus.* *Norway Seal.*

Whiskers waved; dark grey above; lips and beneath pure white.

*Phoca dimidiata, Schlegel, Mus. Leyden.*

*Callocephalus dimidiatus, Gray, Cat. Phoc. B. M.* 24.

Inhab. Norway. *Mus. Leyden.*

May be only a particular state of one of the preceding species.

### 7. *PAGOMYS.*

The branches of the lower jaw diverging; lower edge of the lower jaw dilated on the inner side, with the angle blunt and sloping behind (see fig. 9, e, p. 28); the palate angularly notched behind.

Inhab. Northern Seas.

*Pagomys, Gray, P. Z. S.* 1860.

*Callocephalus*, § \*\*, part., *Gray, Cat. Seals B. M.* 23.



1. *Pagomys foetidus*. *Ringed Seal*.

Back blackish; on it, or on its side, there are largish, oval, whitish, thin rings (from  $1\frac{1}{2}$ " to 2" long); the circle round the eyes is of one colour; the hairs of the beard are thin and brown; the grinders rather far apart, and straight as regards the margin; fur short, crisp, recurved at the tip; lower jaw dilated and inflexed beneath in front.

Young greenish black (not eyed like the adult), beneath paler.

*Phoca foetida*, Müller, *Zool. Dan. Prodr.* viii.; *O. Fabr. Fauna Grænl.* 13; *Fischer, Syn.* 577; *Gray, Griffith's A. K.* v. 178.

*Phoca hispida* (part.), *Erxl. Syst.* 589.

*Phoca hispida*, *O. Fabr. Skrivt. Nat. Selsk.* i. 74. t. 12. f. 1 (skull).

*Phoca Bothnica*, *Gmelin, S. N.* i. 63.

*Callocephalus foetidus* et *C. hispidus*, *Gray, Cat. Seals B. M.* 23.

? *Phoca concolor*, *Dekay, N. H. New York*, 54.

? *Phoca equestris*, *Pallas, Zool. Rosso-Asiat.* iii. 40; *Schrenck, Amur-Lande*, i. 182. t. 9. f. 1, 2 (♂), f. 3 (♀), uniform-coloured.

*Phoca fasciata*, *Shaw, Zool.*

*Phoca annellata*, *Nilsson, Skand. Fauna*, i. 362. t. 38; *Thienem. Nat. Bemerk.* 83. t. 9-12; *Bull. Sci. Nat.* v. 261; *Wiegmann, Arch.* vii. 312; *Gaimard, Voyage Islande*, t. 11. f. 7; *Ball, Sketches Brit. Seals*, t. 11. f. 36 (skull), cop. *Thienemann*; *Radde, Reisen in Suden von Ost-Sibirien*, 1862, i. 296. t. 1-3 (animal, skull, and other bones).

*Phoque commune*, *F. Cuvier, Mamm. Lithog.* iv. t. , cop. *Hamilton, Seals*, t. 4.

*Callocephalus discolor*, *F. Cuvier, Dict. Sci. Nat.* xxxix. 545; *Mém. Mus.* xi. 186.

*Phoca* (*Callocephalus*) *hispida*, *F. Cuvier, Mém. Mus.* xi. 189. t. 12. f. 3, *g, h, i* (skull); *Gaimard, Voy. Isl. Mamm.* t. 11. f. 1, 2 (skull).

*Phoca discolor*, *Gray, Griffith's A. K.* v. 177.

*Phoca Frederici*, *Lesson, Dict. Class. H. N.* xiii. 416.

? *Phoca Schreberi*, *Lesson, Dict. Class. H. N.* xiii. 414 (part.).

*Callocephalus hispidus* (part.), *F. Cuv. Dict. Sci. Nat.* xxxix. 547.

*Callocephalus annellatus*, *Rüppell, Verz.* 167; *Gray, Zool. E. & T.* 3.

? *Ribbon Seal*, *Penn. Arct. Zool.* i. 165.

*Kuma of the Tugunsen, near Baikal.*

*Nerpa of the Russians.*

Inhab. North Sea. England, *Nilsson*. Lake Baikal.

- a. Skin: stuffed.
- b. Specimen: stuffed. North Sea.
- c. Skull of specimen b.
- d. Specimen: stuffed. North Sea.
- e. Skull of specimen d.

Herr Gustav Radde gives the measurements of three skulls of *Phoca vitulina* from the East Sea, one *Phoca Caspica* from the Caspian, and four *P. annellata*—three from the East Sea and one from Lake Baikal (see *op. cit.* p. 301).

We have received a Ringed Seal (*Pagomys foetidus*) that was born in the Zoological Gardens and died soon after its birth. "It was entirely covered with closely-set, well-developed fur of a silver-grey colour, being rather browner on the upper surface. It is 2 feet 8 inches long, from the tip of the nose to the end of the tail; the fore paws are 6, the hinder 8 inches long, and the latter are 7 inches

wide when expanded. The webs of the feet are covered with hair, and the claws are well developed and black. The whiskers are white, well developed, and slightly waved."—*Proc. Zool. Soc.* 1862, 202.

The Seal of the Severn, which Professor Nilsson regarded first as *P. annellata* and then as *P. Groenlandica*, Mr. Ball thinks, from its small size and the form of the intermaxillary bones, is neither, and that it has yet to be determined.—*Ball, Proc. Roy. Irish Acad.* 1836, 19. f. 32–35.

## 2. *Pagomys*? *Largha*. *Largha Seal*.

Muffle bald, narrow, with a central groove; whiskers compressed, waved; shining ashy white, with numerous scattered, small, oval black spots, smaller and closer on the back; feet brownish ash; claws long, black; no under-fur.

Young yellow; back dark grey, from the skin being visible through the pale hair; hair short, flattened; web baldish.

Var. Spots larger, more equally scattered (Japan).—Skull and teeth like *P. oceanica*, Temm.

*Phoca Largha*, Pallas, *Zool. Rosso-Asiat.* i. 113.

*Phoca nummularis*, Temm. *Fauna Japon.* c. 3. t. ; Schrenck, *Amur-Lande*, i. 180; Middendorff, *Reise aussersten &c.* i. 122.

Chien de mer de Détroit de Behring, Choris, *Voy. Pictoresque*, t. 8.

*Callocephalus Largha*, Gray, *Cat. Phoc.* 24.

*Phoca Chorisii*, Lesson, *Dict. Class. H. N.* xiii. 417; Fischer, *Syn.* 24.

Phoque tigre, Kraschennikow, *Hist. Kamtsch.*

*Phoca tigrina*, Lesson, *Manuel*, 550.

? Phoque de Steller, Kraschenn. *Hist. Kamtsch.* 107.

*Pagomys*? *nummularis*, P. Z. S. 1864, 31.

Inhab. North Pacific. Japan, *Mus. Leyden*. East Shore, Kamtschatka, Pallas.

This species is only known from some skins and three fragments of skulls in the Leyden Museum, which were sent to me for comparison by the energetic Curator of the Leyden Museum.

The fragments of skulls above referred to consist of the face-bone and the lower jaws of three specimens; the most perfect specimen has part of the orbit and the upper part of the brain-case attached to it. They are all from very young specimens, of nearly the same age; and, unfortunately, the most perfect one is without the hinder portion of the palate, so that one cannot make sure that it has the same form of the palatine margin that is found in *Pagomys*; but the part of the side of the palate that is present, when compared with the same part in *Pagomys*, leads one to think it most likely to be of the same form as in that genus.

The general form and size of the face, and the form of the teeth, are very similar to those of a skull of *Pagomys foetidus* of the same age. It only differs from the latter in the lower jaw being rather shorter and broader, in the grinders being larger, thicker, and rather closer together, in the central lobe of the grinders being considerably larger, thicker, and stronger, and in all the lobes of the grinders being more acute. The lower margin of the lower jaw is dilated

in front, just as in *Pagomys fœtidus*; but the jaws behind the dilatation diverge more from each other, leaving a wider space between them at the hinder part. The form of the hinder angle of the jaws is very similar in the two species. The orbit is rather smaller and more circular; for in *P. fœtidus* it is rather oblong, being slightly longer than wide. The forehead appears, as far as one can judge by the fragments, to be flatter and broader, and the nose rather shorter.—*Gray, P. Z. S.* 1864.

The lower jaws short and broad; the grinders thick, with a broad thick central lobe, and nearly side by side (in the skulls of the young animals).

The following measurements show the difference between the two species:—

	<i>P. fœtidus.</i> in. 12ths.	<i>P. nummularis.</i> in. 12ths.
Length of lower jaw to hinder notch . .	2 11	1 7
Length of lower jaw to end of dilatation.	1 5½	1 2½
Length of upper teeth-line . . . . .	1 3½	1 2
Length of three grinders . . . . .	0 2½	0 3
Width at outside of hinder notch . . . . .	1 9	1 7
Length of orbit . . . . .	1 8½	1 5

The *Phoca nummularis* of Japan has been considered to be identical with *Phoca Largha* of Pallas, from the east shore of Kamtschatka, the *Phoca Chorisii* of Lesson, and the *Phoque tigre* of Kraschennenikow (which has been named *Phoca tigrina* by Lesson), on the strength of their coming from nearly the same district; but I am not aware that specimens of any of the latter species exist to verify the union and determine what are the species described under these names.—*Gray, P. Z. S.* 1864.

## 8. PAGOPHILUS.

Palate truncated behind; fingers gradually shorter; muzzle rather produced; hair dry, flat, close-pressed, without any under-fur; web between the hind toes baldish. Lower jaw with the branches diverging, dilated and inflexed beneath in front, so as to close in the front part of the gullet; the angle acute, erect behind, with a notch above the basal tubercle; grinders rather distant. (Fig. 8.)

Inhab. Northern Ocean.

Callocephalus §, *F. Cuvier, Mém. Mus.* xi. 1827.

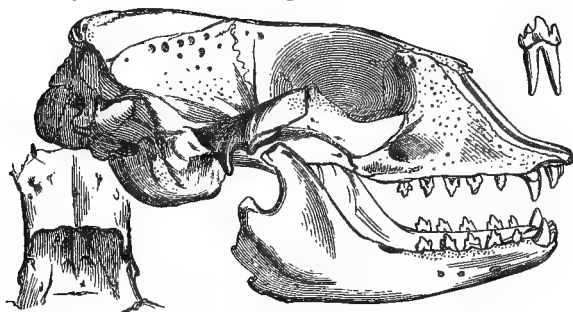
Pagophilus (subgen. of Callocephalus), *Gray, Zool. Erebus & Terror*, 3.

Pagophilus, *Cat. Phocidæ B. M.* 25.

### 1. *Pagophilus Grœnlandicus.* *Harp Seal.*

Grey or whitish, with large and small black spots; hairs of the beard waved on the edges; the cutting-teeth diminish in size; the grinders separate, straight; edge of the mouth oblique. Length from 4 to 5 feet.

Fig. 8.



Pagophilus Grœnlandicus. Skull.

Until six or seven weeks old white,—called *White Coats* at Newfoundland; at one year old they have small spots; at two years old they have large spots, and the males are called *Bed Lampiers*; at three years old the males and females have the harp-shaped band, and are then called *Saddlebacks*.—*Jukes, Newfoundland.*

*Phoca Grœnlandica*, Müller, *Zool. Dan. Prodr.* 8; *O. Fabr. Fauna Grœnl.* 11; *Thienemann, Nat. Bemerk.* t. 14–21; *Bull. Sci. Nat.* v. 261. t. 15 & 18, t. 19 (skull); *F. Cuv. Mém. Mus.* xi. 186. t. 12. f. 2; *Nilsson, Skand. Fauna*, i. 370. t. 37 (young); *Wiegmann, Arch.* vii. 314; *Gray, Griffith's A. K.* ii. t. 91 ♂, t. 92, v. 177; *Bell, Sketches of British Seals*, t. 12. f. 37–39 (skull), *Mus. Paris*; *Volkmann, Anat. Anim.* i. t. 4. f. 1, 8; *Owen, Cat. Osteol. Mus. Coll. Surg.* 646.

*Phoca oceanica*, *Lepech. Act. Petrop.* 1777, i. 295. t. 7 & 8; *Fisch. Syn.* 238; *Hamilton, Seals*, t. 7.

*Callocephalus oceanicus*, *Lesson, Man.* 196.

*Phoca semilunaris*, *Bodd. Elench.* 170.

*Phoca dorsata*, *Pallas, Zool. Rosso-Asiat.* 112.

*Phoca Mülleri*, *Lesson, Dict. Class. H. N.* xiii. 412.

*Phoca annellata*, *Gaimard, Voy. Islande*, t. 11. f. 7, 8, 9.

*Callocephalus Grœnlandicus*, *F. Cuv. Dict. Sci. Nat.* xxxix. 546; *Mém. Mus.* xi. 186. t. 12. f. 2, d, e, f; *Rüppell, Verz. Senck. Samml.* 169.

*Pagophilus Grœnlandicus*, *Gray, Cat. Phoc. B. M.* 25. fig. (skull).

?*Phoca Albini*, *Alexandra, Mem. Torin.* 1850, ii. 141. t. 1–4 (skeleton).

*Saddleback of Northern Sealers*, *Wallace, Proc. Roy. Phys. Soc. Edinb.* 1862, 392.

*Phoque à croissant*, *Buffon, H. N. Suppl.* 325; *Cuv. R. A.* i. 166.

*Harp Seal*, *Penn. Quad.*; *Griffith's A. K.* t. ; *Bell, Brit. Quad.* 269; *Hamilton, Seals*, t. 7; *Jukes, Newfoundland.*

*Swart süde*, *Egede, Grœnl.* 62, fig.

*Attarsoak*, *Crantz, Grœnl.* 163.

*Young. Phoca lagura*, *Cuvier, Oss. Foss.* v. 206; *Fischer, Syn.* 238; *Blainv. Ostéog. Phoca*, t. 9 (? dentition); *Gaimard, Voy. Islande*, t. 11. f. 6 (skull); *Gray, Griffith's A. K.* v. 177.

*Callocephalus lagurus*, *F. Cuv. Dict. Sci. Nat.* xxxix. 546.

*Phoca albicauda*, *Desm. Mamm. Supp.* 541, from *Mus. Paris.*

*Phoca Desmarestii*, *Lesson, Dict. Class. H. N.* xiii. 416.

*Phoca Pilayi*, *Lesson, Dict. Class. H. N.* xiii. 416.

Inhab. North Sea.

a. Adult: stuffed. North Sea.

b-d. Adult: stuffed.

e. Skin. From Mr. Brandt's Collection.

f-j. Skulls. Greenland. From Dr. Moller's Collection.

k. Skeleton. Greenland. From Mr. Brandt's Collection.

l, m, n. Skulls. Greenland. From Dr. Moller's Collection.

o. Skull of a young specimen. Greenland. From Dr. Edward Rüppell's Collection.—The front of the lower edge of the lower jaw of this young specimen is scarcely dilated.

The skeleton and two skulls of this Seal are described in Cat. Osteol. Coll. Mus. Coll. Surg. 646. no. 3961.

“Several Harp Seals are now seen in the deep sheltered voe at Balta Sound.

“This Seal can scarcely be considered very rare here, but it is said only to occur in bad weather, and certainly the present visit forms no exception to the rule, the wind having for some days been blowing heavily from the north-east, accompanied by sleet and snow.”—*H. L. Saxby, Balta Sound, Shetland, March 14, 1864, 'Zoologist,' 1864, p. 9099.*

At a brewer's in Spring-grove Lane, Isleworth, there is a stuffed specimen of a Seal that was caught on the 25th of March, 1858, in the river Thames at Isleworth, which appears to be a young specimen of this species; unfortunately the bones which would have determined the question were destroyed, or at least not kept.

“The *Ground Seal*, which forms the larger part of the prey of the Northern sealers, has the colour and markings like the male Saddle-back, but it is more robust; it is perhaps *Ph. leporina*, or the ‘Hare of the Sea.’”—*Wallace, Proc. Roy. Phys. Soc. Edinb. 1862, 390.* This cannot be, as that has not the mark on the back.

M. Gaimard, in his ‘Voyage to Iceland and Greenland,’ Mammalia, pl. 11, devotes a plate to the skull and teeth of the Seals of Iceland and Greenland; but he does not pay any attention to the form of the lower jaw, except incidentally, when representing the teeth of the lower jaw of his *P. annellata* (t. 11. f. 9). I may observe that this author names on his plates what we call *Phoca annellata* *P. hispida*, and what we call *P. Greenlandica* *P. annellata*.—*P. Z. S. 1864.*

## 9. HALICYON.

The palate of the skull arched out behind. Cutting-teeth  $\frac{6}{4}$ . Grinders 3 or 5, lobed, compressed. The lower jaw strong, bowed out on the sides, thick in front, and with a low crest on the inner side of the lower edge near the front; the ramus of the lower jaw erect, with a tubercular prominence beneath the notch at the angle. (Fig. 9.) Skin &c. unknown.

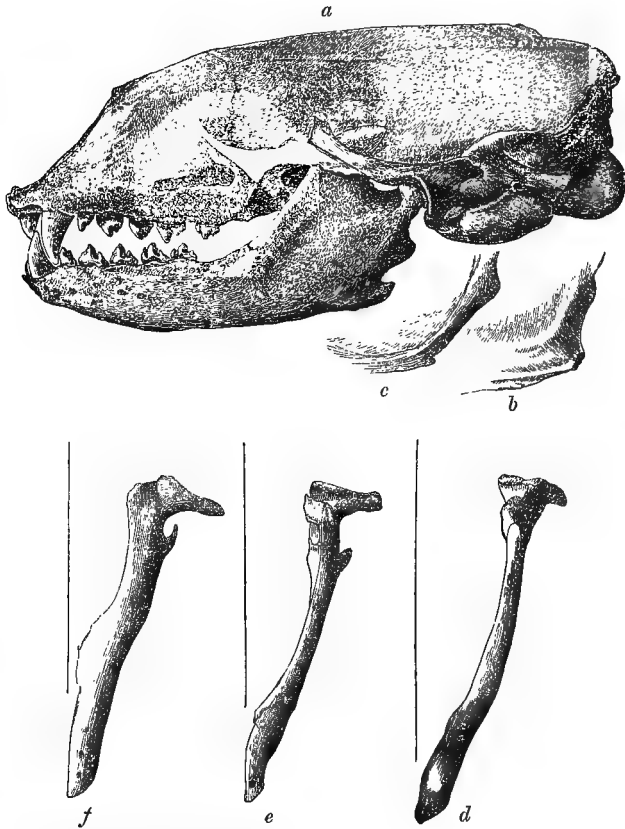
Inhab. Northern Seas.

*Halicyon, Gray, P. Z. S. 1864, p. 28.*

In *Pagophilus Greenlandicus* and *Halicyon Richardi* the angle of the lower jaw is far back, and the hinder edge of the ramus ascends

nearly perpendicularly, with a notch at the hinder end, as shown in *f*, fig. 9. In *Phoca barbata* the form of the lower jaw and ramus is nearly similar; but instead of a notch near the angle, the inner edge is produced inwards into a rounded lobe (*b*, fig. 9; and see Cat. Seals B. M. p. 27. f. 9).

Fig. 9.



- a.* Skull of *Halicyon Richardi*.  
*b.* End of lower jaw of *Phoca barbata*, to show the dilatations and inflexions of the lobe over the angle.  
*c.* End of the lower jaw of *Pagomys fetidus*. The end of the jaw of *Callocephalus vitulinus* is somewhat similar.  
*d.* Lower edge of the lower jaw of *Halicyon Richardi*.  
*e.* Lower edge of the lower jaw of *Phoca barbata*.  
*f.* Lower edge of the lower jaw of *Pagophilus Groenlandicus*. The jaw of *Pagomys fetidus* is somewhat similar, but much smaller.

In *Callocephalus vitulinus* and *C. (Pagomys) fetidus*, on the con-

trary, the angle of the lower jaw is more towards the front, and the hinder edge of the ramus ascends obliquely, with the notch considerably in front of the condyle (see *c*, fig. 9).—*P. Z. S.* 1864.

The skull of *Halicyon* resembles that of *Callocephalus hispidus* and *Pagophilus Groenlandicus* in the dilatation of the front part of the lower edge of the lower jaw; but it agrees with *Callocephalus hispidus* most in the greater development of the face, and in the concave edge of the hinder part of the palate.

It differs from these skulls—

1. In the dilatation of the lower jaw not being extended so far back, only occupying the first two-fifths of the length of the jaw; while in the other two species it occupies full half the length of that bone.

2. In the sides of the lower jaw being much wider apart, and arched outwards, making the space between them much wider behind, agreeing in this respect with *Phoca barbata*.

3. In the front of the lower jaw being thick and swollen, and with only a slight ridge on the middle of the lower edge in front; and the jaws in this part being well separated from each other, not thin, concave inwardly, and with a well-developed inferior edge on the inner sides, those of the two sides of the jaws being parallel and near together in the centre.

The angle at the hinder lower edge of the lower jaw is much more produced, and with a more prominent tubercle, than in either *Callocephalus hispidus* or *Pagophilus Groenlandicus*.

4. The hinder edge of the palate being concave forwards, and not straight and transverse as in *Pagophilus*, nor angularly cut out as in *Callocephalus*.—*Gray, P. Z. S.* 1864.

In the younger specimen the edge of the palate has a slight prominence in the middle of each side; but this is evidently an accidental deformity, as the prominences are not of the same size in the two sides. In the adult skull the two sides of the palate are evenly arched out.

The lower jaw most resembles that of the restricted genus *Phoca* (of which *P. barbata* is the type) in being solid and strong, and in the two sides being arched out, leaving a very wide oval space between them, the front part of the space being continued by a tubercle on the inner edge of the front of the jaw, a short distance from the symphysis.

In *Phoca* the tubercle on the inner side of the lower edge is short, rounded, blunt, and more or less rugose; in the new Seal, *Halicyon*, it is a short-edged, elongated ridge. In *Phoca* the teeth are small, erect, and far apart; in *Halicyon* they are larger, closer together, and distinctly three- or five-lobed.

In *Halicyon* the hinder edge of the ramus of the lower jaw is simple, with a distinct notch between it and the tubercular angle of the jaw. In *Phoca* the hinder edge of the ramus is inflected, forming a large half-oblong lobe, convex in front and concave behind (*b*, fig. 9).

It is very interesting to observe that there is a representative genus on each side of the Arctic Pole; and this agrees with my

previous experience—that each species of Seal has a limited, indeed I may say a very well-defined and very limited, geographical distribution. Though the species are very difficult to distinguish by their external characters, yet the skeleton, and especially the skull, affords well-marked and very definite characters.

M. Lepechin described a *Phoca oceanica* (Act. Petrop. 1777, 259. t. 6 & 7), which has been considered the same as *Pagophilus Grœnlandicus*, as abundant on the ice around Nova Zembla. It would be desirable to see the skull of a specimen from that locality, and thus discover which species extends itself so far north as those islands. *Phoca oceanica*, in its young and old state of fur, resembles *Pagophilus Grœnlandicus*; but unfortunately we have only a very limited knowledge of the external appearance of this new Seal (*Halicyon Richardi*) from Vancouver's Island.

The study of a large series of specimens of several species of Seals shows that the form of the lower jaw, though hitherto little attended to by zoologists, affords a very good character for the distinction of the species.—Gray, *P. Z. S.* 1864, 28.

### 1. *Halicyon Richardi*, sp. nov.

Fur pale brown; when young, darker.

*Halicyon Richardi*, Gray, *Proc. Zool. Soc.* 1864, 28.

*Phoca Grœnlandica*, Middendorff, *Reise in den aussersten N. und O. Sibiriens*, i. 222.

Inhab. Fraser's River and Vancouver's Island.

Mr. Charles B. Wood, Surgeon of H.M.S. 'Hecate,' has very kindly sent to the British Museum, along with other interesting specimens from the north-western part of North America, the skeleton of a Seal from Fraser's River, and the skull of a Seal obtained on the west coast of Vancouver's Island.

The skull was procured from the natives, who were towing the animal alongside of their canoe. They refused to part with the entire animal, but were at length induced to sell the head.

The examination of the skulls shows that the two Seals evidently belong to the same species, the specimen from Fraser's River being adult, and the other not quite so old. Mr. Wood observes that "the younger Seal was captured among the islands in Queen Charlotte's Sound, at the north end of Vancouver; has a fur of a dark brown, almost black colour; and is unlike that from Fraser's River, which is lighter and less timid, being often seen seated on a log floating down with the current."—*P. Z. S.* 1864.

This species, at the request of Mr. Wood, is dedicated to Captain Richard, the Hydrographer to the Admiralty, and Captain of H.M.S. 'Hecate' when these Seals were collected. I have the more pleasure in doing this, as the Museum has received many very interesting specimens collected during the voyage of the 'Hecate,' showing the interest which her Commander takes in the natural sciences, which I have no doubt will receive additional encouragement in the new



position which he has won by his hydrographic and scientific qualifications.

## 10. PHOCA.

Muzzle broad, short; forehead convex; whiskers smooth, tapering; ear-hole large; fingers unequal, the third longest, second and fourth long, the first and fifth shorter, nearly equal; palate with a semicircular edge behind. Forehead arched; grinders small, far apart, often much worn; teeth small. The branches of the lower jaw arched on the sides and wide apart; lower edge produced, forming a blunt rugulose tubercle on the inner side behind the symphysis; the angle of the lower jaw with a rounded lobe on the inner side above the basal tubercle. (Fig. 10.)

*Female.* Teats 4.

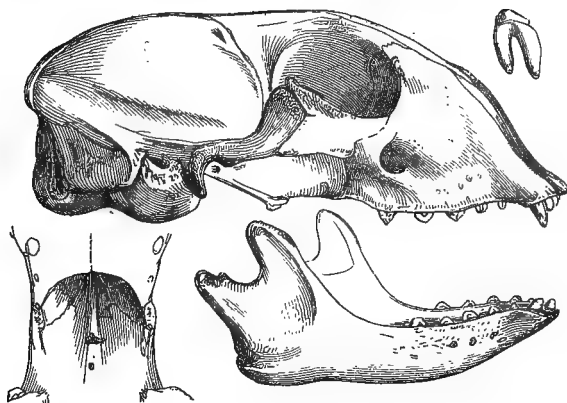
Inhab. Northern Seas.

*Phoca, sp., Linn. &c.*

*Phoca, Gray, Zool. E. & T.; Cat. Phocidæ B. M. 26.*

*Callocephalus, sp., F. Cuvier, Mém. Mus. xi. 1827.*

Fig. 10.



*Phoca barbata.* Skull, grinder, and palate.

1. *Phoca barbata.* Leporine Seal.

*Male.* Black; belly yellowish, black-dotted. *Female.* Beneath grey.

*Phoca barbata, O. Fabr. Skrivt. Nat. Selsk. i. 139-159. t. 13. f. 3 (skull); Faun. Grœnl. 15; Müll. Zool. Dan. Prodr. viii.; Nilsson, Skand. Faun. i. 374; Wieg. Arch. vii. 317; Thienem. Nat. Bemerk. i. t. 1, 2, 3, t. 4 (skull); Bull. Sci. Nat. v. 261; F. Cuv. Mém. Mus. xi. 184. t. 12. f. 4, k, l, m; Gray, Cat. Osteol. Spec. B. M. 32; Zool. Erebus & Terror; Griffith's A. K. v. 178; Fischer, Syn. 240; Blainv. Ostéog. Phoca, t. 9 (dentition); ? Temm. Fauna Japon.*

*Callocephalus barbatus*, *F. Cuv. Dict. Sci. Nat.* xxxix. 547; *Rüppell, Verz.* 167.

*Phoca leporina*, *Lepech. Act. Petrop.* i. 264. t. 8, 9; *O. Fabr. Skrivt. Nat. Selsk.* i. 164; *Fischer, Syn.* 237; *Gray, Griffith's A. K.* v. 178.

*Phoca Lepechinii*, *Lesson, Dict. Class. H. N.* xiii. 415.

*Callocephalus Leporinus*, *F. Cuv. Dict. Sci. Nat.* xxxix. 545.

? *Phoca maxima*, *Steller, Nov. Comm. Petrop.* ii. 290.

Leporine Seal, *Penn. Quad.* 177.

? Sea Calf, *Parsons, Phil. Trans.* n. 469. 383. t. 1. f. 1; cop. *Buffon, H. N. Supp.* vi. t. 14.

? *Phoca Parsonii*, *Lesson, Dict. Class. H. N.* xiii. 414, from

? Long-bodied Seal, *Parsons, Phil. Trans.* xlvii. 121, cop. (*Hali-chærus*?).

? Grande Phoque, *Buffon, H. N.* xiii. 333.

? Great Seal, *Penn. Syn.* 341.

Inhab. North Sea and Japan, according to Temminck.

Skin sold as an article of commerce in Japan.—*Temm.*

a. Skeleton: length 8 feet. North Sea. From Mr. Brandt's Collection.

b. Skin: adult. North Sea. From Mr. Warwick's Collection.

The *Lachtak*, *Steller, Nov. Comm. Petrop.* ii. 290 = *Phoca Lachtak*, *Desm. N. Dict. H. N.* xxv. 588 = *Phoca nautica*, *Pallas, Zool. Rosso-Asiat.* i. 108 = *Phoca barbata*, *Schrenck, Amur-Lande*, i. 181; *Mid-dendorff, Reise aussersten &c.* i. 122 = *Phoca albigena*, *Pallas, Zoogr. Rosso-Asiat.* 107—of Behring's Straits, has been referred to *Phoca barbata*, but *Pallas* describes the fingers as subequal and webbed to the end, which scarcely agrees with that animal.

The body is ventricose; the hair very short (5 lines), rigid, silver-grey; back brown-lettered; tail very short.

The *Maraku* = *Phoca Ochotensis*, *Pallas, Zool. Rosso-Asiat.* i. 117; *Schrenck, Amur-Lande*, i. 181—with soft fur, and pure white when young, from the North Pacific, also requires further examination.

SECT. II. Grinders  $\frac{5.5}{5.5}$  or  $\frac{6.6}{5.5}$  with single root (except the two hinder grinders of Halichoerus).

A. Ears, conch none. Toes simple, of fore feet exerted, of hind feet large; the inner and outer ones large, long, the three middle ones smaller; palm and soles hairy (sometimes chaffy and callous with wear). Muffle hairy to the edge and between the nostrils. Grinders  $\frac{5.5}{5.5}$ .

Phocacæerna, § 2, part., Nilsson, *Skand. Fauna*; Wieg. *Arch.* vii. 317.  
Phocina, part., Turner, *Proc. Zool. Soc.* 1848, 88.

### Subfamily 3. TRICHECHINA.

Muzzle large, truncated, simple; canines large; grinders lobed or truncated when old.

Cetæ, part., Gray, *Ann. Phil.* 1825, 346.

Trichechina, Gray, *Zool. Erebus & Terror*, 3.

Trichecina et Phocina, part., Turner, *P. Z. S.* 1848, 88.

Trichechidæ, Gray, *Ann. Phil.* 1825, 340.

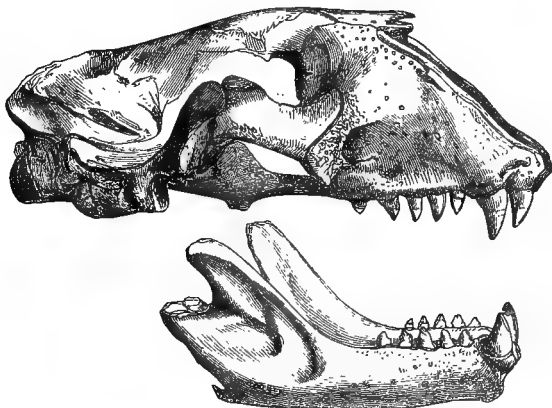
Trichechidæ seu Campodontia, J. Brookes, *Cat. Mus.* 37, 1828.

Les Morses, F. Cuvier, *Dict. Sci. Nat.* lix. 465; *Dents des Mamm.* 233.

### 11. HALICHERUS.

Muzzle broad, rounded; cutting-teeth  $\frac{6}{4}$ ; grinders  $\frac{5.5}{5.5}$ , conical, the hinder two upper and one lower double-rooted, rest simple; canines moderate; whiskers crenulated; muffle hairy, becoming baldish with age; palm and soles hairy; claws 5-5, elongate. Palate of skull with a narrow rounded notch behind; lower edge of lower jaw rounded, not dilated or inflexed in front.

Fig. 11.



Halichoerus Grypus. Skull.

Halichoerus, Nilsson, *Vet. Akad. Handl.* 1837; *Skand. Fauna*, i. 377; *Wieg. Arch.* vii. 318.

Halychoerus, Hornschuch, *Isis*, 1824, viii. 810; *Bull. Sci. Nat.* v. 104.

Phoca, sp., O. Fabr.; Lichtenstein.

1. *Halichoerus Grypus*. *Grey Seal*.

- Phoca grypus*, O. Fabr. *Skrivt. Nat. Selsk.* i. 167. t. 13. f. 4 (skull).  
*Halichoerus grypus*, Nilsson, *Skand. Fauna*, i. 377. t. 34. f. 1, 2; *Wiegman Arch.* vii. 318.  
*Phoca gryphus*, *Licht. Berl. Acad.* 1821, t. 1. f. 1, 2; *Blainv. Ostéog. Phoca*, t. 9; *Fischer, Syn.* 239.  
*Phoca hispida*, *Schreß. Säugeth.* 312. t. 86; *Hamilton*, t. 8.  
*Phoca Halichoerus*, *Thienem. Nat. Bemerk.* 142.  
*Phoca leporina*?, *Licht. in Haude und Spinersch, Zeitung*, n. 46.  
*Phoca Ochotensis*, *Pallas, Zool. Rosso-Asiat.* i. 117.  
*Halychoerus griseus*, *Hornsch. Isis*, 1824, 810; *Bull. Sci. Nat.* v. 104.  
*Halichoerus griseus*, Nilsson, *Skand. Fauna*, 377. t. 34. f. 1, 2; *Hamilton*, t. 10.  
*Halichoerus gryphus*, *R. Ball, Trans. Roy. Irish Acad.* xviii. t. 1 (male and female), t. 2, 3 (skull, teeth, &c.); *Sketches Brit. Seals*, t. 1, 2, & 7. figs. 1-22; *Cat. Seals B. M.* 30.  
*Grey Seal*, *Bell, Brit. Quad.* 284. f.  
*Seal from South Sea*, *Home, Phil. Trans.* 1822, t. 27 (skull).  
*Young Phoca scopulicola*, *Thienem. Nat. Bemerk.* 1824, 59. t. 5 (♂ adult); *Bull. Sci. Nat.* v. 261; *Fischer, Syn.* 237.  
*Phoca Thienemanni*, *Lesson, Dict. Class. H. N.* xiii. 415.  
*Callocephalus scopulicolus*, *Lesson, Man.* 199.

Inhab. North coast of Europe (Ireland and Scotland).

- a. Adult: stuffed. Coast of Northumberland.  
 b. Half-grown: stuffed. Fern Island. Presented by J. P. Selby, Esq.  
 c. Skull of a. Fern Island.  
 d. Skull of b. Fern Island. Presented by J. P. Selby, Esq.

Mr. Ball states that the habits of the Irish Seal differ so much from those ascribed to it in the Baltic, that he thinks it may, on comparison, prove to be a distinct species. The colour of the Irish animal varies so much, from sex, age, season, &c., that it cannot be regarded of value as a specific character; the brain is very small compared with that of *Phoca*, and its intellectual power bears the same proportion. It may always be distinguished from other Seals by its straight profile, fierce aspect, and greater proportionate length.—*Proc. Royal Irish Acad.* Dec. 1836, p. 18.

The skull figured by Mr. Clift in Home's paper in the *Phil. Trans.* 1822, t. 27, with other bones of the body, is in the Museum of the Royal College of Surgeons (see Owen, *Cat. Osteol. Coll. Mus. Coll. Surg.* p. 643. no. 3943, from a specimen given by Mr. Oxendon to Mr. Hunter). It was shot in the Orkneys.

The "Grey-bearded Seal from Orkney" (*Home, Phil. Trans.* 1822, t. 28, skull, cop. Ball, f. 31), Mr. Ball regards as the skull of *Phoca vitulina* with some teeth of *P. Greenlandica* inserted in the upper jaw.—*Ball, op. cit.* Dec. 1836, p. 18.

MM. Hornschuch and Schilling (*Wiegmann's Arch.* 1851, 22) propose to separate the genus into three species:—

1. *H. grypus*, O. Fabr. = *H. griseus*, Nilsson.
2. *H. macrorhynchus*, Hornschuch & Schilling, 1850.
3. *H. pachyrhynchus*, Hornschuch & Schilling, 1850.

See also Lilljeborg, *Arskrift. Kongl. Vetensk. Soc.* i Upsal, 1860, 297;

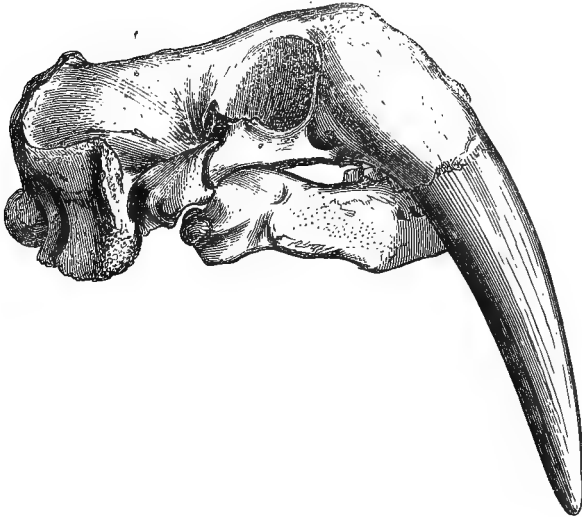
Overs. Kongel. Danske Vidensk. 1860, 698; Arch. Naturg. 1861, 100. All the specimens I have seen seemed to belong to a single species.

## 12. TRICHECHUS.

Muzzle very broad, truncate, swollen and convex above; muffle, palm, and soles chaffy, callous, with the hair more or less worn off in the adult (hairy when young?). Cutting-teeth  $\frac{4}{2}$  in young,  $\frac{2}{0}$  in adult; grinders  $\frac{55}{44}$  in adult, truncated, all single-rooted; canines, upper very large, exserted. Eyes prominent; tail none.

The skin is covered with small ovate scales. Nose with very rigid, white, compressed, pellucid bristles, rounded at the end. Fore feet small; outer and hinder edge of the upper side bald, rest covered with hair; front claw rudimentary; skin of the soles rigid, warty. Hind feet rather large; first and fifth toes elongated, with a distinct flap and rudimentary claw; three middle ones shorter, with subacute claws. Tail rudimentary.

Fig. 12.



Trichechus Rosmarus. Skull: adult.

The skull differs from the other Earless Seals in having a distinct alisphenoid canal, like the Eared Seals; and it agrees with the Earless ones in having no postorbital process, and the mastoid process strong and salient, its surface continuous with the auditory bullæ.—*Turner.*

In the young there are in the upper jaw three incisors on each side, the first or inner extremely small, the second a little larger, and the third or outer disproportionately large, being equal to the

largest grinders. The canine tooth is displaced, being thrust outwards beyond the line of the other teeth. There are five grinders with single roots, the fifth very small. In the lower jaw there are five grinders. In the adult the incisors are obliterated, except the lateral pair of the upper jaw. The fifth grinder also disappears, and sometimes the fourth.—*Macgilliv. Nat. Lib.* vii.

In the very young the cutting-teeth  $\frac{6}{8}$ , all, especially the two upper lateral, deciduous; canines  $\frac{1\frac{1}{1}}{1\frac{1}{1}}$ , upper elongate, lower conical like the grinders; grinders  $\frac{4\frac{4}{5}}{5\frac{5}{5}}$ , small, rather compressed.—*Rapp, Bull. Sci. Nat.* xvii. 280.

The young Walrus has three teeth in each premaxillary bone, and two on each side of the fore part of the mandible. They soon disappear, except the outer pair of the upper incisors, which remain close to the maxillo-premaxillary suture on the inner side of the long canine tusks, and, by their thick obtuse form, seem to commence a series of small and simple molars. In the adult there are usually three molars on each side behind the permanent molariform incisor, and there are four similar teeth on each side of the lower jaw.—*Owen, Cat. Osteol. Series Mus. Coll. Surgeons*, p. 630. no. 3860.

The skeleton is described by Prof. Owen, *op. cit.* p. 630. nos. 3860 to 3919.

*Odobenus*, *Brisson, Règne. Anim.* 48.

*Rosmarus*, *Scopoli, Introd. H. N.* 1777.

*Trichechus*, *Linn. Syst. Nat.* i.; *Nilsson, Vet. Akad. Handl.* 1837; *Skand. Fauna*, t. ; *Wiegmann, Arch.* vii. 322; *Fleming, Phil. Zool.* ii. 187; *Rapp, Bull. Sci. Nat.* xvii. 280; *Fischer, Syn.* 678; *F. Cuv. Dict. Sci. Nat.* lix. 465, 1829; *Gray, Cat. Seals B. M.* 30.

(Tribe) *Trichecina*, *Turner, Proc. Zool. Soc.* 1848, 88.

*Morse, F. Cuvier, Dents des Mamm.* 233. t. 95, 1825.

*Trichechidæ* seu *Campodontia*, *J. Brookes, Mus. Catal.* 37, 1828.

M. F. Cuvier thinks the Morse forms an isolated family, distinguished by the great breadth of its muzzle, the length of its upper canines, and the form of its teeth. It has the same organs of movement and intestinal canal as the Seals.—*D. S. N.* lix. 465.

Professor Baer illustrates his paper with a map showing the geographical distribution of the Walrus in the Arctic Sea.

For the chase and uses of the Morse, see Wrangel, 'Nordküste von Sibirien,' ii. 319, 320.

### 1. *Trichechus Rosmarus.* *Morse.*

Pale brown; when young black, when old nearly white.

*Trichechus Rosmarus*, *Linn. S. N.* i. 39; *Müller, Prod. Zool. Dan.* i.; *Schreber, Säugeth.* 262. t. 79; *Nilsson, Wiegmann, Arch.* vii. 322; *Blainv. Ostéog. Phoca*, t. 1 & 4; *Fischer, Syn.* 243; *Baer, Mém. Acad. Pétersb.* iv. 97. t. 4, 1838; *Mém. Mus.* vii. t. 9; *Gray, Cat. Seals B. M.* 32; *Owen, Proc. Zool. Soc.* 1853; *Ann. & Mag. Nat. Hist.* 1855, xv. 226; *Cat. Osteol. Coll. Mus. Coll. Surg.* 631.

*Rosmarus arcticus*, *Pallas, Zool. Rosso-Asiat.* i. 269; *Schrenck, Amur-Lande*, i. 179; *Volkmann, Anat. Anim. Tab.* 1831, t. 10. f. 3 (skull).

*Trichechus obesus* et *T. divergens*, *Illiger*.

Rossmarus, *Ol. Magnus, Hist. Reg. Septentr.* 757, fig.; *Gesner, Aquat.* 249, 250, fig.

Walross, *Nilsson, Skand. Fauna*, i. 388.

Walruss, *Bell, Brit. Quad.* 282.

Phoca Rosmarus, *Linn. S. N.* ed. 10. i. 38.

Arctic Wallrus, *Penn. Syn.* 335; *Cook's Last Voy.* iii. 262. t. 8, fig.; *Shaw, Zool.* i. 234. t. 68, 69; *Nat. Misc.* t. 76.

Morse ou la Vache marine, *Buff. H. N.* xiii. 353, 415. t. 54, 55.

Morsch, *J. G. Gmelin, Sibirien*, iii. 165.

Wallross, *Mart. Spitzb.* 78. t. P. f. b; *Egede, Grœnl.* 61, fig.; *Steller, Kamtsch.* 106.

Inhab. North Sea. Mus. Brit. adult.

a. Adult: stuffed. North Sea. Greenland?

b. Skull: adult. North Sea.

c. Skull: adult. North Sea. Presented by General Thomas Hardwicke.

d. Skull of young.

e. Tooth, longitudinally divided. Presented by Dr. J. E. Gray.

f. Fœtus, in spirits. North Pacific.

g, h, i. Three teeth. N.W. coast of America. Presented by Captain Kellett, R.N., H.M.S. 'Herald.'

j. Skeleton.

k. Skull of young. Presented by the Linnean Society.

In the 'Proceedings of the Zoological Society' for 1853, p. 112, is a paper by me "On the attitudes and figures of the Morse," as given at various periods by different authors, with copies of some of the more interesting examples, arranged in chronological order, showing the extraordinary notions that the older naturalists had of the animal.

*Sea Horses* are said to be found in abundance on the seaward part of the island of St. Lorenza near Callao, mentioned in M. Bonelli's 'Travels in Bolivia,' i. 90 & 128. I have never heard of the genus *Trichechus* living out of the Arctic Ocean, and should have believed that the author had mistaken the *Sea Bear* (*Otaria leonina*) for the *Sea Horse*, if he did not describe "the two great white tusks projecting from the mouth on either side," and further observe that "the tusks are of great value and form an important article of commerce" (see i. 90), which cannot apply to the tusks of the *Sea Bear*.

It is to be observed that the Peruvian continuation of the Antarctic current runs up the shores of Chili and Peru (see Journ. Roy. Geogr. Soc. 1853) and chills that coast. This may explain why Seals are found so near the tropics in these seas.

### Subfamily 4. CYSTOPHORINA.

Muzzle of the males with an inflatable appendage. Cutting-teeth  $\frac{4}{2}$ ; grinders with a large swollen root, and a small, compressed, simple, plaited crown. Muffle hairy.

Stemmatopina, Gray, *Ann. Phil.* 1825, 340.

Cystophorina, Gray, *Zool. Erebus & Terror*, 3; *Cat. Seals B. M.* 33.

Cystophora, Nilsson, *Vet. Akad. Handl.*; *Skand. Fauna*; *Wiegmann Arch.* vii. 323.

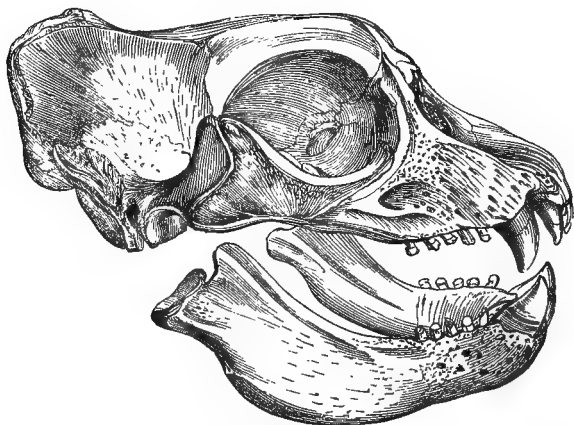
Mirounga, Gray, *Griffith's A. K.* v. 179, 1827.

Phoca, § 2, F. Cuvier, *Mém. Mus.* xi. 196.

### 13. MORUNGA.

Nose of the male with an elongated tubular proboscis; muzzle of the skull broad, truncated in front; forehead convex; hinder palatine bone short, transverse. Hair flat, truncated, adpressed; whiskers round, rather waved, thick. Claws, front obsolete, hinder distinct.

Fig. 13.



Morunga elephantina. Skull.

The head broad, short, truncated in front, with a tuft of bristles over each eye, and one on each side of the middle of the muzzle; the upper lip longer than the lower; the forehead convex; the nostrils of the male "are wrinkled, and can be blown up into a crest" (Forster), "with an elongate tubular proboscis" (Péron); of the female simple, rounded, with a hairy muffle between and around the edge of the nostrils.

Cutting-teeth  $\frac{4}{2}$ , far apart, conical, the two middle upper smaller, the rest nearly equal; the grinders with large, swollen, subcylindrical roots, and a small, compressed, simple, plaited crown; the hinder palatine bones short, transverse.



The whiskers are very long and large, roundish, very slightly compressed, rather waved.

The fore feet are rather small, oblong, obliquely truncated, the wrist being nearly as long as the feet, with five elongated claws, the first the smallest; the hinder feet are moderate, the marginal toes upon each side large, rounded, the three middle ones very small, tapering; all clawless. The tail conical.

Fur short; hair short, flat, broad and rounded at the tip in the adult, rather more tapering in the young; hair on the lips rather longer, more slender, and slightly curled.

Inhab. Southern Ocean.

Mirounga, part., *Gray, Griffith's A. K.* v. 179, 1827.

Morunga, *Gray, Cat. Osteol. Spec. B. M.* 33; *Zool. Erebus & Terror.*

Macrorhinus (Macrorhine), *F. Cuvier, Mém. Mus.* xi. 200. t. 13, 1827;

*Dict. Sci. Nat.* lix. 464, 1829; *Fischer, Syn. Mamm.* 230.

Cystophora, part., *Nilsson, Wiegman. Arch.* vii. 324.

Macrorhyna (misprint), *Gray, Griffith's A. K.* i. 180.

Rhinophora, *Wagler, Nat. Syst. Amph.* 27, 1830.

This genus has many characters in common with the Crested Seal of the North American continent, but differs especially in the nose being provided with a proboscis, while in that genus it has a hood-like swelling proceeding up the nose to the back of the head.

The male and female are so different in size that Lord Byron mistook them for mother and young.—*Weddell, Voy.* 84.

Pallas (*Zool. Rosso-Asiat.* i. 106) describes the skull of this species as the skull of a Sea Lion, brought from the Cape of Good Hope by Mr. Tulbagh.

### 1. *Morunga elephantina.* *Sea Elephant.*

A Sea Lion and Lioness from Juan Fernandez, *Anson, Voy. round the World* (1786), t. 122. t. 19, copied *Pernetty, Voy. Iles Malouines*,

ii. 47. t. 9\*. f. 1, and altered t. 8\*. f. 1;—hence

*Phoca leonina*, *Linn. S. N.* i. 55; *Schreber, Säugeth.* 297. t. 83 a; *Blainv. Ostéog. Phoque*, t. 5, 9.

Bottle-nosed Seal, *Shaw, Zool.* i. t. 73; *Penn. Quad.* ii. 531 (with an original description of the female).

*Phoca Ansonii*, *Desm. Mamm.* 239, 369 (part only).

*Mirounga Ansonii*, *Gray, Griffith's A. K.* v. 180.

Grand Phoque à museau ridé, *Buffon, Suppl.* vi. 316.

Anson's Sea Lion, *Forster, Voy. round the World*, ii. 527.

*Phoca major*, &c. n. 5, "Manate from Nicaragua," *Parsons, Phil. Trans.* 1751, 121 (female).

*Phoca elephantina*, *Molina, Saggio*, 260 (1782).

L'Éléphant marine, ou Phoque à trompe, *Phoca proboscidea*, *Péron & Lesueur, Voy. Terres Austr.* ii. 34. t. 32; *Hamilton, Seals*, t. 16, 17; *Cuvier, Oss. Foss.* v. t. 18. f. 1; *F. Cuvier, Mém. Mus.* xi. t. 14. f. 1 (skull); *Dents des Mamm.* 123. t. 39 a.

*Phoca proboscidea*, *Hamilton, Jard. Nat. Lib.* t. , *Mus. Liverpool.*

*Cystophora proboscidea*, *Nilsson, Vet. Akad. Handl.* 1837; *Skand. Fauna*; *Wiegman. Arch.*; *Owen, Cat. Osteol. Coll. Mus. Coll. Surg.* 638.

*Mirounga proboscidea*, *Gray, Griffith's A. K.* v. 180, 1827.

*Morunga elephantina*, *Gray, Cat. Osteol. Spec. B. M.* 33; *Cat. Seals B. M.* 34.

- Leo marinus (Cap. B. S.), *Pallas, Zool. Rosso-Asiat.* i. 106.  
 Sea Elephant, *Weddell, Voy.* 53, 84, 134.  
 Macrorhynchus proboscideus, *Gray, in Brookes's Mus. Cat.* 36, 1828.  
 Phoque gris argenté à os nasaux très courts, *Mus. Paris, from M. Dubison = Cuvier, Oss. Foss.* v. 213; *Nilsson, Wieg. Arch.* vii. 325;—hence  
 Phoca dubia, *Fischer, Mamm.* i. 235,  
 Phoque des Patagons, *F. Cuvier, Mém. Mus.* i. 203. t. 14. f. 2, d, e, f.  
 Mirounga Patagonica, *Gray, Griffith's A. K.* v. 186.  
 Stenmatopus Patagonicus, *J. Brookes, Cat. Mus.* 36, 1828.  
 Rhinophora proboscidea, *Wagler, Nat. Syst. Amph.* 27.

Inhab. Southern Ocean.

- a. Skull of young. Antarctic Ocean.  
 b. Adult: stuffed. Antarctic Ocean. Presented by the Lords of the Admiralty.  
 c. Skeleton of b. Antarctic Seas, Antarctic Expedition. Presented by the Lords of the Admiralty.—Skull figured in 'Zool. Erebus & Terror,' t. .  
 d. Skin, with skull.  
 e. Skin of young male. Cape of Good Hope?  
 f. Skull. Antarctic Seas, Antarctic Expedition. Presented by the Lords of the Admiralty.  
 g. Skull and imperfect skeleton of young. Antarctic Seas, Antarctic Expedition. Presented by the Lords of the Admiralty.  
 h. Skeleton of specimen e. Cape of Good Hope? From Mr. Bartlett's collection.

The skulls of different ages of this species are described by Professor Owen, *Cat. Osteol. Coll. Mus. Coll. Surg.* p. 368. no. 3920. Among others is the anterior portion of the jaws of the *Sea Lion* from the South Seas, described and figured in *Anson's Voyage round the World*, p. 122. t. 19 (see no. 3923).

See Péron on the *Sea Elephant*, *Freycinet, Voy. Australe*; translated in *Brewster's Edin. Journ. of Science*, 1827, vii. 73.

#### 14. CYSTOPHORA.

Nose of the male with a large compressed hood, extending to the back of the head; muzzle very broad, hairy; nostrils large. Muzzle of the skull broad, narrowed on each side in front; forehead flat; palatine bone broad, square. Hair elongate, cylindrical; whiskers flat, waved. Claws 5-5, distinct.

*Cystophora*, *Gray, Zool. Erebus & Terror*, 4.

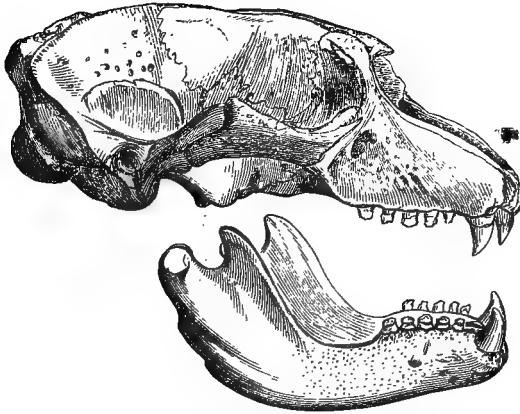
*Cystophora*, sp., *Nilsson, Vet. Akad. Handl.* 1837; *Skand. Fauna*; *Wieg. Arch.* vii. 326.

*Mirounga*, part., *Gray, Griffith's A. K.* v. 463.

*Stenmatopus* (*Stenmatope*), *F. Cuvier, Mém. Mus.* xi. 196. t. 13, 1827; *Dict. Sci. Nat.* lix. 464; *Fischer, Syn.* 230.

The young is like the young of *Pagophilus Groenlandicus* in external appearance, but it is easily known from that species by the hairiness of the muffle between the nostrils, and by the teeth not being lobed, but only plaited on the surface. (See also *Nilsson, Wieg. Arch.* vii. 320.)

Fig. 14.



Cystophora cristata. Skull.

1. *Cystophora cristata*. Hooded Seal.

Outer cutting-teeth and the canines narrow, compressed.

*Phoca cristata*, *Erzl. Syst.* 590; *F. Cuv. Mém. Mus.* xi. 196. t. 13. f. 3; *O. Fabr. Skrivt. Nat. Selsk.* i. 120. t. 12. f. 2; *DeKay, Ann. Lyc. N. Y.* i. t. 7; *Fischer, Syn. Mamm.* i. 241; *Blainv. Ostéog. Phoca*, t. 5 (skull), t. 9 (teeth); *Hamilton*, t. 14; *Gervais, Zool. et Pal. Franç.* t. 42 (animal and skull, young).

*Phoca mitrata*, *Milbert, MS.*; *Cuv. Oss. Foss.* v. 210. t. 18. f. 3; *F. Cuv. Dents des Mamm.* 122. t. 39. t. 38 B; *Fischer, Syn. Mamm.* 241; *Hamilton, Seals*, t. 13.

*Phoca leucopla*, *Thienem. Bemerk.* 102. t. 13 (young); *Bull. Sci. Nat.* v. 261; *Fischer, Syn.* 257, 675.

*Mirounga cristata*, *Gray, Griffith's A. K.* v. 463.

*Cystophora cristata*, *Nilsson, Vet. Akad. Handl.* 1837; *Skand. Faun.*; *Wiegmann, Archiv*, vii. 327; *Gray, Proc. Zool. Soc.* 1849, 91; *Cat. Ost. Coll. B. M.* 32; *Cat. Seals B. M.* 36.

*Stenmatopus cristatus*, *F. Cuvier, Dict. Sci. Nat.* xxxix. 551; *Mém. Mus.* xi. 196. t. 13. f. 3, g, h, i.

*Stenmatopus mitratus*, *Gray, in J. Brookes's Mus. Cat.* 36, 1828.

*Phoca leonina*, *Linn. S. N.* i. 55; *Mohr, Isl. Nat.* 2; *Müller, Prodr. Zool. Dan.* viii.; *O. Fabr. Faun. Grænl.* 7; *Wallace, Proc. Roy. Phys. Soc. Edinb.* 1862, 393.

*Cystophora borealis*, *Nilsson, Skand. Fauna*, i. 383.

*Phoca cucullata*, *Bodd. Elench.* 107.

*Phoca dimidiata*, *Cretzschmar, fide Rüppell.*

Seal with a caul, *Ellis, Hudson's Bay*, 134. t. 6. f. 4.

*Klapmyds*, *Egede, Grænl.* 46.

*Klap myssen*, *Egede, Grænl.* 62.

Hooded Seal, *Penn. Syn.* 342; *Shaw, Zool.* i. 262.

*Phoca Isidorei*, *Lesson, Rev. Zool.* 1843, 256; *Echo du Monde Savant*, 1843, 228.

A Seal new to the British shores, *W. B. Clarke*, Aug. 14, 1847, 4to figure of Seal, skull, &c.

Inhab. North Atlantic. Called *Bladder-nose* by the Sealers. Rare.

Coast of Europe. Ile d'Oleron, Mus. Paris ; River Orwell, 29th June, 1847, Mus. Ipswich.

Very young, grey, without spots when wet. Called *Blue-backs* in Newfoundland.

- a. Skin, stuffed, of adult male.
- b. Skin, stuffed, of adult male.
- c. Skin, stuffed, of adult female.
- d. Skin, stuffed, of half-grown young.

*Phoca leucopla*, *Thienem. Bemerk.* t. 13, 1824.

*Phoca mitrata*, *Milbert, in Cuv. Oss. Foss.* v. 210.

a. Skull of adult. Greenland. Crowns worn ; the roots of the 1st, 2nd, 3rd, and 4th rather enlarged, oblong club-shaped, rather elongate ; the root of the 5th grinder compressed, of the left side simple, of the right partially divided into two short roots continued in grooves on each side. Specimen No. 1 described *Proc. Zool. Soc.* 1849, 92.

b. The skull of an adult or aged specimen. Greenland. The crowns plaited ; the roots of all the grinders enlarged and short, club-shaped and simple, separated from the crown by a narrow collar. Specimen No. 2 described *P. Z. S.* 1849, 92.

c. Skull of an aged specimen. Greenland. The crowns plaited and tubercular, the roots of the grinders rather enlarged ; the roots of the 3rd grinder rather compressed, simple, with a groove on the outer side of the 4th and 5th grinders, scarcely enlarged, and divided into two distinct diverging roots. Specimen No. 3 described *P. Z. S.* 1849, 92.

d. Skull, without lower jaw, of nearly adult. Greenland. Wanting the grinders ; but the cavity for the grinders shows that the 4th grinder on both sides had a short clavate root, with a slight central groove on the outer side, and the 5th grinder on each side had two separate roots. Specimen No. 5 described *P. Z. S.* 1849, 92.

e. Skull of a half-grown animal. Greenland. The crowns of the grinders plaited and tubercular ; the 4th grinder on each side with ovate, short, simple roots, and the 5th grinder with compressed, truncated, simple roots ; the grinders are rather further apart than in the preceding skull. Specimen No. 6 described *P. Z. S.* 1849, 92.

f. Skull of a very young animal. Greenland. The crowns of the grinders are very distinctly plaited ; the 4th and 5th grinders of both sides have two distinct roots, and the 3rd grinder has a groove down the middle of the outer side. In all these skulls the grinders are close together, forming a nearly continuous line. Specimen No. 7 described *P. Z. S.* 1849, 92.

g. Skull of nearly adult. Greenland. The crowns of the few grinders remaining plaited ; the root of the 4th and 5th grinders of the left side, as shown by the cavities, divided into two roots ; of the 4th grinder of the right side simple, with a slight groove on the outer side ; and of the 5th grinder two-rooted, like the similar grinder on the outer side. Specimen No. 4 described *P. Z. S.* 1849, 92.

The specimen found in the Orwell was uniform dark grey above,

darker over the basal parts of the hinder extremities, and yellowish white beneath. 40 inches long.

The skull and dentition of this species are described by Prof. Owen in *Cat. Osteol. Coll. Mus. Coll. Surg.* p. 640.

## 2. *Cystophora Antillarum*. *West Indian Hooded Seal*.

Skull, face broad. The outer upper cutting-teeth and the canines broad, strongly keeled on each side and longitudinally plaited within. Fur grey-brown; lips and beneath yellow.

*Cystophora Antillarum*, *Gray, Proc. Zool. Soc.* 1849, 93; *Zool. E. & T.* t. ined.; *Ann. & Mag. N. H.* 1850, 58; *Wiegman. Arch.* 1851, 29.

Inhab. West Indies.

- a. Stuffed specimen. West Indies, Jamaica, *Mr. Gosse*.  
 b. Skull of a very young specimen. The face is broader than the skull of *C. cristata* of the same size. The crowns of the teeth are plaited and tubercular; the 4th grinder has only a single root, the 5th grinder has two. West Indies, Jamaica, *Mr. Gosse*.— (Specimen described, *Gray, Proc. Zool. Soc.* 1849, 93.)

- a. *Cystophora?* sp., *Cassin, U. S. Exploring Exped. Mamm.* 26, 1858.

“Jan. 20, 1839. Coast of South America, between Rio de Janeiro and the Rio Negro, at 9 A.M., a Seal appeared about the bow of the vessel, easily keeping ahead and frequently coming to the surface. Our distance from the nearest land was 135 miles, though the water was green as if on soundings. When swimming below the surface the animal might almost have been mistaken for a shark, except that its body was much more flexible in turning; and another remarkable difference was that it appeared to swim entirely by means of its pectoral flappers, the tail being extended and apparently inactive.”—*Dr. Pickering's Journal, quoted in Cassin's U.S. Exploring Expedition, Mamm.* 26.

- b. “*Cystophora proboscidea?*, a young male Seal from the Iles Creusettes,” *Owen, Cat. Osteol. Coll. Mus. Coll. Surg.* 640. no. 3939.

Inhab. “Iles Creusettes.”

This skull differs from *Cystophora cristata* in the greater length of the enamel crowns of the canines and the smoother character of the enamel. The crowns of the molars are relatively larger, are separated by a less marked constriction from the fang, and the enamel does not present the same wrinkled character. The palatal process of the palatines forms a transverse quadrate plate more deeply emarginated behind.

It may probably have belonged to a young individual of *C. proboscidea*.—*Owen, op. cit.* p. 640.

B. *Ears with a subcylindrical, distinct, external conch. Toes of the hind feet subequal, short, with long membranes at the end; fore feet fin-like; palm and soles bald, longitudinally grooved. Nose simple, with a rather large callous muffle above and between the nostrils; cutting-teeth  $\frac{5}{1}$ , upper often bifid; grinders  $\frac{6^6}{6^6}$ .*

### Subfamily 5. ARCTOCEPHALINA.

The skull has a postorbital process, an alisphenoidal canal, the mastoid process strong and salient, standing aloof from the auditory bullæ.—*Turner.*

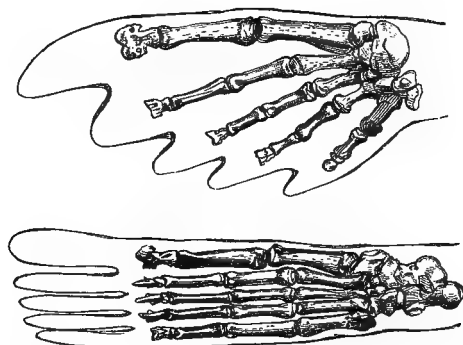
*Arctocephalina*, Gray, *Zool. Erebus & Terror*, 4; *Turner, Proc. Zool. Soc.* 1848, 88.

*Otaria*, Péron, *Voy. Terres Austr.* ii. 118; *Desm. Mamm.* 248; *Fleming, Phil. Zool.* ii. 187; *Gray, Griffith's A. K.* v. 182; *Nilsson, Vet. Akad. Handl.* 1837; *Skand. Fauna*; *Wieg. Arch.* vii.

*Phoca*, § 3, *F. Cuvier, Mém. Mus.* xi. 205.

*Otariadæ*, *J. Brookes, Mus. Cat.* 36, 1828.

Fig. 15.



*Arctocephalus Hookeri.* Fore foot and hind foot.

### 15. CALLORHINUS.

The face short; forehead convex, regularly rounded from the end of the nasal bone to the middle of the vertex; the nasal opening is small; the palate rather concave, contracted behind, short, nearly reaching the middle of the zygomatic arch. Lower jaw short, thick, flattened, expanded beneath just in front of the condyle.

*Callorhinus*, Gray, *Proc. Zool. Soc.* 1859, 357.

*Arctocephalus*, § \*, Gray, *Proc. Zool. Soc.* 1859, 117.

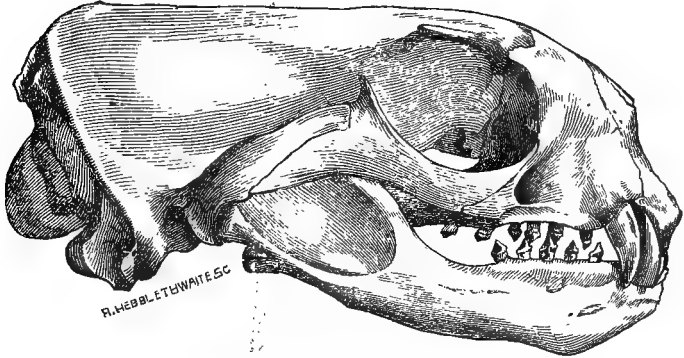
*Arctocephalus*, sp., *F. Cuvier.*

#### 1. *Callorhinus ursinus.* Northern Fur-Seal.

Adult male grey-black; hair of the back long, black, reddish, with a subterminal band and a short grey tip; under-fur short, woolly,

red; the hair of the neck and front of the body longer, forming a kind of mane; lips and nose reddish; whiskers very long, strong, white, smooth, tapering to a fine point. Skull short, forehead very convex and rounded.—*P. Z. S.* 1859, 102.

Fig. 16.



Callorhinus ursinus. Skull.

Palate rather concave in front, narrowed and flattened behind, with a deep narrow hinder aperture, which has a regular ovate front edge; outer upper cutting-teeth moderate; orbit very large; zygoma very strong; grinders small.—*P. Z. S.* 1859, 117.

*Ursus marinus*, *Steller, Nov. Comm. Petrop.* ii. 331. t. 15;—hence *Phoca ursina*, *Schreb. Säugeth.* iii. 289. t. 82; *Gmel. S. N.* i. 62; *Shaw, Zool.* i. 265. t. 72; *Fischer, Syn.* 231; *F. Cuv. Mém. Mus.* xi. 205. t. 15. f. 1 (skull?).

*Otaria ursina*, *Desm. in Péron & Lesueur, Voy.* ii. 41; *Nouv. Dict. H. N.* xxv. 595; *Mamm.* 249; *Gray, Griffith's A. K.* v. 182; *Wagner, Bull. Akad. München*, 1849, 168; *Wiegmann, Arch. Nat.* 1849, 39; *Schrenck, Amur-Lande*, 189.

*Otaria ursina*, var., *Mus. Leyden.*

*Otaria Fabricii*, *Lesson, Dict. Class. H. N.* xiii. 419, from *O. Fabr.*

*Otaria Kraschennenikowii*, *Lesson, Dict. Class. H. N.* xiii. 420.

*Chat marin*, *Kraschennenikow, Hist. Kamtsch.* i. 306.

*Arctocephalus ursinus*, *F. Cuv. Dict. Sci. Nat.* xxxix. 554; *Gray, in Brookes's Cat. Mus.* 37; *Zool. Ereb. & Terror*, 3; *Cat. Phocidae B. M.* 41; *P. Z. S.* 1859, 103, 107. t. 68 (skull); *Nilsson, Wiegmann, Arch.*

*Ursine Seal*, *Penn. Hist. Quad.* ii. 526, 531.

*Ours marin*, *Buffon, Supp.* vi. t. 47; *Cuv. Règne Anim.* i. 167.

*Sea Bears*, *Forster, Cook's Second Voy.* ii. 203.

*Young. Phoca nigra*, *Pallas, Zool. Rosso-Asiat.* 107?

*Callorhinus ursinus*, *Gray, P. Z. S.* 1859, 357.

Inhab. Northern Pacific Ocean, Kamtschatka. Behring's Straits. Sea of Ochotsk, *Schrenck.*

a. Skin of adult male.

b. Skull: adult male. Behring's Straits.—Described in *Proc. Zool. Soc.* 1859, 103. t. 68.

Skins collected to sell to the Chinese.—*Pallas.*

Pallas described a small Seal from the Kurile Islands (Zool. Rosso-Asiat. i. 107), which he regards as the same as *la petite Phoque* of Buffon (*P. pusilla*, Gmelin), under the name of *P. nigra*.

Steller figures and describes a large Seal under the name of *Ursus marinus* (Nov. Comm. Petrop. ii. 331. t. 15), which is the authority for the Ursine Seal of Pennant (Quad. ii. 526) and *Phoca ursina* of Schreber, Gmelin, and most succeeding authors.

Forster, in Cook's Second Voyage (ii. 203), appears to speak of the same animal under the name of "Sea Bear."

No specimen of this species existed in any of the Museums which I visited on the Continent or in England, nor could I find a skull of the genus from the Northern Pacific Ocean; yet I felt so assured, from Steller's description and the geographical position, that it must be distinct from the Eared Fur-Seals from the Antarctic Ocean and Australia, with which it has been usually confounded, that in the 'Catalogue of Seals in the Collection of the British Museum' I regarded it as a distinct species under the name of *Arctocephalus ursinus*, giving an abridgment of Steller's description as its specific character.

The name *Arctocephalus ursinus* is usually applied to the various species of Eared Fur-Seals found in the different English and Continental Museums.

The British Museum has just received from Amsterdam, under the name *Otaria leonina*, a specimen of the Sea Bear from Behring's Straits, which was obtained from St. Petersburg. It is evidently not an *Otaria*, but a new genus allied to *Arctocephalus*, and agrees in all its characters with the Sea Bear, *Ursus marinus* of Steller, and not with the Sea Lion or *Leo marinus* of that author, which is called *Otaria Stelleri* in the catalogues, and was confounded with *Otaria leonina* of the Southern Pacific Ocean by Nilsson and most modern authors. The latter animal is still a desideratum in the British Museum and other European Collections.

The skin is 8 feet long, and agrees in all particulars with Steller's description of the adult male of the species, and is most distinct in external character and colour from the Fur-Seal (*Arctocephalus Falklandicus*) of the Falkland Islands and from *A. lobatus* from Australia.

The skull is equally distinct from the various skulls of all the species of the genus *Arctocephalus* (both Fur- and Hair-Seals) which are in the Collection of the British Museum, and is easily known from them by the shortness of the face and the height and convexity of the nose.

The skull of this specimen is quite distinct from the skull of the *Arctocephalus Gilliespii* of California, recently described by Dr. MacBain in the 'Proceedings of the Physical Society of Edinburgh,' under the name of *Otaria Gilliespii*, from a skull in the Edinburgh Natural History Museum, of which we have a cast in the British Museum: but we are not able to ascertain with certainty whether this is a Fur- or Hair-Seal, though, from the length of the palate, compared with the width of the skull at the hinder grinders, I am induced to believe that it may belong to an animal which has a soft



under-fur. This proves that the Seals from the different parts of the west coast of America are distinct from each other, each specimen having a specific geographical range.

### 16. ARCTOCEPHALUS.

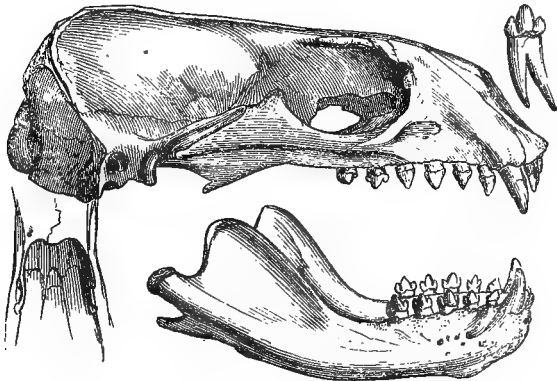
Muzzle rather tapering in front. Cutting-teeth  $\frac{5}{4}$ , upper nearly square. Grinders  $\frac{6.6}{8.6}$ . Palate of the skull rather narrower behind than in front, short, scarcely reaching to the middle of the zygomatic arch. Lower jaw-bone narrow, rounded below, without any angle behind.

The face and skull rather elongate; the forehead flattened, and nearly horizontal from the nasal bone to the vertex; the palate rather concave, contracted behind, short, not reaching beyond the middle of the zygomatic arch; the nose-aperture large, high; the lower jaws moderate, with a crest-like ridge behind, beneath, just in front of the condyle.

The crest-like process on the hinder part of the under edge of the lower jaw differs somewhat in shape and development in the different species; but it nowhere resembles the flat expanded disk found in a similar situation in the lower jaw of the preceding genus.

Nose simple, with a rather large callous muffle above and between the nostrils. Whiskers cylindrical, thick, round, tapering, not waved; hinder ones largest. Ears with a subcylindrical, distinct, external conch.

Fig. 17.



Arctocephalus Hookeri. Skull, palate, and grinder.

The fore feet elongate; the palms bald, longitudinally grooved; claws five, very small, rudimentary, scarcely visible. Hind limbs rather produced; the legs free. The hind feet elongated; the soles bald, longitudinally grooved; the toes subequal, short, webbed, and each furnished with a long membranaceous expansion, the web and the membranaceous expansion bald.

*Arctocephalus*, Gray, P. Z. S. 1859, 358.

*Arctocephalus* (*Arctocephale*), F. Cuvier, *Mém. Mus.* xi. 205. t. 15.

f. 1; *Dict. Sci. Nat.* lix. 463, 1829; Fischer, *Syn.* 230; Gray, *Zool. Erebus & Terror*; Turner, P. Z. S. 1848, 88.

*Otaria*, sp., Péron; Nilsson.

Dr. J. Müller (Wieg. Arch. 1841, p. 333) described two species, *Otaria Chilensis*, and *Arctocephalus Lamairii* from Australia; but *O. Chilensis* is probably *O. leonina*, which is the only Eared Seal I have seen from the west coast of South America, and the latter is *Arctocephalus lobatus*.

In the Leyden Museum (1845) there are four specimens of Fur-Seal, all named *Otaria ursina*; they are of a black or dark grey colour, with white tips to the hair and reddish under-fur; the largest is 4 feet long. One is from the Aleutian Isles, one from New Holland, and two from the Creusette Isles.

The Hair-Seals in the same museum, and the skull from Brookes's museum, which I described as *Arctocephalus lobatus*, are called *O. Stelleri*; some are said to come from Japan and others from New Holland.

In King's Narrat. Austral. ii. 414, 1828, I pointed out the distinction between the Fur-Seal of New South Shetland and the Hair-Seal of Australia.

The skull from the cabinet of M. Faujas, which Cuvier figures (*Oss. Foss.* v. 222. t. 18. f. 4), is much more like the skull of an adult *Arctocephalus* than of *Otaria jubata*; the outer and upper cutting-teeth are scarcely larger than the others.

There are ten skulls of this genus in the Paris Museum:—

1 & 2. Adult and half-grown. From the Cape of Good Hope. The palates become narrower behind. The front outer upper cutting-teeth rather large; grinders large, all except first and hinder upper with two lobes (see Cuv. *Oss. Foss.* v. 221. t. 18. f. 5).

3. Old skull, from M. Parzudaki.

4. From Australia, by MM. Quoy and Gaimard.

5. Adult. From Port Jackson. *Phoca cinerea*. Very little different from the adult from the Cape of Good Hope.

6 & 7. Imperfect. King George's Sound. MM. Quoy and Gaimard (*Cuv. Oss. Foss.* v. 222).

8. Adult. Auckland? The 'Zélée,' 1841.

9 & 10. From America, by M. d'Orbigny. The grinders larger, more acute, and rather further apart.

The Eared Seals (*Arctocephali*) have been divided into Fur- and Hair- (Eared) Seals by the sealers. *A. Hookeri* and *A. lobatus* are called Hair-Seals because they are destitute of any under-fur; but this appears to be the case only with the older specimens; for the young of *A. lobatus* is said to be covered with soft fur, which falls off when the next coat of hair is developed. The under-fur is well developed in the adult specimens of *A. ursinus* and *A. Delalandii* and the half-grown specimen of *A. nigrescens*, and entirely absent in the adult *A. Hookeri* and half-grown *A. lobatus* in the Museum Collection.

In Proc. Zool. Soc. 1859, p. 107, I divided this subgenus into two

sections, separating *A. Hookeri* from the other species; but I had only young or half-grown specimens of the skulls of this species; and since I have obtained the young skull from California, I am induced to believe the slight convexity of the forehead and the slenderness of the lower jaw to be dependent on the age of the specimen, and that most probably the forehead of the adult animal becomes flatter and the lower jaw stronger as the animal increases in age.

The species of this genus are scattered over the world.

*A. Monteriensis*, *A. Californianus*, and *A. Gilliespii* are from California.

*A. Hookeri*, *A. nigrescens*, and *A. Falklandicus* from the Falkland Islands and Cape Horn.

*A. Delalandii* from the Cape of Good Hope.

*A. lobatus*, *A. cinereus*, and *A. australis* from Australia.

a. *Skull short and broad.*

\* *Hinder edge of the palate transversely truncated.*

### 1. *Arctocephalus Monteriensis.*

Skull broad; face short; palate rather concave in front, nearly flat behind, the hinder aperture somewhat contracted, with a nearly straight transverse hinder edge. Teeth large; the lower jaw elongate.

*Arctocephalus Monteriensis*, *Gray, Proc. Zool. Soc.* 1859, 357. t. 72 (skull), p. 360.

Inhab. California (Monterey). Called *Lobo marino* by the Spaniards.

a. "Skull and tongue bones of the Californian Sea Lion (Spanish *Lobo marino*), taken near Monterey; *A. S. Taylor*, July 1858." Presented by J. H. Gurney, Esq., M.P.

This skull is as large as, and very like in external appearance to, the skull of the adult *Otaria leonina*, or Southern Sea Bear of the southern part of the west coast of America, which we have in the British Museum from the coast of Chili.

The skulls of the *Lobo marino* and *Otaria leonina* are easily distinguished, and, when they are more closely examined, prove to belong to two different genera. The Californian skull has the short flat palate, contracted behind, of the genus *Arctocephalus*, and the other the very long deeply concave palate, nearly as wide behind as in front, of the genus *Otaria*. It also has the high nose, with a nearly horizontal facial line over the nose, of the former genus, instead of the low nose shelving towards the edge of the upper jaw of the *Otaria* or Sea Lion of Chili.

The adult skull is more than double the size of the adult skulls of the other species of *Arctocephali* which we have in the Museum Collection, and shows the existence of a Seal of very large size in these seas—as large as the Sea Lion of Chili.

The skull has been compared with the skulls of *Arctocephalus Delalandii*, from the Cape, figured in *Proc. Zool. Soc.* 1858, t. 69;

*Arctocephalus lobatus*, from Australia ;

*Arctocephalus Gilliespii*, from California, l. c. t. 70 ;

*Callorhinus ursinus*, from Behring's Straits, l. c. t. 68 ;

*Arctocephalus nigrescens*, from the Falkland Islands ?

The only one that nearly approaches it in size is that of the very old *Arctocephalus lobatus* from Australia ; but this skull is at once known from that of the Monterey Sea Lion by having a rather deeply concave palate, much narrowed behind, and with a semicircular edge to the hinder palatine opening ; while in the Monterey Sea Lion the palate is nearly flat, slightly concave in front, and not so contracted behind, and with a transverse hinder margin to the posterior opening.

The Monterey species is very distinct from *A. Gilliespii*, also from California, which, besides being very much smaller (not more than one-third of the size), has a much narrower skull with a longer face, and a very different form to the hinder palatine opening.

The Monterey Seal may be the "Lion marin de la Californie" of Choris, 'Voy. Pittoresque,' t. 11, from which *Phoca Californiana* of Fischer's 'Synopsis Mammalium,' p. 231, and the *Otaria Californiana* of Lesson have been derived ; but the accounts of the species are so very slight, that there is nothing but the habitat and the name to lead one ; and we already have two very distinct species of Sea Lions, *Arctocephalus Monteriensis* and *A. Gilliespii*, from California.

\*\* *Hinder edge of the palate slightly arched, semicircular.*

## 2. *Arctocephalus lobatus.*

Face of skull moderately elongate ; palate deeply concave, narrowed behind, hinder aperture with a semicircular front edge ; lower jaw rather short, strong ; the outer upper cutting-teeth are large and compressed.

Canines very large, strong, rugulose, thick at the base. Grinders large, with a rugose keel round the inner side of the base ; the first and second with one small lobe ; third, fourth, and fifth grinders with a distinct front and hinder lobe. The flaps to the hind toes short, not so long as the toes.

*Otaria cinerea*, Gray, in King, *Narrat. Australia*, ii. 413 ; Griffith's *A. K.* v. 183 (not Péron?), 1827.

*Arctocephalus lobatus*, Gray, *Spic. Zool.* i. t. (skull) ; *Bull. Sci. Nat.* xvi. 113 ; in J. Brookes's *Cat. Mus.* 37, 1828 ; *Cat. Phoc. B. M.* 44 ; *P. Z. S.* 1859, 110, 360.

*Phoca lobata*, Fischer, *Syn.* ii. 574.

*Otaria Lamairii*, J. Müller, *Wiegmann's Arch.* 1841, 334.

*Otaria Stelleri* (*Mus. Leyden*, 1845), *Faun. Japon.* t. 21, 22, 23 (animal), t. 22, f. 3 (skull).

*Otaria jubata* (part.), Gray, *Cat. Osteol. Coll. B. M.* 33.

Young covered with soft fur, which falls off when the next coat of fur is developed.

Inhab. N.W. coast of Australia. Houtman's Abrolhos, Mr. Gilbert. a-c. Skins of half-grown. Port Essington.

- d. Jaws of skull, half-grown. Houtman's Abrolhos, Australia. From Mr. Gould's Collection.
- e. Lower jaw, half-grown. Houtman's Abrolhos, Australia. From Mr. Gould's Collection.
- f. Teeth, very young. Houtman's Abrolhos, Australia. From Mr. Gould's Collection.
- g. Teeth, very young. Houtman's Abrolhos, Australia. From Mr. Gould's Collection.
- h. Stuffed skin of adult. Black; forehead and crown pale yellowish. N.W. Australia. Presented by His Excellency Sir George Grey, K.C.B.
- i. Skull of *h*, adult. Very rugose; very like adult skull of *Otaria leonina*, but the palate is short and much contracted behind, the teeth more lobed, and with a tubercular ridge below, like the younger skulls. N.W. Australia. Presented by His Excellency Sir George Grey, K.C.B.

Professor Owen describes a mutilated skull and jaws of a Sea Bear (*Arctocephalus australis*) found eighty miles inland in South Australia, presented to the Museum of the College of Surgeons by Dr. Robson (see Cat. Ost. Coll. Mus. Coll. Surg. p. 647. nos. 3964 & 3965).

\*\*\* *Hinder edge of the palate large, gradually contracting into an angle in front.*

### 3. *Arctocephalus Californianus*.

*Arctocephalus Monteriensis*, junior?, *Gray, P. Z. S.* 1859, 357.

The young animal is blackish, silvered by the short white tips to the short black hairs; those on the nape and sides of the hinder part of the body having longer white tips, making those parts whiter and more silvery. The under-fur is very abundant, reaching nearly to the end of the hair. The end of the nose and sides of the face are whitish. The whiskers are elongate, rigid, smooth, and white. The hind feet are elongate, with rather long flaps to the toes.

Inhab. California.

The skull is very small for the size of the skin, and I should have doubted its belonging to the skin if it were not accompanied by the following label:—

- a. "Skull of the Fur Seal I sent last year. It is very imperfect, from my forgetting where I had put it; but it must do until accident throws another in the way; the other bones were lost.—*A. S. Taylor.*" Presented by J. H. Gurney, Esq., M.P.

This is the skull of quite a young animal, with what I am induced to believe are its milk-teeth, and, like the young skulls of most of the species of this genus, is very unlike the adult form. It also differs from the adult *A. Monteriensis* in the form of the hinder opening of the palate, which is very large and gradually contracted to an angle in front of the mouth. I am not aware that the form of this part is changed by the age of the specimen. It is not so in the only species with which I have the opportunity of comparing it, that is

to say, in a series of skulls of different ages from the young to the adult, of a Seal of the allied genus *Otaria* (*O. leonina*).

The skin is so like that of *Arctocephalus nigrescens*, that we were induced to regard it as a second specimen of that species before we received the skull. But the skull of the original specimen of that Seal shows that the adult animal and skull are not nearly half the size of the animal and skull of the *Lobo marino* of Monterey.

#### 4. *Arctocephalus nigrescens*.

Skull broad; face rather elongate; palate slightly concave, flat behind, hinder aperture narrow, with a nearly straight hinder edge.

*Arctocephalus nigrescens*, Gray, *Zool. Erebus & Terror*, t. . f. , skull (inedit.); *P. Z. S.* 1859, 107 & 360.

Inhab. Falkland Islands?

a. Skull from a half-grown specimen.

This skull is very like that of *A. Delalandii*, but differs considerably in the form of the front edge of the hinder palatine aperture; the outer cutting-teeth and the canines are moderately slender, and similar in form, but the latter are much the larger.

\*\*\* *Hinder edge of the palate contracted, ovate.*

#### 5. *Arctocephalus Delalandii*.

Face of skull rather short; forehead flattened from nasal bone to the vertex; palate concave, hinder aperture narrow, with a rather acute, ovate anterior edge; teeth large; lower jaw rather short, strong. Hair rigid, under-fur small in quantity, reddish brown.

*Arctocephalus Delalandii*, Gray, *P. Z. S.* 1859, 107. t. 69 (skull), p. 369.  
*Otaria Peronii*, *A. Smith*, *S. Afr. Quart. Journ.* ii. 62.

ADULT.

*Otaria Delalandii*, *F. Cuvier*, *Dict. Sci. Nat.* xxxix. 423; *Cuvier*, *Oss. Foss.* v. 220. t. 18. f. 15 (skull).

*Phoca pusilla* (part.), *Fischer*, *Syn. Mamm.* 232.

JUNIOR?

Le petit Phoque, *Buffon*, *Hist. Nat.* xiii. 341. t. 53.

Little Seal, *Penn. Quad.* 243, from *Buffon*.

*Phoca parva*, *Bodd. Elench.* 78, from *Buffon*.

*Phoca pusilla*, *Schreb. Säugeth.* 314. t. 85, from *Buffon*.

*Otaria pusilla*, *Desm. N. Dict.* xxv. 600.

*Otaria Peronii*, *Desm. Mamm.* 250, 382; *Encyc. Méthod.* t. 111. f. 2, from *Buffon*.

Loup marin, *Pagès*, *Voy. aut. du Monde*, ii. 32.

Inhab. Cape of Good Hope.

a. Adult; stuffed. Cape of Good Hope.

b. Skulls; adult. Cape of Good Hope.

c. Skin of young with the under-fur dark brown. Cape of Good Hope?

- d. Skin of young with the under-fur dark brown. Cape of Good Hope.
- e. Skull of a very young specimen. Cape of Good Hope? or Falkland Islands? Presented by Sir John Richardson.

Two skulls of adults from the Cape, and one half-grown, habitat unknown. These skulls agree in the form of the hinder palatine opening, but vary in other respects a little from each other: the two adult ones differ in the aperture of one being wider and shorter than that of the other: in the young skull the front edge of the aperture is more acute in the centre than in either of the others; the outer cutting-teeth of the upper jaw are large, but much smaller than the very large canines.

Cuvier (Oss. Foss. v. 220) observes that Delalandé brought from the Cape a young specimen 3 feet 6 inches long, of a reddish-grey colour, the ends of the hairs annulated with grey and blackish, rather paler beneath; the whiskers strong, simple, and black; the feet black; the under-fur soft, woolly;—and two skeletons of young, and the skull of an adult specimen. This skull is figured (Cuvier, Oss. Foss. v. t. 18. f. 5); but unfortunately the palate, which is the most characteristic part of the skull, is not figured nor described. The palate of the skull of the younger specimen is described thus:—“Le palais est plus étroit, se porte plus en arrière et est échancré par un angle plus aigu.”

Buffon notices a young Seal, which he calls the *petit Phoque* (vol. xiii. t. 53), on which the *Phoca pusilla* of Schreber and succeeding authors has been founded, which is probably the young of this species.

Daubenton states (Hist. Nat. xiii. 413) that the specimen figured by Buffon came from India; but it is probable that it was brought from the Cape of Good Hope in a ship coming from India. No Seal has as yet been described as inhabiting the coast of India.

Fischer confounded with *Phoca pusilla* of Buffon a Seal from Rottenest Island, on the eastern coast of Australia (Syn. Mamm. 232).

Mr. Burchell, in the list of animals he collected in South Africa, mentions “a Seal,  $10\frac{1}{2}$  feet long, killed in Table Bay, 19th May, 1815, and of very rare occurrence on the coast of the colony.”

Dr. Andrew Smith describes a specimen  $8\frac{1}{2}$  feet long, and observes, “the young when between 2 and 3 feet in length are nearly quite black, and are called *Sea Dogs* by the colonists.”—*South African Quart. Journ.* ii. 62.

b. Skull narrow, elongate.

\* Hinder edge of the palate transversely truncated.

### 6. *Arctocephalus Hookeri*.

Skull narrow, elongate; palate deeply concave in front, narrow and rather concave behind, with a deep hinder aperture, which has a transverse truncated front edge with a slight central lobe directed backward; outer upper cutting-teeth very large, conical, acute; orbit moderate; zygoma slender; angle of jaw bent inwards.

Flaps of the hinder toes elongate, unequal, of the outer toes on each side longest. Canines moderate. Pale yellowish.

Canines slender, conical. Grinders small, conical, smooth, without any tubercles at the base; the two front smaller; the third and fourth with a single lobe in front; the fifth with a lobe in front and behind. Whiskers round, very thick, black or whitish, smooth, not waved, hinder largest; fur brown-grey, slightly grizzled, pale, nearly white beneath; hair short, close-pressed, rather slender, flattened, black with whitish tips, the tips becoming larger in the underpart of the sides. Feet reddish or blackish; front claws small, rudimentary; hind claws 5, the second and third largest, the fourth and fifth and then the first smallest; toes moderate; membrane of the toes elongate, longer than the toes, the outer one broadest and largest, the rest nearly equal.

*Arctocephalus Hookeri*, *Gray, Voy. Ereb. & Terror*, t. ; *Cat. Osteol. Spec. B. M.* 33; *Cat. Seals B. M.* 45. fig. 15 (skull); *P. Z. S.* 1859, 107, 360.

Hair Seal, *Weddell*, 141?

Inhab. Falkland Islands and Cape Horn.

- a. Skin, stuffed. Falkland Islands.
- b. Skin, stuffed, with teeth. Falkland Islands.
- c. Skeleton, full-grown. Falkland Islands. Antarctic Expedition. Presented by the Lords of the Admiralty. Skull figured in 'Zool. Voy. Erebus & Terror,' t. .
- d. Skeleton. Antarctic Expedition. Presented by the Lords of the Admiralty.
- e. Skull, imperfect. Antarctic Expedition. Presented by the Lords of the Admiralty.
- f. Skull, imperfect. Antarctic Expedition. Presented by the Lords of the Admiralty.
- g. Skull. South Sea. Mr. Warwick's Collection.

The skulls of four half-grown specimens are all very uniform in their characters.

There is in the Museum a skull of a very young Seal which appears to belong to the same species.

In three of the skulls the outer upper cutting-teeth are very large and acute, more than half the size of the canines, and like them in form. In one skull (perhaps of a female?) the upper outer canines are much smaller and more slender, not half the size of the same teeth in the other skulls of the same size, and the canines themselves are also much more slender; the front of the palate is also more concave.—*Gray, P. Z. S.* 1859, 107.

The skull of *A. Hookeri*, in the concavity and comparative greater width of the palate behind, and in the form of the hinder palatine opening, most resembles that of the genus *Otaria*; but it is very distinct from the skulls of that genus.

The Eared Seal (*Pennant*, Quad. 268; *Phoca flavescens*, *Shaw*, Zool. i. 260. t. 73; *Otaria flavescens*, *Desm. Mamm.* 252; *Gray*, Griffith's A. K. v. 183), 22 inches long, may be a young specimen of



this species, but it is not stated if this Seal has under-fur or not. The young of *Otaria Forsteri* of the size mentioned is blackish.

\*\* *Hinder edge of the palate contracted, ovate.*

### 7. *Arctocephalus Gilliespii.*

Skull elongate, narrow; the face much elongated; palate slightly concave, front edge of the hinder aperture ovate; lower jaw elongate, strong.

*Otaria Gilliespii, Macbain, Rep. Phys. Soc. Edinb. 1858.*

*Arctocephalus Gilliespii, Gray, P. Z. S. 1859, 107. t. 69, & p. 360.*

Inhab. California.

A cast of the original skull described by Dr. Macbain, now in the Museum of the College of Surgeons, Edinburgh, was sent to the British Museum, from which the figure in P. Z. S. 1859, pl. 70, was taken.

The species is at once known by the length of the face: in all the skulls we have of the genus, a line drawn across the palate at the front edge of the zygomatic arch leaves one-third of the palate behind the line, and two-thirds in front of it; while in this species it leaves only one-fourth behind, and very nearly three-fourths in front of the line.

The skull has only four grinders on each side in the upper jaw, but one has evidently fallen out in front of the series and one behind; and the fifth grinder of the complete series, which is usually in a line with the front edge of the zygomatic opening, is in this species rather in front of it.

The following are the measurements of the different skulls in inches and eighths:—

	<i>Callorhinus uristinus</i> , adult.	<i>Arctocephalus Monte-</i> <i>riensis</i> , adult.	<i>Arctocephalus Hookeri</i> , half-grown.	<i>Arctocephalus lobatus</i> , very old.	<i>Arctocephalus nigres-</i> <i>cens</i> .	<i>Arctocephalus Gilliespii</i> .	<i>Arctocephalus Dela-</i> <i>landii</i> .	<i>Arctocephalus</i> , young, from California.	<i>Otaria leonina</i> , aged.	<i>Otaria leonina</i> , half- grown.
Extreme length along base of skull	9 4	14 0	10 0	11 6	8 0	11 0	10 4	7 2	13 2	8 4
Length of palate	4 0	7 6	4 6	6 0	4 0	5 2	5 2	3 1	9 0	4 6
Length of lower jaw	6 2	11 0	6 6	8 6	6 0	8 0	7 4	5 0	10 4	5 4
Breadth of face at ear-bones	5 0	9 0	4 4	6 2	4 6	6 2	7 0	3 4	8 4	4 2
Breadth at zygomatic arch	5 6	9 0	4 4	6 4	5 6	5 4	6 6	4 2	9 0	4 6
Breadth of condyles	5 0	8 2	5 6	6 0	5 2	5 6	6 6	4 2	9 0	4 6

\*\*\* *Skull not known.*

### 8. *Arctocephalus Falklandicus.*

Grey, under-fur red; young blackish. Length 4 feet.

Sea Bear, *Forster, Voy. i. 174, ii. 528.*

Fur Seal, *Clayton, Phil. Trans. lxxvi. 102; Weddell, Voy. 23, 134, 137.*

- Ursine Seal (part.), *Penn. Quad.* ii. 527.  
 Ours marin, *Buffon, H. N. Supp.* vi. 336. t. 47.  
 Otaria Forsteri, *Lesson, Dict. Class. H. N.* xiii. 421.  
 Phoca Forsteri, *Fischer, Syn.* 232.  
 Falkland Isle Seal, *Penn. Quad.* i. 275, ii. 521 (from Roy. Soc.).  
 Phoca Falklandica, *Shaw, Zool.* i. 256; *Gray, in King's Narrat. Australia,* ii. 414; *Griffith's A. K.* v. 183.  
 Otaria Falklandica, *Desm. Mamm.* 252; *Fischer, Syn.* 233.  
 Otaria Shawii, *Lesson, Dict. Class. H. N.* xiii. 424.  
 Seal or Sea Bear of Forster, *Hamilton, Nat. Lib.* 261. t. 22.  
 Otaria Falklandica (Fur Seal of commerce), *Hamilton, Nat. Lib.* t. 25; *Ann. N. H.* 1839, ii. 81. t. 4.  
 Otaria Guerini, *Quoy et Gaim. Voy. Uran.* 71.  
 Platyrrhinus Urania, *Lesson, Man.* 204.

*Young.* Blackish ?

- Otaria Hauvillii, *Lesson, Dict. Class. H. N.* xiii. 425—and  
 Phoca Hauvillii, *Fischer, Syn.* 243, both from *Cuv. Oss. Foss.* v. 220.  
 Sea Bear, in *Brit. Mus.*, *Hamilton, Nat. Lib.* 266. t. 23.  
 Phoca pusilla (adult ?), *Cuvier, Oss. Foss.* v. 220. t. 18. f. 5 (skull).

VAR. ?

- Otaria ursina, var., *Mus. Leyden.*  
 ? Phoca porcina, *Molina, Sagg.* 260; *Shaw, Zool.* i. 260; *Fischer, Syn.* 234.  
 Porcine Seal, *Penn. Syn.* 178.  
 Otaria porcina, *Desm. N. Dict. H. N.* xxiv. 602.  
 Otaria Molinæi, *Lesson, Dict. Class. H. N.* xiii. 425.  
 ? Otaria Chilensis, *J. Müller, Wieg. Arch.* 1841, 333 (skull only).  
 ? Otariæ Ullœ, *Tschudi, Mamm. Consp. Peruana; Fauna Peruana,*  
*Mamm.* t. .  
 ? Long-necked Seal, *Grew, Mus.* 95; *Parsons, Phil. Trans.* xlvii. t. 6;  
*Penn. Quad.* ii. 521.  
 Phoca longicollis, *Shaw, Zool.* i. 256.  
 Phoca Weddellii, var., *Fischer, Syn.* 240.  
 ? Otaria coronata, *Blainv. in Desm. Mamm.* 251; *Gray, Griffith's A. K.*  
 v. 182.

Inhab. Antarctic Ocean. Falkland Islands, *Cook.* New Georgia, *Cook.* South Orkney and South Shetland, *Weddell.* ?Chili, *Molina.*

α. Skin of adult, female, without skull.

β. Skin of young with the under-fur grey. Falkland Islands.  
 ("The adult is 5 feet long, and its skin worth 15 dollars.")  
 Presented by Sir John Richardson, M.D.

### 9. *Arctocephalus cinereus.*

Grey; hair of neck rough, elongate, yellowish; hairs yellowish white and blackish; under-fur red. Length 7 feet.

Otaria cinerea, *Péron, Voy. Terr. Austr.* ii. 54 ? 77; *Desm. Mamm.* 251;  
*Quoy et Gaim. Voy. Astrol. Mamm.* 89. t. 12, 13 & 15.

Phoca cinerea, *Fischer, Syn.* 233 ?

Otarie (Oran du M. Gaimard), *Cuvier, Oss. Foss.* v. 222.

Otaria ursina, var., *Mus. Leyden.*

*Young.* Darker; hair black, silky.—*Quoy, l. c.* t. 13.

Inhab. South coast of Australia. Imperfect skull, *Mus. Paris.*  
 Port Western, *Quoy.* Kangaroo Island, *Péron* ?

Péron indicates a species from Eugene Island, Australia, under the name of *Otaria albicollis*, Péron et Lesueur, Voy. ii. 118; Desm. Mamm. 251; *Phoca albicollis*, Fischer, Syn. 233.

Cuvier observes, "this species has the arms placed far forwards, and not as in other *Otariæ*" (Oss. Foss. v. 223), and "the only *Otaria* brought home by Péron (hence probably his *O. cinerea*) was 2 feet 9 inches long; it is rather whiter than the specimens from the Cape" (Oss. Foss. v. 221). The skull is not mentioned.

Péron, in speaking of the productions of "Isle de Decrees," says they found a new Seal 9 or 10 feet long. "The hair of this animal is very short, very hard, and very thick (*très grossier*); but its skin is thick and strong, and the oil abundant."

### 10. *Arctocephalus australis*.

The flaps to the hind toes moderate; grey, with yellow reflexions; head, cheeks, and side of muzzle whitish, beneath fulvous; neck thick; limbs beneath blackish; whiskers strong, flat, white.

*Otaria australis*, Quoy et Gaim. Voy. Astrol. Mamm. 9. t. 10-14; Nilsson, Vet. Akad. Handl. 1837; Skand. Fauna; Wieg. Arch. vii. 322.

Inhab. South coast of Australia, "King George's Sound," Quoy. Most probably the same as *A. Hookeri*.

What is the Black Seal of the coast of New Holland? There is a male, presented by J. B. Boisley, in the Australian Museum, Sydney (*Otaria*, sp., no. 36. Cat. p. 7).

It is very doubtful if either of these species differs from *A. lobatus*.

### 17. OTARIA.

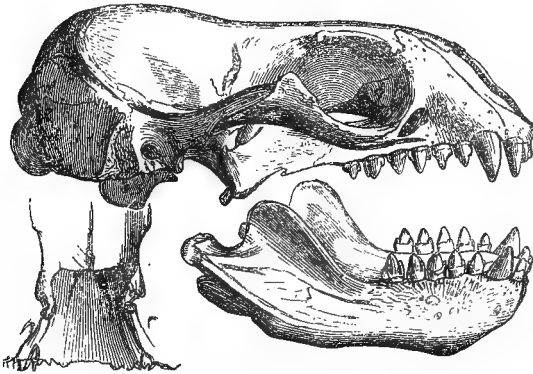
Face short, shelving; the nose-aperture large, oblong; the forehead flat, shelving from the edge of the nose-bone to the middle of the vertex; the palate very concave, decurved deeper with age, scarcely contracted behind; ear elongated, extending nearly to the articulation of the lower jaw; the lower jaw with a crest-like ridge on the inner side of the hinder part, just in front of the condyle.

Muzzle broad, high in front; forehead rather convex; occiput high; cutting-teeth  $\frac{3}{4}$ , the upper outer ones very large, like canines; grinders (of the adults) with very large roots and small, compressed, lobed crowns; palate-bone rather wider behind than in front, long, extending nearly to the articulation of the lower jaw behind; lower jaw broad, dilated below in front and behind at the angles; the upper jaw elongate, and dilate with age.

Head short, broad; chin large; muzzle truncated; muffle bald, forming a distinct disk between and above the nostril; ears small, short, conical. Fore feet rather large; claws indistinct; tail very short, conical. Hind feet large, with the three middle claws long, subcylindrical, the fifth or inner one rudimentary; toe-flaps very long, the outer one broad, second, third, and fourth rather longest and narrow, the fifth shortest, all much longer than the very short

toes. Fur rather rough, of the head, neck, and chin longer; hair cylindrical; under-fur none.

Fig. 18.



Otaria leonina. Skull.

The skulls of the adult *Arctocephali* have been mistaken for the skulls of this genus, but the form of the hinder part of the palate, which is little altered by the age of the specimens, at once separates the two genera. I was formerly inclined to believe that the form of the hinder part of the palate altered; but the examination of the skin, with its skull attached, of an adult *Arctocephalus lobatus* has proved that it does not alter.

*Otaria*, sp., Péron & Lesueur, *Voy. Terr. Austr.*; *Desm. Mamm.*; Nilsson, *Vet. Akad. Handl.* 1837; *Skand. Fauna*, t. ; *Wiegmann Arch.* vii.

*Platyrrhynchus* (*Platyrrhinque*), F. Cuvier, *Mém. Mus.* ix. 209. t. 15. f. 2; *Dict. Sci. Nat.* lix. 465; Gray, in *Brookes's Cat. Mamm.* 37, 1828; Fischer, *Syn. Mamm.* 231.

*Otaria*, Gray, *Zool. Erebus & Terror*; *P. Z. S.* 1859, 360; Turner, *P. Z. S.* 1848, 88.

*Platyrrhinus*, Lesson, *Mamm.* 204.

There is doubtless a great difference in the development of the skull in the male and female Seals, but unfortunately the sex of the specimens from which the skulls have been derived is often not marked. In the only species where I have been able to observe this fact, almost the only difference was in the size and in the strength of the markings on the skull, and in the size of the canine teeth. The full number of the teeth of these animals is developed early in life; and the canines of the second set are gradually developed, the roots being far in the socket, and protruded as the jaw enlarges.

The changes in the form of the palate and in the distance between the teeth of the same set in the younger and older skulls of the same species after they have obtained their full set of teeth are very great—quite as much as the difference in the external form of the skull produced by the development of the occipital ridges, &c.—*P. Z. S.* 1859, 360.

1. *Otaria leonina*. *Southern Sea Bear*.

Deep brown.

Sea Lion, *Cook, Voy.* ii. 203; *Forster, Voy. round the World*, ii. 512; *Weddell, Voy.* 198.

Leonine Seal (part.), *Penn. Quad.* ii. 534.

*Phoca jubata*, *Schreb. Säugeth.* 300. t. 83; *Forster, Icon. ined.* G. 4; *Descript. Anim.* 317; *Pander & D'Alton*, t. 3. f. D, t. 2. f. .

*Otaria jubata*, *Desm. Mamm.* 248, 380 (*E. M.* t. 109. f. 3); *Gray, Griffith's A. K.* v. 184.

*Otaria Pernettyi*, *Lesson, Dict. Class. H. N.* xiii. 420.

*Phoca Scout*, *Bodd. Elench.* 172.

Le Lion marin, *Buffon, Hist. Nat. Supp.* vi. 358. t. 48 & 49; *Forster, Cook's Voy.* iv. 54 (from *Forster's MSS.*), copied; *Pernetty, Voy.* ii. 47. t. 10.

Leonine Seal, *Shaw, in Zool.* i. 270. t. 74 (altered).

*Otaria Forsteri*, *Lesson*.

*Phoca Ansonina*, *Blainv. Journ. Phys.* 1820, 299.

Phoque à crinière, *Cuvier, R. A.* i. 167.

*Phoca leonina*, *Blainv. Ostéog. Phoca*, t. 6 (skull) & t. 9 (dentition); *Molina, Sagg.* 282-341.

*Otaria leonina*, *Péron, Voy.* ii. 65.

*Phoca Byronii*, *Blainv. in Desm. Mamm.* 240.

*Otaria Chilensis*, *Müller, Wiegmann Arch.* 1841, 334.

*Mirounga Byronii*, *Gray, Griffith's A. K.* v. 181.

Sea Lion, Island of Tinian, *Byron in Mus. Coll. Surg.*

*Otaria*, sp., *Cuvier, Oss. Foss.* v. 223.

*Platyrrhynchus (leoninus)*, *F. Cuv. Mém. Mus.* xi. 208. t. 15. f. 2 (adult skull); *J. Brookes, Mus. Cat.* 37.

*Otaria platyrrhynchus*, *Müller, Wiegmann Arch.* 1841, vii. 333.

*Otaria molossina*, *Lesson, Voy. Coq.* 109. t. 3 (young), *vide skull Mus. Paris*.

*Phoca molossina*, *Lesson, Bull. Sci. Nat.* viii. 96.

Lesson's Otary, *Hamilton, Nat. Lib.* t. 24, from *Lesson*.

*Platyrrhynchus molossinus*, *Lesson, Man.* 203.

*Platyrrhynchus Urania*, *Lesson, Man.* 204?

*Otaria Guerini*, *Quoy & Gaim. Zool. Uran.* 71?

Sea Lion of Forster, *Hamilton, Nat. Lib.* t. 18.

Sea Lion of Pernetty, *Hamilton, Nat. Lib.* t. 19, from *Edinb. Mus.*

Sea Bear of the British Museum, *Hamilton, Nat. Lib.* t. 23?

Inhab. Southern Pacific Ocean. Patagonia.

- a. Skin of adult, stuffed. West coast of S. America. Vera Cruz. Presented by Captain Fitzroy, R.N.
- b. Front of lower jaw of a. West coast of S. America. Vera Cruz. Presented by Captain Fitzroy, R.N.
- c. Skull of half-grown. West coast of S. America. Chili? From Mr. Bridges' Collection.
- d. Skull, young. W. coast of S. America. Presented by Sir John Richardson, M.D.

The skull of the Sea Lion brought from Tinian Island by Commodore Byron in 1769 is now in the Museum of the College of Surgeons.—See *Cat. Ost. Coll. Mus. Coll. Surg.* p. 648. no. 3966, where several skulls of this Seal are described by Professor Owen.

2. *Otaria Stelleri*. Northern Sea Bear.

Reddish; females tawny.

*Leo marinus*, *Steller, Nov. Comm. Petrop.* ii. 360.

*Phoca jubata*, *Gmel. S. N.* i. 63 (part.).

*Otaria jubata*, *Péron et Lesueur, Voy.* ii. 40 (not *Desm.*).

Leonine Seal (part.), *Penn. Quad.* ii. 534.

*Phoca Stelleri*, *Fischer, Syn.* 231.

*Otaria Stelleri*, *Lesson, D. C. H. N.* xiii. 420; *J. Müller, Wieg. Arch.* vii. 330, 333.

*Otaria Californiana*, *Lesson, D. C. H. N.* xiii. 420, from

Lion marin de la Californie, *Chloris, Voy. Pitt.* t. 11.

*Phoca Californiana*, *Fischer, Syn. Mamm.* 231.

*Otaria jubata* (part.), *Nilsson, Vet. Akad. Handl.*; *Skand. Fauna*; *Wieg. Arch.* vii. 381.

Inhab. Northern Pacific Ocean.

I do not believe that there is a specimen of this species in any museum, nor any remains of it. The specimen sent from St. Petersburg under the name of *Otaria leonina* was the *Ursus marinus* of Steller, and is, like the genus which I have called *Callorhinus*, more allied to *Arctocephalus* than to *Otaria*. Yet I have such faith in the accuracy of Steller that I have decided to retain it in the list, and hope some day to receive a specimen with its bones, or at least its skull.

## Order CETACEA.

Teeth all similar, conical; or dissimilar, ridged; sometimes not developed.

Palate often furnished with transverse plates of *baleen* or whalebone.

Body fish-shaped, nearly bald, ending in a horizontal tail.

Front limbs short, fin-shaped.

Mammalia, Cete, *Linn. Syst. Nat.* ed. 12. i. 27; *Link, Beytr.* 1795; *Desm. N. D. H. N.* xxiv. 35, 1804; *Fischer, Syn.* 1828; *Eichwald, Zool. Spec.* iii. 337; *Gray, Ann. Phil.* 1825.

Ceti, *Wagler, Amph.* 1830.

Les Cétacés, *Cuvier, Tab. Elem.* 1798; *R. A.* i. 271, 1817, ed. 2. i. 281; *F. Cuvier*, 1829.

Cetaceæ, *Brisson, R. A.* 217, 1762; *Gray, Med. Rep.* xv. 309, 1821.

M. à nageoires (pars), *Desm. N. D. H. N.* xxiv. 32, 1804.

Natantia, *Illiger, Prodr.* 139, 1811.

M. pinnata et pinnipedia (pars), *Storr, Prodr. Mamm.* 1780.

Bipedes, *Latr. Fam. Nat.* 64, 1825.

Sirenia et Cete, *Selys-Longchamps*, 1842.

Cetacea et Amphibia (pars), *Rafin. Anal. Nat.* 60, 1815.

Cete, *Gray, Cat. Cetac. B. M.* 1850, 1.

Cetacea, *R. Knox, Journ. Proc. Linn. Soc.* 1858, iii. 63; *Gray, P. Z. S.* 1864, 195; *Proc. Zool. Soc.* 1863; *Ann. & Mag. Nat. Hist.* 1864, xiv. 345.

### SYNOPSIS OF THE FAMILIES.

Suborder I. *Skin smooth, bald. Teats 2, inguinal. Limbs clawless; fore limbs fin-shaped; hinder united, forming a forked horizontal tail. Nostrils enlarged into blowers. Carnivorous. CETE.*

Section I. MYSTICETE. *Teeth rudimentary; they never cut the gums. Palate furnished with transverse fringed horny plates of baleen or whalebone. Head large, depressed. Nostrils separate, longitudinal. Gullet very contracted. Tympanic bone single, large, cochleate, attached to an expanded periotic bone which forms part of the skull.*

1. BALÆNIDÆ. Dorsal fin none. Belly smooth. Baleen elongate, slender. Vertebrae of neck ankylosed. Pectoral fin broad, truncated at the end; fingers 5. Tympanic bone rhombic. Maxillary bones narrow.
2. BALÆNOPTERIDÆ. Dorsal fin distinct. Belly longitudinally plaited. Baleen short, broad. Maxillary bones broad. Pectoral fin lanceolate; fingers 4. Vertebrae of neck free. Tympanic bone oblong or ovate.

Section II. DENTICETE. *Teeth well developed in one or both jaws, sometimes deciduous. Palate without baleen. Head large or moderate; tympanic bones 2, subsimilar, united, free in a cavity in the base of the skull.*

- A. *Nostrils longitudinal, parallel or diverging, covered with a valve, one often larger and more developed. Pectoral broad, truncated; fingers 5.*
3. CATODONTIDÆ. Head blunt; back of the skull concave. Teeth only in the lower jaw, fitting into pits in the upper.
  4. PLATANISTIDÆ. Head longly beaked; back of the skull covered with the reflected edge of the maxillaries. Teeth in both jaws compressed.
 

B. *Nostrils united into a single transverse or crescent-shaped blower. Teeth in both jaws, often deciduous. Pectoral fin lanceolate.*
  5. INIIDÆ. Head beaked. Teeth rugulose, crowns with an internal process. Back without any fin, keeled behind.
  6. DELPHINIDÆ. Head beaked. Teeth simple, cylindrical, conical, smooth, in the whole length of both jaws, sometimes deciduous. Back rounded. Dorsal fin falcate, rarely wanting. Pectoral fin moderate, on the upper part of the side of the body; fingers 4- or 5-jointed.
  7. GLOBIOCEPHALIDÆ. Head ventricose. Teeth cylindrical, simple, in the front of both jaws. Dorsal fin falcate. Pectoral fin low down on the sides of the body; fingers elongate, many-jointed.
  8. HYPERODONTIDÆ. Head beaked. Teeth few, cylindrical or compressed in the front or side of the lower jaw only. Dorsal fin falcate. Pectoral fin low down on the sides of the body; fingers 4- or 5-jointed.

Suborder II. *Skin rather hairy; whiskers rigid. Limbs clawed. Teats 2, pectoral. Nostrils 2, apical. Herbivorous. SIRENIA.*

9. MANATIDÆ. Grinders none, or flat-crowned. Front of jaws covered with horn.

### Suborder I. CETE.

Skin smooth, without hair. Limbs clawless; fore limbs fin-like; hinder caudal, horizontal, forked or rounded. Teats 2, inguinal. Nostrils enlarged and close together, called blowers. *Carnivorous.* Teeth conical, all similar, often not developed, and absorbed. Palate often furnished with transverse pendent horny plates of baleen or whalebone; fringed on the edge.

Cete, *Gray, Ann. Phil.* 1825; *Selys-Longchamps*, 1842; *Gray, Cat. Cetac. B. M.* 1850, 5.

Cetacea, *Blumenbach; Duméril, Z. A.* 1806; *Lilljeborg, Ofvers.* 2.

Cetaceæ carnivoræ, *Gray, Med. Rep.* xv. 309, 1821.

(Souffleurs) *Hydraula, Latr. Fam. Nat.* 1825, 65.

Natantia, Cete, *Illiger, Prodr.* 141, 1811.

Cete β, *Fischer, Syn.* 1828.

Mammalia pinnata, *Storr, Prodr. Mamm.* 1780.



Cétacés, *Cuv. Tab. Elem.* 1798; *Duvernoy, Tab. Anim. Vert.*

Spiracules, *J. Brookes, Cat. Mus.* 38, 1828.

Balænidæ, *Rüppell, Verz. Senck. Samml.* 186, 1845.

Cetacea vera seu Carnivora, *Owen, Cat. Mus. Coll. Surg.* ii. 439.

Dr. Peters objects to the tail being considered the representative of the hind feet of the Whale. He observes: "Prof. Reinhardt discovered only a rudiment of a femur in *Balæna Mysticetus*, all other [whales] having the pelvis without the vestiges of limbs. You know very well that the horizontal tail-fin is only an expansion of the soft parts. How did this expression escape you?"—*Letter*, 24th Nov. 1864.

I am still not convinced that the tail does not represent the hind members, at least analogically if not actually.

Belon and Rondelet appear to have known the Dolphin (*Delphinus Delphis*), the 'Ondre' (*D. Tursio*), and the Phocæna (*P. vulgaris*); but their account of the Spermaceti Whale is very indistinct.

Clusius, in 1605, first described and figured the Sperm Whale in a recognizable manner, from two specimens thrown on the coast of Holland in 1598 and 1601; and Johnston (t. 41 & 42) well figures one of these specimens.

In 1671, Martens, in his 'Voyage to Spitzbergen,' gave a description and figure of the Whalebone Whale, the "Fin-fish" (*Balænoptera Physalus*), the Wise Fish (*Beluga Catodon*), and the Butzkopt (*Orca Gladiator*); and his figures of the first and second have been the chief authorities for these animals until this time.

In 1692, Sibbald published a small quarto pamphlet, with three plates, describing the Whales which had come under his observation. He divides them into three groups:—I. The Small Whales with teeth in both jaws, of which he notices three—the Orca (*O. Gladiator*), the Beluga, and one from hearsay, which from its size was probably a Porpoise (*Phocæna vulgaris*). II. The larger Whales with teeth in the lower jaw:—1. the Sperm Whale; and 2. the Black Fish. And III. The Whalebone Whales, of which he describes three specimens. The arrangement he proposed is the one used in this Catalogue; and his work forms the groundwork of all that was known on the larger Cetacea up to the Linnean time: but Artedi and Linnæus committed the mistake of regarding individual peculiarities resulting from accidental circumstances as specific distinctions, so that three of their species have to be reduced to synonyma. [There is a later edition, edited by Pennant, which appeared in Edinburgh in 1773.]

In 1725, Dudley, in the 'Philosophical Transactions' (No. 387), describes all the Whales now recognized by the whalers, except the Black-fish: viz., 1. the Right or Whalebone Whale; 2. the Scrag Whale; 3. the Fin-back Whale; 4. Bunch or Humpback Whale; and 5. the Spermaceti Whale. Cuvier, in his historical account, scarcely sufficiently estimates either Sibbald's or Dudley's contribution.

Bonnaterre, and after him Lacépède, in their Catalogues, collected together with great industry all the materials they could find, in

every work that came in their way ; hence they (the latter especially) formed a number of species on most insufficient authority : for example, they made a genus on the otherwise good figure of the Sperm Whale figured by Anderson, because the artist had placed the spout on the hinder part of the head ; and a division of a genus for the Fin-fish of Martens, because he did not notice in his description or figure the fold on the belly. Yet the characters given by Lacépède, and genera formed by him, have been used in our latest works, some even in Cuvier's last edition of the 'Animal Kingdom' ; and many of these species still encumber our Catalogues.

Cuvier, dissatisfied with this state of things, in his 'Ossemens Fossiles,' examined the various documents and consulted the authorities which had been used by Lacépède ; but he appears to have undertaken the work with a predisposition to reduce to the smallest number the species which his predecessor had described. Thus, he concludes that there are only eleven species of Dolphins, one Narwhal, one Hyperoodon, one Cachalot or Sperm Whale ; and he appears to think there are only two Whalebone Whales—the Right Whale and the Finner. To make this reduction : first, he believes that the Humpbacked Whale of Dudley is only a whale that has lost its fin, not recognizing that the *Cape Rorqual*, which he afterwards described from the fine skeleton now shown in the inner court of the Paris Muséum, is one of this kind ; secondly, that the Black-fish and the Sperm Whale are the same species—an error which must have arisen from his not having observed that Sibbald had figured the former, for he accuses Sibbald of twice describing the Sperm Whale ; and when he comes to Schreber's copy of Sibbald's figure, he thinks the figure represents a Dolphin which had lost its upper teeth, overlooking the peculiar form and posterior position of the dorsal fin, and the shape of the head, which is unlike that of any known Dolphin. This mistake is important, as it vitiates the greater part of Cuvier's criticism on the writings of Sibbald, Artedi and others, on these animals. Unfortunately these views have been very generally adopted without re-examination. But, in making these remarks, it is not with the least desire to underrate the great obligation we owe to Cuvier for the papers above referred to ; for it is to him that we are indebted for having placed the examination of the Whales on its right footing, and for directing our inquiries into the only safe course on these animals, which only fall in our way at distant periods, and generally under very disadvantageous circumstances for accurate examination and study.

In 1828, Mr. F. J. Knox, the Conservator of the Museum of the Old Surgeons' Hall in Edinburgh, published a Catalogue of the Anatomical Preparations of the Whale, in which he gives many interesting details of the anatomy of the *Balæna maxima* and *B. minima*, which had been stranded near Edinburgh, of the foetus of *B. Mysticetus* from Greenland, and of *Delphinus Tursio* (*D. leucopleurus*), *D. Delphis*, *Phocæna communis*, *Soosoo Gangeticus*, and *Halicore Indicus* ; but the paper has been very generally neglected or overlooked. In 1858, Dr. R. Knox published "Contributions to the Anatomy

and Natural History of the Cetacea" in the Journal of the Linnean Society, vol. iii. p. 63.

M. F. Cuvier's 'Cétacés' (Paris, 1836) is little more than an expansion of his brother's essays, with a compiled account of the species; but he has consulted with greater attention the works of Sibbald and Dudley, and has some doubts about the finned *Cachalots* being the same as the *Sperm Whale* (p. 475), but at length gives up the subject. He has found out that the *Humpbacked Whale* is evidently a *Rorqual* (p. 305), but does not record it as a species, nor recognize it as the *Cape Rorqual*, nor as Dr. Johnston's Whale; the latter he incorrectly considers the same as *Balæna Physalus*. He combines together as one species Quoy's short-finned *Rorqual* of the Falkland Islands with Lalande's long-finned *Whale* of the Cape (p. 352). He is in great doubt about the hump of the *Cachalots* (p. 279); his remarks on that subject and on the *Cachalots* of Sibbald show how dangerous it is for a naturalist to speculate beyond the facts before him.

Sir William Jardine's *WHALES*, in the 'Naturalist's Library,' is chiefly an abridgement of M. Lesson's compilation, with some extracts from Knox and other English writers on the subject.

Eschricht, in his 'Nordischen Wallthiere,' p. 7, divides the Cetacea into four groups, according to their food, thus:—

1. *Sarkophagen*: Orca.
2. *Teuthophagen*: *Physeter*, *Rhynchocete* (*Hyperoodontina*, *Gray*), *Monodon*, *Beluga*, *Globiceps*.
3. *Ichthyophagen*: *Phocæna*, *Delphinus*, *Platanista*, and *Ogmobalæna*, *Eschricht*, = *Balænoptera*.
4. *Pteropodophagen*: *Leiobalæna*, *Eschricht*, = *Balæna*.

He further proposes to separate these groups into *Zahnwalle* (or Tooth-whales), which includes all the genera in the first three groups, except *Ogmobalæna*; this genus he places with *Leiobalæna* in the second group, which he calls *Bartenwalle*, which is synonymous with *Balæna* of Linné.

Eschricht, in the 'Danish Transactions,' has published several most interesting papers on the anatomy and development of the Whales of the North Sea, especially of the Fin-whale (*Balænoptera rostrata*), the Naebhval (*Hyperoodon*), and the Nordhval (*Balæna Mysticetus*), and with Professor J. Reinhardt he has published a complete treatise on the osteology of the latter species.

Dr. Ludovicus Reichenbach, in his 'Synopsis Mammalium Iconibus illustrata' (8vo, Leipsic, 1855), divides the Whales into four families and seven genera, thus:—I. *Balænina*. 1. *Balæna*. II. *Narwalina*. 2. *Monodon*. III. *Delphinina*. 3. *Physeter*; 4. *Delphinus*. IV. *Manatina*. 5. *Rytina*; 6. *Halicore*; 7. *Manatus*.

Mr. Edward Wakefield has given a very good chronological history of Whales and Whaling in Simmonds's 'Colonial Magazine' for July 1844, p. 111; he quotes the 'Histoire générale des Pêches anciennes et modernes,' by S. B. Noel (vol. i. 1815), the rest of the work remaining in MS. in the library of the late Baron Cuvier.

The British species are no better known ; for in Fleming's excellent work they are left in nearly the same state as when Linnæus published his twelfth edition of the 'Systema Naturæ'; and Mr. Bell's account and figures are chiefly derived from preceding authors. In the former edition of this Catalogue I was led to take three or four species from the list of British species ; I determined the specific identity of one hitherto neglected, and added two or three species for the first time to our fauna.

In the 'Annals and Magazine of Natural History' for 1846, vol. xvii. p. 82, I gave a list of British Cetacea, raising the number to seventeen, and added *Lagenorhynchus albirostris* and *Grampus Cuvieri* to the previous list.

In the 'Proceedings of the Zoological Society' for 1864, p. 195, I published a paper "On the Cetacea which have been observed in the Seas surrounding the British Islands," in which I describe thirty species belonging to twenty genera. Fleming only indicates as British sixteen species of Cetacea, which Jenyns and Bell had reduced in their works to fourteen species of the Order.

The size of the head, compared with that of the body, varies greatly according to the age of the specimen. In the newly-born whale the head is small ; and it enlarges regularly, but at a more rapid rate than the body, as the whale increases in size. In the Greenland Whale the adult head is two-fifths of the length of the body.

The species of the different families have a very great similarity when examined externally, and, as a whole, the best character for the genera and species is to be obtained from the examination of the skeleton, and especially of the skull, cervical vertebræ, and the bones of the fore limbs. But here, as in other vertebrate animals, it requires great care to observe the external characters of the animal and the peculiarities of its osteology, so that the outer form, colour, &c. may be known, at the same time as the osteological characters, and that the variations of either the skeleton or the outer appearance may be corrected by the double comparison.

We have until lately been chiefly indebted to Sibbald, John Hunter, and Dr. Knox for the anatomy of the larger whales.

More recently Eschricht has given an excellent memoir on the Right Whale, and on the long-armed and smaller Finner Whale, the account of the latter being chiefly derived from dissection of the fetal or newly-born specimen.

No series of animals are more difficult to observe and describe than the large Whales and Dolphins. They are only seen at distant periods, and generally either isolated or each kind and age in the same school or herd. They are only seen alive at a distance from the observer, and generally in rapid motion and under unfavourable circumstances for study. They are unwieldy to collect and compare. It is almost impossible to preserve their skin, it being very thin and apt to crack and curl up ; and when preserved, they are difficult to keep without deterioration, on account of the fat and salt they contain, and the odour they emit, especially in damp weather. For this

reason, in the Paris and some other museums, they have prepared a series of plaster models to illustrate the genera.

When the larger kinds are cast ashore, they are seized by the lord of the manor or some other person and sold for their blubber, and their bones are often sold for manure; or, from some difficulty respecting the ownership, they are left to rot on the beach, as was the case with the skeleton of the Sperm Whale cast ashore at Whitstable, Kent, and prepared by Mr. Gould for the Zoological Society in 1829.

The putrefying of the flesh and the preparing of the oil render a stranded whale by no means a desirable neighbour; so that it is not to be wondered at that they are usually got rid of as soon as possible, and that the naturalist has seldom the opportunity of examining them even in England, where the means of travelling are easy and rapid.

Recently a new difficulty has arisen: agriculturists have found that they are good manure, and as soon as any of them, especially of the smaller kinds, are caught or thrown ashore, they are carried inland and buried, as was the case with a school of *Delphinus Orca* lately taken near Bridgewater.

Yet they are objects of general interest; and when they are cast ashore near populous places they are often shown for a time, and the smaller species are sometimes even carried far inland and exhibited; and the only chance that the zoologist has of examining fresh specimens of these animals is to watch for their occurrence and hasten to see them while they are in a more or less complete state.

I am by no means convinced that all the species in the following Synopsis are distinct. It is rather to be regarded as a collection of the accounts of the Whales of different localities, derived from the specimens and other materials at present at our command; and I have endeavoured to select from these sources what appeared to afford the best characters for defining them, so as to furnish to those naturalists who might enjoy the opportunity of observing the animals, a short abstract of what has been observed with regard to them, and a reference to where they may find a more detailed account of each kind. I have been induced to adopt this course, as whenever I have had the opportunity of examining and comparing the proportions of the allied species from distant seas, and of comparing their bones, they have invariably proved to be distinct, which leads me to believe that many of the other species from different seas, which have been regarded as the same, will be found to be distinct, though representatives of those found in other seas.

## Section I. MYSTICETE.

*Teeth rudimentary; they never cut the jaws, and are absorbed. Palate furnished with transverse fringed horny plates of baleen or whalebone, forming a "screening-apparatus." Head large, depressed. Blowers far back, longitudinal, each covered with a valve. Spout double. Eyes small, near angle of the mouth. Gullet very contracted. Tympanic bones large, conch-like, attached to an expanded periotic bone, which forms part of the skull. Lacrymal and malar bones thin, small. Living on mollusca and fish.*

Balæna, *Cuv. Tab. Elem.* 1798; *Lesson, N. Tab. Règ. Anim.* 201.

Balænadæ, *Gray, Lond. Med. Repos.* xv. 310.

Les Baleines, *F. Cuv.* 1829.

Cete, *Illiger, Prodr.* 141, 1811.

Cetacea edentula, *Brisson, R. A.* 218.

Edentés abnormaux, *Blainv.* 1816.

Cete hydræoglossi, § B, *Wagler, N. S. Amph.* 33, 1830.

Cétacés, *Lesson, N. Tab. Règ. Anim.* 197, 1842.

Cetacea, *Rafin. Anal. Nat.* 60, 1815.

Ruderer Whale, *Oken, Lehrb. Nat.* 661, 1815.

Balenidia, *Rafin. Anal. Nat.* 61, 1815.

Balænidæ, *Gray, Ann. Phil.* 1828; *Zool. Erebus & Terror*, 15; *Cat.*

*Mamm. B. M.*; *Cat. Cetac. B. M.* 5, 1850; *Selys-Longchamps*, 1842.

Vermivora, *Lesson, N. Tab. Règ. Anim.* 201.

Bale, *Oken, Lehrb. Naturg.* 663, 1815.

Les Baleines (Baléniens), *Geoff. Leçons, Mamm.* 67, 1835; *Duvernoy, Ann. Sci. Nat.* 22, 1851.

Bartenwalle, *Eschricht, Nord. Wallthiere*, 7, 1849.

(Baleen Whale) Balænidæ, *Owen, Cat. Osteol. Mus. Coll. Surg.* ii. 439.

Balænidæ, "*J. Gray*," *Bardhwalur, Lilljeborg, Ofversigt*, 39, 1862.

Balænoidea seu Mysticete, *Flower, Proc. Zool. Soc.* 1864, 388.

"Teeth never functionally developed, but always disappearing before the close of the intra-uterine life. Upper jaw provided with plates of baleen. Sternum composed of a single piece, generally broader than long, and connected only with the first rib. No costal sternal bones; all the ribs at their upper extremity articulating only with the transverse processes of the vertebræ; their capitular processes when developed rudimentary, and not forming true articulations with the bodies of the vertebræ. Rami of the mandibles curved, their anterior ends meeting at an angle and connected by fibrous tissue, without any true symphysis. Skull symmetrical. Maxilla produced in front of, but not over, the orbital process of the frontal. Nasal bones well developed, symmetrical. Lacrymal bones distinct from the jugal."—*Flower, P. Z. S.* 1864, 388.

M. Geoffroy observed rudimentary teeth in the lower jaw of a foetal whale.—*Ann. du Mus.* x. 365. Eschricht figures them in the foetal jaw of a *Megaptera*.—*Danish Transactions*, 1843, xi. t. 3.

The substance called Whalebone is of the same nature as horn; it is wholly composed of animal substance, and extremely elastic.—*Hunter, Phil. Trans.* 1787. It is called *fanon* by the French. The Scotch even at the time of Sibbald called it *baleen*, probably from the French.—*Fleming, Wern. Trans.* 203.

The baleen or whalebone has generally been considered as the

teeth of the Whale; but this must be a mistake, for Mr. F. J. Knox observes—"In the foetal *B. Mysticetus* sixty to seventy dental pulps were found on each side of each jaw, making the whole number amount to from 260 to 300. The preparation (n. 56) exhibits a portion of this gum with twelve pulps: had these pulps been confined to the upper jaw and corresponded to the number of baleen plates, it would have formed a strong analogy between the baleen and teeth; but the number of baleen plates in the Whale greatly exceeds the number of dental pulps, and the lower jaw, which contained an equal number of pulps with the upper, has neither teeth nor baleen in the adult whale. Their presence therefore in the foetal *Mysticetus* forms one of the most beautiful illustrations of the unity of organization in the animal economy. The teeth in the *Balæna* never cut the gum, but become gradually reabsorbed into the system; the very cavity in which the germs were lodged disappears; whilst, to suit the purposes of nature, the integumentary system furnishes the baleen, which is evidently a modified form of hair and cuticle."—*Knox, Cat. Prep. Whale*, 22. Professor Eschricht also has shown that the foetus of *Megaptera Boops* (Danish Trans. 1845, xi. t. 4) has numerous teeth on the edge of the jaw, though they are never developed. I am inclined to regard the baleen as a peculiar development of hair in the palates of these animals, and somewhat analogous to the hair found in the palates of the genus *Lepus*. (See also *Rousseau, Rev. Zool.* 1856, 193, 257, 305, 353; *Ravin, Ann. Sci. Nat.* 1836, 266; and *Meyer, Nov. Act. Acad. Leop. N. C.* 1855, xxv. 449.)

From the examination I have been able to make of the baleen of *Balænoptera rostrata*, and of different masses of small blades of *Balæna australis*, it would appear as if there were, at least in these two species, two or more series of baleen on each side of the palate; the external series being formed of large triangular blades placed at a certain distance apart; and the internal, in *Balænoptera rostrata*, composed of smaller, much thinner, triangular pieces, placed much closer together, and forming a very dense screening-apparatus; and in *Balæna australis* the inner series is formed of numerous separate narrow strips of whalebone, each ending in a pencil of hairs, which vary in size from that of small twine to that of tape half an inch wide; these are placed behind the others, and gradually increase in size from the innermost to the broad external series. They are early deciduous, and the groove in which they are placed becomes filled up and solid.

Mr. Knox (*Cat. Prep. Whale*) gives the best account of the development, position, and distinction between the baleen of the Whales of the North Sea which has come under my observation, and it agrees with the observations I had made on the subject before I could procure his pamphlet.

In *Balæna maximus*, Knox (*Physalus antiquorum*), 314 external or labial plates (baleen) were counted on each side; towards each extremity these plates degenerate into bristles, and admit of being counted with difficulty. Towards the mesial line the baleen as a mass diminishes gradually in depth, giving the whole palatine surface

an elegant arched form. The 314 external or labial plates do not extend to the whole extent in a transverse direction, but a system of numerous small and narrow plates succeeds the external ones. For each external plate, twelve (internal) smaller ones could be easily counted; so that the number of plates which could be counted, and not including the bristly terminations towards the snout, pharynx, and mesial line, stand thus: external or labial plates, 314; internal small plates, corresponding to each external one, 12: total number of baleen plates, 3768. The longest plate of baleen is placed about the centre of each of the sides, and measured 26 inches in length and 15 in breadth. The substance when recent is highly elastic and very heavy; the whole weighed nearly two tons.

In *Balæna minimus*, Knox (*Balænoptera rostrata*), 307 external or labial plates (baleen) can be counted on each side; towards each extremity these plates degenerate into fine bristles, which were not counted. The plates hang perfectly parallel with each other, and from their closeness and fringed lingual aspect, must act as a very perfect filter in collecting the minute molluscous animals, and at the same time enable the whale to eject the water.

The baleen or whalebone affords good characters for the separation of this family into sections. It is short or long according to the species of Whale, being modified entirely by the more or less arched form of the upper jaw. Mr. Knox first pointed out this curious and important fact. The usual conclusion come to by all persons was, that the size of the whale corresponded to the length of the bone or baleen. Now this is only good with regard to one species of Whale, and not at all to the whole group of Whalebone Whales.—*Knox, Cat. Prep. Whale*, 8.

The whalebone of the smooth-bodied Whales without any back-fins (*Balæna*) is elongate, much longer than broad at the base, and gradually attenuated, and edged with a fringe of equal, lengthened, fine, soft bristles. The baleen is internally formed of a thin layer of fibres, covered on each side with a thick coat of 'enamel'; when dry and out of the mouth, the blades are flat.

The whalebone of the plaited-bellied Whale with a bunch (*Megaptera*) or a dorsal fin (*Balænoptera*) is short, broad, triangular, not much longer than broad at the base, and rapidly attenuated, and is edged with a series (sometimes rather crowded) of elongate, rigid, unequal bristle-like fibres, which become much thicker and more rigid near and at the tip. The baleen is internally formed of a more or less thick layer of thick fibres, covered on each side with a thin layer of enamel, and when dry and out of the palate they are curled up and somewhat spirally twisted.

The thickness of the plate of baleen depends on the number of bristles. In the baleen of *Balæna maximus* there are 506 bristles in the thickness of the plate, and by a rude enumeration there appeared to be at least 130 bristles in each inch. The whole breadth of the plate being  $5\frac{1}{2}$  inches, gives us 747 bristles entering into its composition. These bristles are matted together to the extent of 11 inches on the external and 5 inches on the internal margins, by a substance



like minute laminæ or scales, and which may be seen by the aid of a microscope to invest the free bristles at the fringed extremity of the plate. We have often observed the facility with which some baleen can be split up, and were struck with the fact that the baleen of *Balæna maximus* would not split. The removal of the external lamina in the plate under description shows the cause of this: about  $6\frac{1}{2}$  inches from the root of the plate, many of the bristles have deviated from their direct parallel inclination, and become intimately twisted and interwoven with each other. It has been attempted to prove the age of the Whale from an examination of the baleen, in the same manner as we judge of the age of cattle by certain annulated markings on the horns. On the plate before us we can distinctly perceive numerous transverse lines crossing the course of the bristles at right angles. If these transverse lines indicate a periodical check to the growth of the baleen, then the age of the *Balæna maximus* would be 800 to 900 years old, that being the number of transverse lines on the longest plate of baleen.—*Knox, Cat. Prep. Whale, 9.*

The baleen of the *Balæna* is alone designated *Whalebone* (or rather *Whale-fin*, as it is usually called) in commerce. The baleen of the other genera of this family is called *Finner-fin* or *Humpback-fin*. The wholesale dealers in baleen, in the 'London Directory,' are called *Whale-fin Merchants*, and whalebone occurs under the name of *Whale-fin* in the 'Price-current.' In the 'London New Price-current' for 1843, the *South Sea Whale-fin* varied during that year from 200*l.* to 305*l.* per ton; and there is no price named for *Greenland Whale-fin*. (See *Maccull. Comm. Dict. i. 1344.*)

The baleen was formerly thought to be the tail of the animal. (See *Blackstone, Comment. i. 233*, quoted by *Macculloch, Comm. Dict. i. 1344.*)

The skulls of the different genera differ considerably in external form, from being nearly as wide as the lower jaw, as in *Sibbaldius*, to being very narrow so as only to form a narrow central arch, as in *Balæna*. The genera may be thus arranged according to the width of the skull:—1. *Sibbaldius*; 2. *Balænoptera*; 3. *Megaptera*; 4. *Physalus*; 5. *Eubalæna*; 6. *Balæna*.

The width chiefly depends on the lateral expansion of the maxilla. In *Balæna* it is band-like; and in *Sibbaldius* very broad, being more than twice as wide as the intermaxillary bones.

The food of the Whale is still a much-disputed point. It is now generally admitted that the *Mysticetus* lives only on small Medusæ, shrimps, &c., but that the other species of *Whalebone Whale* devour inconceivable quantities of fish; for instance, M. Desmoulins states that "600 *great cod* and an immensity (probably as many thousand) of pilchards have been found in the stomach of a single *Rorqual*."

Mr. F. J. Knox, in dissecting the *Balæna maximus*, which is a *Rorqual*, saw no cavity in the course of the viscera which could have contained six cod of ordinary size: that of *B. minimus* was empty, although the Firth of Forth, particularly at and above Queensferry, abounds at all seasons with herrings and other fishes and their fry. The want of teeth by no means renders it impossible that the *Balæna* with

baleen can live on large fishes; but the extreme narrowness of the gullet (that of *B. maximus* barely allowed the passage of the closed human hand, and that of *B. minimus* was certainly narrower than that of an ordinary-sized cow), added to the want of teeth, and the want of proper authenticated information on the subject, are strong arguments in favour of the hypothesis that they do not.—*Knox, Cat. Prep. Whale*, 16.

Professor Eschricht proposes to divide the Whales into groups according to their food, as given at p. 65. I suspect that they vary their food to a considerable extent at different periods of the year and under different circumstances.

Professor Eschricht (in *Fordhandl. Skand. Naturf. Kiöbenh.* 1847, 8vo, 1849, p. 103) has published a paper on the geographical distribution of some of the Northern Whales, with a map, by which it appears that *Balæna Mysticetus* in Baffin's Bay lives in from latitude 65° to 69° in December to June, and in July and August ascends to 77°. The *Finnolic* lives in lat. 76° in the summer, on the coast of North Greenland, and in lat. 69° in South Greenland. The *Keporkale* in lat. 76° in North Greenland, and in lat. 62° in South Greenland.

The rarity of their occurrence, the difficulty of naturalists examining them when they do occur, and especially of comparing them with other specimens, explain why the Whalebone Whales have been so imperfectly known; and, when observed, the specimens are so large that it is almost impossible for the eye of the naturalist to take them in as a whole, and to compare the parts in detail.

The allied species are so alike externally, that naturalists and others who have had the opportunity of examining them have been inclined to regard the different specimens observed as only states of growth of the same species; and, for the same reason, the specimens which have been observed in different parts of the world have been regarded as alike; and thus the belief has become general that the species of Whalebone Whales have a very extended geographical distribution.

The examination and comparison of the few skeletons that have been collected have shown that there are many more species than has been generally supposed, and seem to lead to the conclusion that each species of Whalebone Whale has only a comparatively limited geographical range; and the observation of whales seems to make it probable that some of them make periodical migrations within these limits.

The study of the subject, and especially of the bones that have been collected, has led me to the following conclusions:—

1. That, though the adult Whalebone Whales have a large head compared with the size of the body, the head of the foetal specimen is short, and that it increases in size, and especially in length, much more rapidly than the rest of the body. This is very apparent in the Right or Greenland Whale, where the head of the adult is two-fifths, while that of the new-born is only two-sevenths of the entire length of the animal. These differences are shown by Eschricht in his figures. The head of the new-born and of the adult Cape Whale-

bone Whale show the same difference; but the head in both states is smaller, compared with the entire length of the animal, than in the northern or Greenland species.

2. That the bones of the Whalebone Whales in the very young state are the same in number, and nearly the same in form, as in the adult animal, the bones only becoming more or less completely ossified, which they appear to do very slowly, and in some species even more slowly than in others; so that the notion that the number of vertebræ increases with the growth of the animal, which has been entertained by some naturalists, is a mistake.

3. It also appears that certain parts which become ossified in most kinds of Whalebone Whales do not become so in others. Thus, the lateral processes of the cervical vertebræ of *Megaptera*, *Benedenia*, and *Physalus* seem to be nearly of the same form in the young and cartilaginous state; that is to say, they have the usual form of these bones in the *Balænopteridæ*; and though the entire lateral process becomes ossified in *Physalus* and *Sibbaldius*, the end of the process remains cartilaginous at least to a much greater age, if not always, in the genera *Megaptera* and *Benedenia*. Naturalists observing this apparently imperfect development of the bones in the latter genus, have been induced to believe that it arose from the youth of the specimens observed, instead of being a peculiarity of the genera, overlooking the fact that the skeletons of the oldest *Megapteræ* that have been examined show the same apparently imperfect development and truncated form of the bones.

4. The general form of the baleen, the comparative thickness of the enamel, and the fineness or coarseness of the internal fibres which form the marginal fringe, and the internal structure as shown by the microscope, all present good characters for determining the species and for separating the Whalebone Whales into natural groups, as I have shown in the 'Zoology of the Erebus and Terror.'

The qualities of the whalebone or baleen from various localities, and hence from different kinds of Whales, have been observed, and have led to their employment for different purposes by the handicraftsman; according to their goodness and rarity, they fetch very different prices in the market—an instance of the practical working man and the trader being in advance of the scientific zoologist.

5. The difference in form of the tympanic bones is great, and affords good characters, not only to separate the species from one another, but also to group them into families and genera.

6. The fact that some Whalebone Whales have the first rib furnished with a double head, one head attached to the last cervical and the other to the first dorsal vertebra, which had been observed by Rudolphi, Yarrell, Dubar, and Schlegel, though apparently considered as only to be found in the young state of the species by the latter author, disappearing as the animal increases in age, proves, I believe, to be a permanent peculiarity of considerable importance, and justifies Lilljeborg in using it as a character for the discrimination of the species, and even for separating the Whales into groups or genera. That it is not a peculiarity of the young state is proved by its being

seen well developed in the skeleton of the gigantic Ostend Whale, which was formerly exhibited at Charing Cross and in other places. This peculiarity is found both in the Right Whales and in the Finners.

Indeed, when the skeletons of the specimens from different localities can be examined, there are no want of characters to separate the Whales into genera and species; as, for example, the breadth of the upper jaw, the size and form of the ramus of the lower jaw, the form of the lateral processes of the cervical vertebræ, the number of the dorsal and caudal vertebræ, the form and size of the articulating surfaces of the vertebræ, the form and number of the ribs, the form of the os hyoides and of the sternum, the shape of the scapula and the development or non-development of the coracoid process, the form and proportions of the bones of the arm, and the number and comparative length of the bones of the paddle. I am convinced that, when more skeletons have been collected, the number of the species of these animals will be greatly increased, especially if the bones of the skeletons are kept separate, and not set up, so that the bones of the different species can be accurately compared. For it is to be observed, probably from the eye not being able to take in the peculiarities of so large a subject, that some of the best comparative anatomists, as Eschricht and Van Beneden, have regarded skeletons from very different localities, as the *Megapteræ* from the Northern Seas and from the Cape, as the same species, from a comparison of set-up skeletons, which were at once declared to be distinct when the separate bones were compared in detail.

Mr. Flower, in his excellent paper "On the Skeletons of Whales in the principal Museums of Holland and Belgium" (Proc. Zool. Soc. 1864, 384), observes that in studying and describing Whales or their skeletons it is most important to ascertain the age of the specimen.

The animals may be divided by their skeletons "into three periods of growth."

1. In the first, all the epiphyses of the vertebral column and of both ends of the humerus, radius, and ulna are still separate, and the processes of the vertebræ are very incomplete. The animal remains in this condition until it has attained to more than half the length of the adult. This stage of growth may be designated as "*young*." Towards its close the majority of the bones lose the spongy character of the "very young" animal, and acquire the form and structure characteristic of succeeding ages.

2. In the next stage, both epiphyses of the humerus, those of the upper end of the radius and ulna, and those of the bodies of the anterior cervical and the anterior caudal vertebræ are united, while those of the greater part of the column are still free. The ossification of the transverse processes of the cervical vertebræ, although often still incomplete at the ends, has gone on so far as to give them in great measure the characteristic form seen in the adult. This is a condition in which skeletons are frequently seen in museums. The animal in this stage, which may be called "*adolescent*," has attained nearly its full size.

3. The last state, or the perfectly "adult," in which all the vertebral epiphyses are ankylosed. Such adult skeletons of Whales are rarely seen, but those of *Hyperodon* and other Delphinidæ are not uncommon in collections.

### Family 1. BALÆNIDÆ.

Dorsal fin none. Belly smooth, without any longitudinal folds. Baleen elongate, slender. Vertebrae of neck ankylosed. Pectoral fin broad, truncated at the end; fingers 5, short; phalanges 3. 4. 4. 4. 1. Tympanic bone rhombic. Rostrum narrow, linear, rounded; the maxilla narrow, linear, rounded. Lower jaw with only a rudimentary coronoid. Scapula high, narrow, nearly as high as wide, with a distinct coracoid process. The second cervical vertebra (or axis) with a small, short, broad lateral process without any basal perforation (except in *Palæocetus*?). The lateral processes of the cervical vertebrae ankylosed; the lower processes of the second and third are well developed, the others are rudimentary and laminar. The baleen or whalebone is narrow, elongate, very gradually tapering, fringed on the inner edge with numerous fine, soft, flexible fibres of a nearly uniform length, consisting internally of a thin layer formed of several series of fibres, covered on each side by a thick coat of enamel.

Balænidæ, *Gray, Proc. Zool. Soc.* 1864.

Balæna, *Gray, Cat. Cetac.* 9; *Rafin. Anal. Nat.* 61, 1815; *Lacépède.*

Wallfische (Balæna), *Schlegel, Abhandl.* 36.

Leibbalæna, *Esch. Walth.* 7, 1849.

Balæna, sp., *Linn.*; *Illiger, Prodr.* 142, 1811.

Balæna, *Lesson, N. Tab. Règ. Anim.* 202.

Balæna, § a, *Fischer, Syn. Mamm.* 521.

"They live in the ocean, but come into the shallow and sheltered bays to bring forth their young.

"They roar like an enraged bull. The females are generally the largest."—*Beale*, 13, 14.

"The bones of the cranium are greatly arched, so as to leave a wide interval between the upper and lower jaw. The rostrum narrow and compressed at the base; the orbital process of the frontal very much prolonged and extremely narrow and rounded on its upper surface."—*Flower, Proc. Zool. Soc.* 1864, 389.

"The length, like the breadth (of the baleen), is a mere consequence of the extreme narrowness of the palate in the *Mysticete* compared to that in the *Balæna (Physalus) maximus*."—*Knox, Cat. Prep. Whale*, 29.

Through the kindness of Messrs. Smith and Simmonds, and Mr. Smith of Messrs. W. Westall & Co., Whale-fin Merchants, I have been enabled to examine numerous specimens of the whalebone or baleen received from different countries, and to compare their peculiarities as exhibited during its preparation.

The fins or whalebones of each series together are called a "side of bone"; the largest are in the middle, whence they gradually

diminish away to nothing at each extremity; the largest fin on the side is called the "sample blade."

Three distinct kinds are known in the trade:—1. The *Greenland*, from Greenland, Davis' Straits, and various parts of the North Sea, which is the best. 2. The *South-Sea*, or *Blackfish whale-fin*, brought by the South-Sea whalers. And, 3. The *North-west Coast*, or *American whale-fin*, which was first imported about five years ago, and at first sold at a high price, but it has now fallen, and is considered as only a large kind of South-Sea. But from the examination I have been able to make, I believe that these three kinds are each produced by very different species of Whales.

The three kinds are very different in shape. The outer edge of the *Greenland* is curved considerably; in that of the *North-west Coast* it is much more straight, and in that of the *South Sea* almost quite straight. Figs. 3, 4, and 5, in plate 1 of the 'Zoology of the *Erebus and Terror*,' represent the three different kinds in the same position, and on the same scale, being one-fourteenth of the natural length and breadth. The fibres on the edge in the *Greenland* and *Margined Whales* are very fine, flexible, and long, forming only a thin series; in the *South Sea* they are rather coarser; but in the *North-west Coast* much thicker and coarser, quite bristly, and much more so towards the apex, and they are more erect and form a thicker series, approaching in that character to the baleen of the *Finners*.

The following are the measurements of the samples of the different kinds of "*whale-fin*" in the British Museum:—

	<i>Greenland.</i>		<i>North-western.</i>		<i>Southern.</i>	
	in.	lin.	in.	lin.	in.	lin.
Length of blade, entire . . . .	144	0	112	0	90	0
Width at base . . . . .	11	0	10	0	9	0
Width at middle . . . . .	6	0	4	0	3	6
Width at $\frac{3}{4}$ length . . . . .	. . . . .		2	4	2	0
Width of hair at end . . . . .	10	0	7	0	7	0
Thickness at base . . . . .	4	4	4	5	0	$3\frac{1}{2}$
Thickness at middle . . . . .	4	4	0	$4\frac{1}{2}$	0	$2\frac{1}{2}$
Thickness at $\frac{3}{4}$ length . . . . .	0	$2\frac{1}{2}$	0	$3\frac{1}{2}$	0	2

The *Greenland* "*fin*" has the hair on its edge generally stripped off, and is clean and bright when it is brought to England; but this may be from the care the North-Sea whalers take in collecting and cleaning it (as described by Scoresby, *Arctic Regions*, i. 418); and the blades are brought home in bundles of about a hundredweight each. On the other hand, the *North-west Coast* "*fin*" and the *South-Sea* "*fin*" have the hair left on the edges; they are brought home in bulk, and are always covered with an ashy-white soft laminar coat, looking like the rotted external layers of the enamel. This coat has to be scraped off with large knives before it is used or prepared, and the surface after the scraping is not so polished and resplendent as that of the *Greenland* "*fins*."

The whalebone is boiled for about twelve hours, to render it soft before it is divided into strips; it then divides very easily. The

smaller pieces, when softened, are split by a small machine into very narrow strips like bristles, and used for bristles to make brooms, &c.

For every economical purpose the Greenland "fins" are preferred, and last much longer, even when divided into the false bristles; and the Greenland fin will alone do for the finer work, such as the strips for plaiting for bonnets, or to make ladies' riding-whips, or the covering of telescopes and other tubes; the white strips for these purposes being taken from pale longitudinal lines on the enamel of the Greenland fins.

The Australian baleen of *Balæna marginata* is nearly equally fine, and if imported might, from its natural white colour, be very useful for many economical purposes, notwithstanding its small size.

There is a dried fœtus of this whale in the Derby Museum at Liverpool; the upper lip is very large and dependent; and a similar dried fœtus in the Museum of the Philosophical Society of Hull. I could not observe any appearance, even a rudiment, of the baleen; but the mouth is closed.

The following paragraph from the 'Daily News' of the 20th of December, 1849, gives some idea of the quantity of whalebone now used:—"The receipts of whalebone in the United States since January have been 2,285,095 lbs., and the exports to date were as follows:—To North Europe, 587,926 lbs.; to France, 515,351 lbs.; to Great Britain, 378,449 lbs.; to other parts, 9296 lbs., making a total export of 1,491,022 lbs. The receipts for the last eight years were 18,912,200 lbs., and the exports 11,299,811 lbs. The quantity taken for consumption during the same period was 7,612,389 lbs. The stock in the United States at that date was estimated at 903,000 lbs.: viz. in New Bedford and Fairhaven, 368,000 lbs.; New York, 275,000 lbs.; in all other places, 260,000 lbs."

These whales yield the *train oil* of commerce; but *train* appears to be applied by the whalers as we use *drain*; they refer to the *train* of the blubber when speaking of the oil of Dolphins, &c., and appear to call all blubber-oil *train*, in contradistinction to head-matter, or spermaceti, which Sibbald says is called "*whale-shot*" by the English; it is still so called by the Dutch whalers.

As the elongated form of the periotic bones and the more or less rhombic form of the tympanic bone are characteristic of the Right Whales or the family *Balænidæ*, so the tympanic portion of each species has a peculiar and specific form, and may be used for the specific character of the species, in the same manner as I have shown, in the 'Zoology of the Erebus and Terror,' that the existence of several species of Right Whales may be proved, and, indeed, the species characterized, by the form and the internal structure of the baleen.

Unfortunately, when species are determined from these characters, the outer form of the animal is unknown; and, unless the ear-bones and baleen are obtained from the same specimen, there is the fear that one may be giving two names—one characterized by the ear-bone, and the other by the baleen of the same animal, and *vice versa*.

Yet I think it is so important that we should avail ourselves of every assistance in determining the species of these animals which are so difficult to observe, that one must run the risk of making such a mistake, as it can easily be corrected when the opportunity occurs to some competent naturalist to examine a specimen containing both the baleen and the ear-bones.

The tympanic bones are often found fossil. Professor Owen, in the 'Hist. Brit. Fossil Mammals,' has named and figured the ear-bones of the genus *Balæna* which have been observed in the Crag; he has named them as if he regarded the following as distinct species:— 1. *Balæna affinis*, fig. 221; 2. *B. definita*, fig. 222; 3. *B. gibbosa*, fig. 223; 4. *B. emarginata*, fig. 224. These bones are all very imperfect, and the figures of the two latter are not sufficient even to decide whether they belong to the genus *Balæna* or to *Physalus*. They differ in the recent genera, thus:—

Tympanic bone rhombic; aperture oblong, only slightly contracted at the upper end, and about two-thirds of the length of the bone. BALÆNA, EUBALÆNA, and HUNTERIUS.

Tympanic bone irregular rhombic; aperture irregular, much contracted at the upper end, and the wide part not half the length of the bone. CAPEREA.

“Dans les galeries d’anatomie comparée du Muséum de Paris parmi les préparations des os d’oreille nous avons trouvé dans un même cadre une caisse tympanique de *Balæna Mysticetus*, une autre de *Balæna australis*, une de *Pterobalæna communis*, et une de *Pterobalæna gigas*.”—*Van Beneden, in Mém. Acad. Roy. de Bruxelles*, 1861, xxxii. 38.

#### SYNOPSIS OF THE GENERA.

- I. *Atlas united with the other cervical vertebræ into one mass; the lateral process of the axis small, broad, solid.*
  - A. *Baleen thin, polished, with a thick enamel coat and a fine fringe.*
    1. BALÆNA. First rib slender near, and undivided at the vertebral end. Tympanic bone square; aperture nearly as long as the bone.
  - B. *Baleen thick, not polished, with a thin enamel coat and a coarse thick fringe.*
    2. EUBALÆNA. First rib broad at the vertebral end. Tympanic bone square; aperture nearly as long as the bone.
    3. HUNTERIUS. First rib broad, with a double head at the vertebral end. Tympanic bone square; aperture nearly as long as the bone.
    4. CAPEREA. First rib — ? Baleen — ? Tympanic bone irregular rhombic; aperture irregular, much contracted at the upper end, and the wide part not half the length of the bone.
- II. *Atlas free from the other cervical vertebræ, which are united into a single mass; the lateral process of the axis rounded.*
  5. MACLEAYIUS. The lateral process of the axis truncated.
  6. ? PALÆOCETUS. The lateral process of the axis produced, rounded, slightly perforated.



In the skeleton of the adult male *Balæna Mysticetus*, which is  $41\frac{1}{2}$  feet long, figured by Eschricht and Reinhardt (t. 2), the head occupies two-fifths of the entire length of the skeleton. In the new-born specimen figured on the first plate of their interesting essay, the body is much longer, and the head only occupies about two-sevenths of the entire length, showing that the head increases in length at a greater rate than the body. This seems general in whales: for the skull of the foetal *Eubalæna australis*, figured by Professor Huxley in his 'Elements of Comparative Anatomy' (fig. 107, on p. 270), is short and broad for the genus; the skull of the foetal and young *Balænoptera rostrata*, figured by Eschricht, is shorter than the adult skull; and that of the foetus is very short indeed.

The frontal bones of the skull of the foetal or new-born specimen are broader and shorter than in the adult, as may be observed in the figures of Cuvier, Eschricht, and Huxley.

I. *Atlas united with the other cervical vertebræ into one mass.*

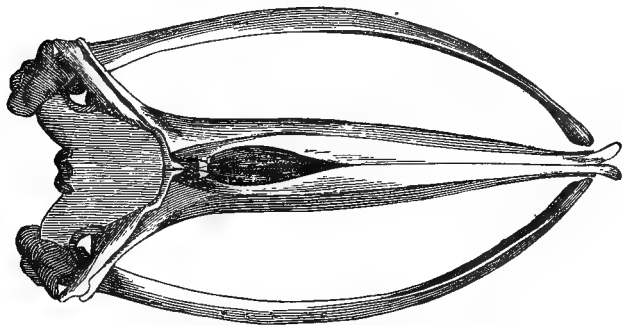
A. *Head very large; of adult, two-fifths the entire length. Baleen elongate, slender, with a single series of very fine elongate central fibres, forming a fine flaccid fringe. Enamel thick, polished.*

### 1. BALÆNA.

The first rib like the others, single-headed. The tympanic bone rhombic; aperture oblong, only slightly contracted at the upper end, and about two-thirds the length of the bone.

Balæna, Gray, *Proc. Zool. Soc.* 1864, 201; *Ann. & Mag. Nat. Hist.* 1864, xiv. 348.

Fig. 1.



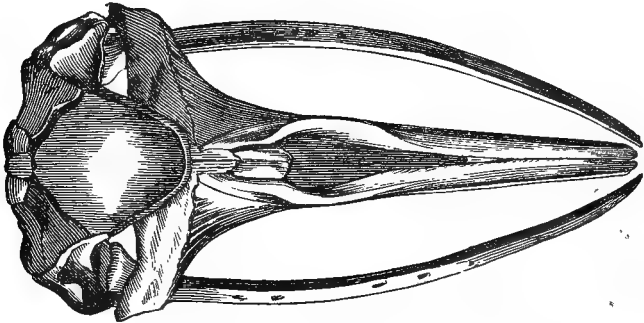
Balæna Mysticetus. *Cuv. Oss. Foss.* v. t. 25. f. 10.

Head about two-thirds of the entire length, rather blunt, swollen, with a slight beard consisting of a few scattered white hairs on the anterior extremity of both jaws (Scoresby, *Arctic Regions*, i. 458).

Skull high and contracted behind; the frontal very narrow, marginal, directed backwards; tympanic bone rhombic, large, aper-

ture oblong, only slightly contracted at the upper end, and about two-thirds the length of the bone; orbits small (see Cuvier, *Oss. Foss.* v. t. 25. f. 9, 10, 11). Baleen narrow, elongate, very gradually tapering, tough, flexible; enamel thick; internal fibres few, in a single series, very slender, forming a beautiful thin flaccid fringe. Cervical and the first dorsal vertebræ united by their bodies (see Cuv. *Oss. Foss.* v. 380. t. 26. f. 18). Blade-bone about as high as broad, with a broad acromion (Cuv. t. 26. f. 8). Pelvis of three bones.

Fig. 2.

Balæna Mysticetus, foetal. *Eschr. Nord. Hvaler*, t. 3. f. 1.

The frontal bone short, broad, and band-like, obliquely truncated over the orbit. The upper maxillary bone and intermaxillaries are very narrow, linear. The nasal rather large. The lower jaw is thick and rounded, with scarcely any ramus near the base (*Eschr. & Reinh. Nord. Hvaler*, t. 5. f. 1). Humerus short; fore-arm bones nearly twice as long as the humerus. The pectoral fin moderate, with five short unequal fingers, and a short spur on the inner side at the base of the first finger; the middle finger longest, then the second, then the first; the outer or little finger very short and rudimentary (see *Eschr. & Reinh. op. cit.* t. 2. f. 1, & fig. p. 578). Phalanges 3. 4. 4. 4. 1.

The cervical vertebræ of the adult are all anchylosed together by the body. The neural arch and the lateral processes, and sometimes the first and even the second dorsal, are anchylosed with them. In the young the first five cervical vertebræ are united into a mass by the bodies; the sixth free, with rudimentary inferior lateral processes; the seventh free, without any inferior process (see *Eschr. & Reinh. op. cit.* t. 2. f. 3, & fig. p. 552).

The blade-bone three-sided, nearly equal-sided, as high as wide at the upper edge, with a small anterior coracoid process (see *Eschr. & Reinh. op. cit.* t. 2. f. 1, & fig. p. 574).

The first rib narrow above, with a single head, and without any internal dilatation, rather broader at the end near the sternum, and rounded at the end. The second rib is simple, rather longer, and

with a broader articulating surface (see Eschr. & Reinh. *op. cit.* t. 2. f. 1-3).

“The number of vertebræ 54. Pairs of ribs 13. Head more than one-third the total length of the body. Nasal bones long and narrow; orbital processes of frontals much elongated, sloping backwards, and very little dilated at their extremity. Cervical vertebræ all anchylosed. Baleen-plates very long, and narrow at the base.”—*Flower, P. Z. S.* 1864, 390.

There seems to be some variety in the union of the cervical vertebræ. According to Eschricht the *B. Mysticetus* has the first five cervical vertebræ united, and the sixth and seventh free. Mr. Flower (*Proc. Zool. Soc.* 1864, 391) describes this as the character of *Eubalæna*, and gives the cervical vertebræ all anchylosed together as the character of *Balæna* (p. 390). The specimen I have examined agrees with Mr. Flower's description.

### 1. *Balæna Mysticetus.* *The Right Whale.*

Head depressed. There are two series of tubercles on each side of the lower lip; and, according to Scoresby's figure, the head is two-sevenths, the fins one-third, the vent two-thirds, and the sexual organs four-sevenths from the nose.

Females larger than the males.

The nose of the skull is regularly and gradually arched above, rather wide behind, near the blowhole; the nose and the intermaxillary bones regularly taper in front. The hinder end of the jaw-bones is obliquely produced behind, and the frontal bones are narrow, nearly linear, and oblique; temporal bone narrow, oblique.

The baleen is very long, varying from 9 to 12 feet, linear, tapering very gradually, of nearly the same moderate thickness from end to end, and covered with a polished grey or greenish-black enamel. The internal fibres occupy a small part of the substance, are parallel, of a fine uniform texture, and black. The enamel, which forms by far the greater part of the substance, is generally blackish; but sometimes, especially on the inner side of the “fin,” it is paler in longitudinal stripes. The fibres on the edge, like the internal fibres of which they are a continuation, are very fine and black. The “fins” or pieces of baleen are flat, or as the merchant calls them “kindly,” so that they produce straight pieces fit for the better kind of parasols and umbrellas, &c., when cut into strips.

*Balæna Mysticetus arctica*, *Schlegel, Abhandl.* 36.

*Balæna Mysticetus*, *Linn. S. N.* i. 105; *Gmelin, S. N.* i. 223; *Müller, Zool. Dan.* 6; *Erxl. Syst.* 601; *O. Fabr. F. G.* 32; *Schreb. Säugeth.* t. 322; *Cuv. Règ. Anim.* i. 285, ed. 2. i. 296; *Oss. Foss.* v. 361. t. 25. f. 9, 11 (adult skull, *B. M.*), t. 26. f. 25; *Lesson, Œuvr. Buffon*, i. 294. t. 11; *Desm. Mamm.* 527, 798; *Dict. Class. H. N.* ii. 160; *Camper, Cétac.* t. 4, 5, 6 (skull of young); *Fischer, Syn.* 521; *Volkmann, Anat. Anim. Tab.* 1831, t. 9. f. 5 (skull, foetus?); *Bell, B. Quad.* 514, fig.; *Nilsson, Skand. Fauna*, 642; *Turton, B. Fauna*, 15; *Fleming, B. A.* 33; *Jenyns, Man.* 46; *Gray, Zool. Erebus & Terror*, 15, 47. t. 1. f. 4 (baleen); *Cat. Mamm. B. M.* 104; *Cat. Cétac. B. M.* 1850, 12; *Proc. Zool. Soc.* 1864, 200; *Lilljeborg, Ofvers.* 107.

- Balcena Mysticetus, *Lesson, N. Règ. Anim.* 202.  
 The Right or Whalebone Whale, *Dudley, Phil. Trans.* xxxiii. 256;  
*Scoresby, Arctic Regions*, i. 448. t. 12. f. 1.  
 Balæna Groenlandica, *Linn. Mus. Ad. Frid.* i. 51.  
 Balæna vulgaris, *Brisson, Règ. Anim.* 347.  
 Balæna vulgi, *Aldrov. Pisc.* 688.  
 Balæna vulgo dicta, *Rondel. Pisc.* 475. fig.  
 Balæna Rondeletii, *Willughb. Pisc.* 35.  
 Balæna Physalus, *Pallas, Zoogr.* i. 289 (not *Syn.*).  
 De Balænis hujusmodi Bipennibus, *Sibbald, Bal.* 27.  
 Balæna Mysticetus borealis, *Knox, Cat. Anat. Prep. Whale*, 21.  
 Nordhval, *Eschricht & Reinhardt, Kong. Dansk. Vidensk.* 1861, 46  
 (anatomy).  
 Var. 1. ? Balæna glacialis occidentalis, *Klein, Misc. Pisc.* n. 12; *Müller,*  
*Zool. Dan. Prod.* 7; *Bechst. Naturg. Deutschl.* 1238; *Virey, in Nouv.*  
*Dict. Sci.* iii. 183; *Desm. Mamm.* 527.  
 Balæna Islandica, *Brisson, Règ. Anim.* 350.  
 Balæna Mysticetus,  $\beta$ . Islandica, *Gmelin, S. N.* i. 223; *Fischer, Syn.*  
*Mamm.* 522.  
 Balæna Nord Caper, *Bonnat. Cét.* 3; *Lacép. Cét.* 103. t. 2, 3; *Gerard,*  
*Dict. Sci. Nat.* iii. 438.  
 Nord Kapper, *Egede, Grœnl.* 55.  
 Nordcaper, *Anders. Isl.* 219; *Crantz, Grœnl.* 145.  
 Var. 2. ? Rock-nosed Whale, *Guérin, in Jameson's New Edinb. Phil.*  
*Journ.* 1845, 267.

Inhab. North Sea.

- a. Skull and lower jaw. North Sea.—The specimen figured in *Cuv.*  
*Oss. v. tab.* 25. fig. 9–11.  
 b, c. Two plates of whalebone. Greenland. Presented by Messrs.  
 Smith and Simmonds.—The specimens figured in the ‘*Voyage of*  
*the Erebus and Terror*,’ p. 47. tab. 1. fig. 11.  
 d. One plate of whalebone. Greenland.

In *Balæna* the atlas is united to the other cervical vertebræ. The atlas has a nearly circular body, with the lateral process on the upper part of the lateral edge; the process has a straight upper edge and a slanting lower one, gradually shelving down towards the lower part of the side of the body of the vertebra, where it is confluent with the upper part of the base of the large, thick, lower lateral process of the second cervical vertebra.

The upper lateral process of the second vertebra is large and well developed, bent forwards at the end, coherent with the outer end of the upper part of the lateral process of the atlas.

The upper lateral processes of the third and succeeding vertebræ are similar, but smaller, and united at the end to the upper process of the preceding cervical vertebra. The lower lateral processes are less developed, and unfortunately they are imperfect in the specimen.

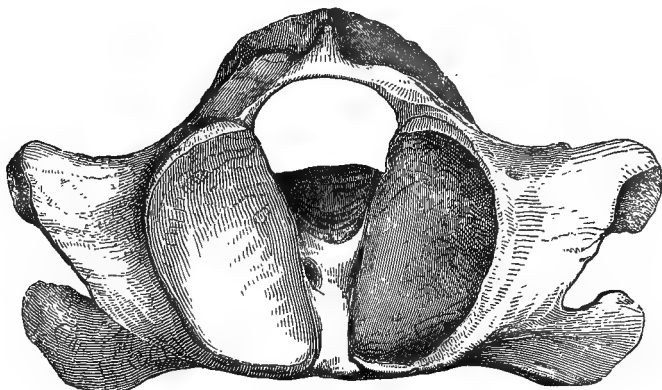
The atlas and other cervical vertebræ of the *Lagocetus latifrons* are all united into a single mass. The body of the vertebræ is nearly circular, with a very large superior conical process formed of the united neural arches; and on the lower part of each side, on a level with the lower edge, are two large, thick, conical processes,

formed of the lateral process of the atlas united to the lower lateral processes of some of the other cervical vertebræ.

The upper lateral processes seem to be scarcely developed, as the mass shelves down above towards the lower edge, and has on its upper part a series of perforations on each side, showing the axes of the nervs and vessels between the united vertebræ.

The cervical vertebræ of a *Balæna* in the British Museum, that was dredged up at Lyme Regis, are united together not only by the body of the vertebræ, but by the neural arches, which form a large vaulted arch, and by the lateral processes.

Fig. 3.

Cervical vertebræ of *Balæna* —. Lyme Regis.

The lateral processes of the atlas are large; they arise from the exterior side of the articular cavity, the edge of the upper side being on a level with the top of the concavity, and the blunt end is rather curved up; the underside gradually shelves from the blunt outer end to the lower margin of the articular cavity.

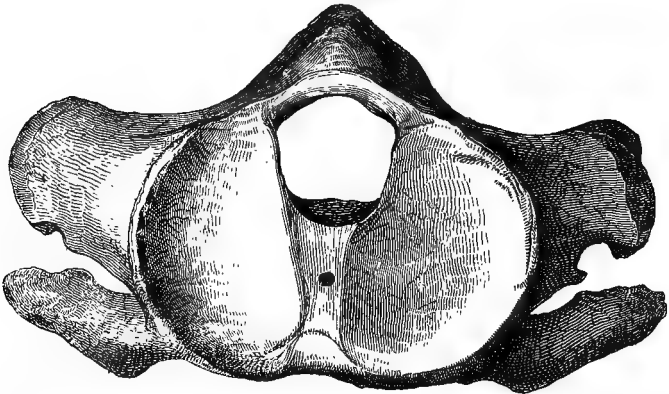
The upper lateral processes of the second, third, fourth, fifth, sixth, and seventh cervicals are all united together at the ends, the process of the second vertebra being the thickest, largest, and bent; it is united to the hinder surface of the end of the lateral process of the atlas by a thick osseous band. The upper lateral processes of the third, fourth, fifth, sixth, and seventh are thinner and smaller, diminishing in size as they proceed backwards; the process of the third is directed backwards to meet the end of the fourth, which, like those of the fifth, sixth, and seventh, is directed rather forwards towards the head.

The lower lateral process of the second vertebra is very large, thick, confluent with the lower part of the lateral process of the first vertebra or atlas, but produced far beyond it, and thickened below and at the end, which is considerably dilated. The lower process of the third vertebra is much smaller, or rather compressed, than that of

the preceding one; and the lower processes of the fourth vertebra are similar, but much smaller still, and also shorter; they are confluent together at their base, and with the base of the process of the second vertebra. The other vertebræ are without any lower lateral processes. The neural canal is very large, nearly circular in front, being almost as high as wide; at the hinder end it is transverse, trigonal, nearly four-fifths as wide as the width of the articulating surface of the first dorsal vertebra, and about two-thirds as high as broad. The outer surfaces of the united arches are very convex and broad, with a broad triangular disk in front marked with a central keel; and the upper surface is keeled, with convex sides behind.

This mass is so unlike the mass of the cervical vertebræ of the Greenland specimen of *Balæna Mysticetus* in the College of Surgeons (which, through the kindness of the Council of that body, I have been enabled to examine and figure), that I am inclined to think it may belong to another species, and is probably the cervical vertebræ of the whale which Eschricht has described under the name of *Balæna Biscayensis*. They differ in the form of the lateral processes of the atlas and other vertebræ, and in the manner in which they are soldered together, and especially in the external form of the neural arch.

Fig. 4.

Cervical vertebræ of *Balæna Mysticetus*. Greenland. Mus. Coll. Surg.

It has been observed at Peterhead, 1682 (*Sibbald*). ? Tynemouth (*Willughby*). Coast of Zetland, occasionally (*Barclay*: see Bell, B. Q. 518).

There are a skull and a complete skeleton, from Greenland, in the Museum of the College of Surgeons; a skeleton at Copenhagen, and another at Brussels; a skull of the adult at Kiel; and the head of a young animal at Leyden.

“The magnificent skeleton of *Balæna Mysticetus* in the Brussels Museum is the only one to be seen at present in any museum in

Europe, except at Copenhagen. The singular effect produced by the enormous size of the head, as compared with the remainder of the skeleton, must be seen to be fully realized.

“The cranium is 18' 9" long in a straight line, the vertebral column 31' 6", making a total of 50' 3". The epiphyses of the arm-bones are united at both ends, as are those of all the caudal vertebræ, but not those of the lumbar and dorsal vertebræ; so that the animal was in a late period of the adolescent stage. The vertebral formula is C. 7, D. 14, L. 10, C. 23=54. The tail is quite complete. This is the normal *total* number, according to Eschricht and Reinhardt; but an individual peculiarity consists in the development of an additional rudimentary rib on the left side, about 18" long, and articulating with the transverse process of the fourteenth vertebra behind the neck. This vertebra is therefore reckoned among the dorsal instead of the lumbar series. The ordinary number of dorsal vertebræ and pairs of ribs is thirteen. The last two lumbar and first three caudal vertebræ are enveloped in an immense mass of exostosed bone. The skeleton appears quite perfect; even the pelvic bones are present, though not yet articulated. There are two bones on each side, differing considerably in the details of their conformation from the same bones in the skeleton which has been lately received, though not yet mounted, at the Museum of the Royal College of Surgeons.”—*Flower, P. Z. S.* 1864, 416.

“There is a skull of a very young individual in the Leyden Museum, in not very perfect condition. It is 5' 2" in length, and 2' 10½" in greatest breadth across the squamosals. The elements of the occipital bones are distinct; but the parietal is already ankylosed with the supraoccipital along the upper margin of the temporal fossa. The basisphenoid is distinct from both the presphenoid and basioccipital, though the union with the latter is the more advanced of the two. At this stage the skull differs much from that of the adult animal. Besides the proportionately greater size of the cranial cavity, the orbital processes of the frontals are shorter, and broader at their extremity, the maxillaries are less arched, and the skull generally much more depressed.”—*Flower, P. Z. S.* 1864, 394.

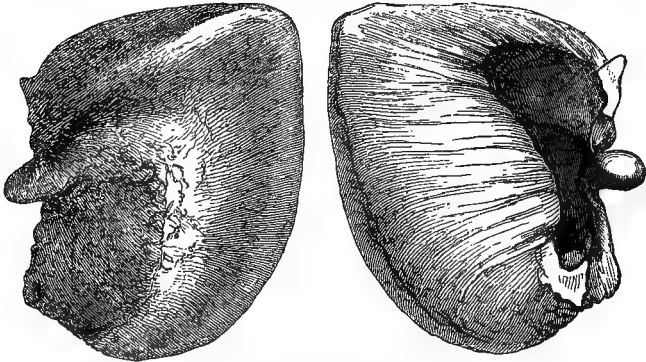
The ear-bones, with the tympanic *in situ*, are represented by Eschricht (Nord. Hvaler, t. 5. f. 4). The tympanic bone is sub-rhombic; the upper surface flat, with a large, subangular, rugose prominence occupying about two-thirds of the upper inner side; the upper margin rounded, the outer edge rather sharp and slightly arched; the lower edge flat, truncated, with a sharp upper and lower edge, which is angulated at the lower outer corner. There is a deep groove between the inner dorsal prominence and the lower edge. The lower surface convex, with a large oblong opening of nearly equal width the whole length.

The specimen of the ear-bones in the British Museum is rather sea-worn and polished; but I have compared it, through the kindness of Mr. W. H. Flower, with the ear-bone of the skeleton which the Royal College of Surgeons has just received from Greenland.

In the British Museum there is a pair of ear-bones, which evi-

dently came from the same animal, very like the former, and must belong to this or a very nearly allied species. They chiefly differ from the ear-bones of *B. Mysticetus*, above described, in the whole surface being smooth, with only a little rugosity on the dorsal prominence on the inner edge, and in the angle of the outer upper and lower hinder edges being sharper and more marked; the outer hinder angle of the dorsal surface is also more concave. I propose to regard it for the present as a variety, *B. M. angulata* (fig. 5). These bones are said to have been found in the Orkneys; but I have not much confidence in the accuracy of this habitat, as they were by some means confounded with the ear-bones of *Physalus Duguidii* which were sent from Orkney by Mr. Heddle.

Fig. 5.

Tympanic bones of *Balæna Mysticetus*, var. *angulata*.

In the British Museum there are two tympanic bones, which differ from all the above in the hinder end being flattened above, bevelled off, narrow, and rounded on the edge; but they are so imperfect that I do not think I am justified in noticing them more particularly, though I believe they indicate another species of *Balæna*. They are both without any locality, and were purchased of dealers, one along with the ear-bone of the Greenland *B. Mysticetus*.

Mr. Scoresby, jun., gives the best description of this whale, in the Mem. Wern. Soc. i. 578. t. 12:—

“The full-grown whale is from 50 to 65 feet in length, and from 30 to 40 feet in circumference just before the fins. It is thickest a little behind the fins, and from thence gradually tapers towards the tail. It is cylindrical from the neck until near about the junction of the tail and body, where it becomes ridged. The head has a triangular shape. The bones of the head are very porous and full of a fine kind of oil. When the oil is drained out, the bone is so light as to swim in water. The jaw-bones are from 20 to 25 feet in length, curved; they give the shape to the under part of the head, which is almost perfectly flat, and is about 20 feet in length by 12 feet in



breadth; the lips are firm and hard. The spout-holes are like two slits, which form an acute angle with each other. The eyes are very small. The throat is so narrow as scarcely to admit a hen's egg. The fins are from 4 to 5 feet broad and 8 or 10 feet long. Tail horizontal, 20 or 30 feet wide.

"The colour is dark grey and white, with a tinge of yellow on the lower part of the head; the back, upper part of the head, most of the belly, the fins, tail, and under part of the jaws are deep black; the fore part, the under-jaw, and a little of the belly are white, and the junction of the tail with the body grey. They are sometimes piebald. Under-sized whales are almost entirely pale bluish, and the suckers are of a pale blackish colour. The blubber is from 10 to 20 inches thick."

"Spiracles two, longitudinal, placed nearly parallel to each other upon the top of the crown bone, about 14 feet from the tip of the lip; they are about 6 inches long. Eyes on the sides, about 5 feet from the crown bone and 16 feet from the tip of the lip, and about 1 foot above and rather behind the angle of the mouth. The under-lip and the throat white; a broad white band extends across the abdomen, between the male organ and the vent, which almost meets on the back; the middle part of the lower surface of the tail white; on the edges of these white patches are many black blotches, giving the animal a piebald appearance. Length 46 feet, of fin 9 feet. Baleen  $9\frac{1}{2}$  feet long."—*Ross, Voy. of H.M.S. Isabella*, ii. 152.

The *Nord Caper*, Anderson, does not appear to differ from this species. It is said to be thinner, and infested with barnacles; this would lead one to think that it was established on a specimen out of health. Lacépède's figures above cited, from a drawing by Backstrom, communicated by Sir Joseph Banks, are the best figures of the Right Whale, after Scoresby's.

A variety, or probably different species, is thus noticed by M. Guérin, the surgeon of a whaler, as the Rock-nosed Whale. It is said "never to leave the coast, and even to make the circuit of the bays. The most important point (of difference) is the comparative size of the head and body. The head is always considerably more than  $\frac{1}{3}$ , while in the true *B. Mysticetus*, as stated by Scoresby, it is less than  $\frac{1}{3}$ , or as 16 to 51. The whalebone is longer in comparison to the length of the animal, but the laminae are thinner for their length; the body is broader and terminates more abruptly; the skin is dark velvet-brown, and has fewer spots and yields less oil. The whalers in general seem to think that it is merely a difference of age that causes this difference in their external characters, but cubs or sucklers are as often found amongst the Rock-noses as amongst the Middle-Ice Whales; the former must have attained the age of maturity."—*Guérin, in Jameson's N. Edin. Phil. Journ.* 1845, 267.

In some individuals the baleen is yellowish white, the fibres and enamel of a pale colour.

There is the stuffed skin of a foetal specimen, 29 inches long, from Mr. F. J. Knox's Collection, in the Anat. Mus. Univ. Edinb.; the lower lips have a broad flap, which is to cover the baleen when developed.

There is also the skeleton of the same fœtus, prepared by Mr. Knox. The bones of the head are ossified, and show the characters of the genus; that is, the upper jaw is high, arched, and its sides are only slightly keeled, not depressed and expanded as in *Balænoptera*, &c. The jaws show the grooves for the teeth. The rest of the skeleton is only cartilaginous. These specimens are described by Mr. Knox, *Cat. Anat. Prep. Whale*, 21.

There is the skeleton of a half-grown specimen, brought home by M. Guérin, in the *Anat. Mus. Univ. Edinb.* (head 6 feet long?).

Mr. Knox gives some observations on the lactiferous glands of a foetal specimen in the account of the dissection of a *Balæna rostrata*. The fœtus is also described by Roussel de Vauzème, *Ann. Sci. Nat. Zool.* 1834, ii. 125; *J'Institut*, 1833, i. 106, and 1834, ii. 289; Wyman, *Proc. Boston Soc. N. H.* 1850, iii. 355 (fœtus).

The embryo of a whale in spirit was presented to the *Nat. Hist. Soc. of Newcastle-upon-Tyne*, in 1836, by J. Stevens, Esq.

A foetal specimen is figured by Camper (*Cétac. t. 1. f. 1, 2*). It is probably from a dried specimen, and the head is very slender. It is to be observed that it is longer in proportion to the length of the body than the very young specimen of *B. australis*, 17 feet long, figured by Delalande, *Dict. Class. H. N. t. 140. f. 3*.

The Icelanders distinguish two kinds of Whale, that of the North (*Nord Hvale*) and that of the South. They say that the skin of the latter has white calcareous crowns (*Coronulæ*) which are not found in the former. (See Van Beneden, *Bull. Sci. Belg.* 1860, xxii. 460.)

Each species of Whale has its own peculiar kind of sessile Cirripede; one has the *Coronula*, another the *Diadema*, and a third the *Tubicinella*. They are all sunk in the surface of the skin, with the aperture for the free valve, or operculum as it is called, alone exposed, and as they grow in size the deeper they sink into the skin. Some genera allied to *Coronulæ* are found on the shells of turtles, and on the outer surface of shells that are partially covered by the mantle of the animal. The Whales have also pedunculated Cirripedes, as *Otions*, on them: these were early observed. "This Whale hath naturally growing upon his backe white things like unto Barnacles" (Purchas, *Pilgrims*, 471). *Coronula Balænaris* is found on the Right Whale of the Arctic Seas (see Pontoppidan, §§ 78, 81).

Some observations on the osteology are given by Professor Owen in *Cat. Osteol. Mus. Coll. Surg.* ii. 439 & 441.

Professors D. F. Eschricht and J. Reinhardt, in "Om Nordhvalen, *Balæna Mysticetus*," published separately in Copenhagen in 1861, and in the fifth volume of the *Transactions of the Danish Royal Academy*, have given a very full account of the osteology of this animal and its allies in the North Sea.

The male and female "*Baleine franche*," figured by Duhamel, *Pêches*, ii. t. 1. f. 1, 2, and which are copied in the 8vo edition of Bloch, *Fische*, t. 1, seem like figures made from description by an artist who had the figure of a Dolphin, or rather Grampus, in his eye. The baleen is drawn as if it was attached to the lower jaw, and projects from the mouth in front. The same figure, with a series

of teeth in the lower jaw in the place of the baleen, and with a small dorsal on its back, again appears in Duhamel (iv. t. 9. f. 2), under the name of "Baleine en Guinée," from the River Gaboon, where, he says, it is called Grampus by the English.

## 2. Balæna Biscayensis.

Baleine de Biscaye, *Van Beneden, Bull. Acad. Roy. Belgique*, 1861, 462.

Balæna Biscayensis, *Gray, P. Z. S.* 1864, 200.

Baleine franche du golfe de Biscaye, *Eschricht, Comptes Rendus*, 1860; *Actes de la Soc. Linn. de Bordeaux*, t. 13. 4<sup>e</sup> livr.

Balæna Eubalæna Biscayensis, *Flower, P. Z. S.* 1864, 391.

Inhab. Bay of Biscay, St. Sebastian. A female and its young, Jan. 1860. Skeleton at the Museum of Pampeluna.

The Right Whale of the Bay of Biscay (*B. Biscayensis*) is regarded as a different species by Eschricht and Van Beneden.—*Gray, P. Z. S.* 1864, 200.

Cuvier observes that the Right Whale was formerly taken in the Gulf of Gascony, but that now it is only found on the shores of Greenland, Iceland, and Spitzbergen. (See Cuv. Oss. Foss. ed. 4. vii. 252; also Eschr. & Reinh. Nord. Hvaler, p. 479, note.)

"MM. Eschricht and Reinhardt (Om Nordhvalen) have conclusively proved that the habitat of *B. Mysticetus* is, and always has been, exclusively confined to the Polar Seas, and therefore that it has no claim to a place in the European fauna. The Right Whale of the North Atlantic, formerly chased by the Basque whalers, belongs to this section (*Eubalæna*) of the family."—*Flower, P. Z. S.* 1864, 391.

M. Eschricht observes, "Le squelette de Pampelune m'occupe tout plein, m'écrit-il à la date du 18 mai dernier. C'est tout ce qu'il y a de plus curieux. Il est presque monté, et l'énorme différence avec le *Mysticetus* dépasse tout ce que j'en avais jugé lors de mon séjour à Pampelune. Figurez-vous, ajoutez-il, qu'il n'est pas plus développé que le squelette d'un *Mysticetus* de peine un an, l'ossification des vertèbres n'est pas encore avancée jusqu'aux apophyses transverses, et les arcs qui ne sont pas même unis des deux côtés sont encore séparés du corps et cependant la colonne vertébrale a la largeur du *Mysticetus* de trois ans et demi." (See also Eschricht "Sur le Développement du questionnaire relative aux Cétacés," *Actes de la Soc. Linn. de Bordeaux*, xxii. livr. 4.)

This theory appears to require further examination. Icebergs are annually carried out from the Arctic Seas to the North Atlantic, and it is probable that Right Whales may sometimes accompany them.

I have not been able to find any details of the skeleton at Pampeluna, so that I have no authority for placing *B. Biscayensis* in a different genus from *B. Mysticetus*.

### 3. *Balæna marginata*. *The Western Australian Whale*.

The baleen very long, slender (nearly eight times as long as wide at the base), pure white, thin, with a rather broad black edge on the outer or straight side.

*Balæna marginata*, Gray, *Zool. E. & T.* 48. t. 1. f. 1 (baleen); *Cat. Cetac. B. M.* 1850, 14; *P. Z. S.* 1864, 200.

Inhab. Western Australia.

*a, b, c.* Three plates of baleen. Length 20 inches; width at the base 2 inches 6 lines. Western Australia. Presented by J. Warwick, Esq.—The specimens figured in the ‘Voyage of the Erebus and Terror,’ tab. 1. fig. 1.

This species is only known from three laminæ of baleen. It is much smaller and broader, compared with its width at the base, than, and is differently coloured from, the baleen of any of the other species.

This is undoubtedly a very distinct species. The baleen is of nearly the same structure as that of the Greenland Whale; but we do not know what may be the form of the first ribs, or of the bones of the other parts of the skeleton.

### 4. ? *Balæna gibbosa*. *The Scrag Whale*.

“A Scrag Whale. Is near akin to the *Fin-back*, but instead of a fin upon its back, the ridge of the after-part of its back is scragged with half-a-dozen knobs or knuckles. He is nearest the Right Whale (*B. Mysticetus*) in figure and quantity of oil. His bone (whalebone) is white, but won’t split.”—Dudley.

“A Scrag Whale,” Dudley, *Phil. Trans.* xxxiii. 259; and *Whalers*. *Balæna gibbosa*, *Erxl. Syst.* 610 (from Dudley); *Gmelin, S. N.* i. 225; *Bonnat. Cét.* 5; *Lacép. Cét.* 113; *Virey, Nouv. Dict. H. N.* iii. 185; *Gerard, Dict. Sci. Nat.* iii. 440; *Desm. Mamm.* 528; *Fischer, Syn.* 523; *Gray, Cat. Cetac. B. M.* 1850, 18.

*Balæna gibbis vel nodis sex*, B. macra, *Klein, MSS. Pisc.* ii. 15.

*Balæna bipennis sex in dorso gibbis*, *Brissot, R. Anim.* 351.

Knotenfish oder Knobbelfish, *Anders. Isl.* 225; *Crantz, Grönland*, 146. Bunched Mysticete, *Shaw, Zool.* ii. 495.

Inhab. Atlantic Ocean.

Dudley’s account is copied by Anderson, Crantz, and all succeeding authors.

Cuvier thought the Scrag Whale (*B. gibbosa*) was only a Rorqual (*Oss. Foss.* v. 267) which had been mutilated; but I suspect, from Dudley’s account of the form, that it must be a *Balæna*, probably well known formerly. Indeed Beale (*Hist. Sperm Whale*) speaks of it as recognized by the whalers now.

“Scrags” is the whalers’ name for young specimens of the Right Whale. (See Dieffenbach, *New Zealand*, i. 45.)

Bonnaterre and all succeeding authors have referred to this genus the *Humpbacked Whale* of Dudley, not understanding his description of the belly being “reeved,” that is, plaited; they call it *Balæna nodosa*.

3. *Head long; of adult, about one-fourth the entire length. Baleen elongate, broad at the base, with several series of rigid central fibres, forming a rigid fringe. Enamel thin.*

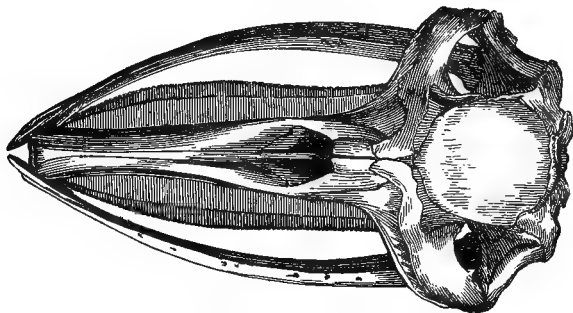
## 2. EUBALÆNA.

Ribs 15.15; first like the others, single-headed. Tympanic bone rhombic, nearly like that of *Balæna*. Head large; of adult, about one-fourth the entire length. Vertebrae 52.

Eubalæna, *Gray, Proc. Zool. Soc.* 1864, 201; *Ann. & Mag. N. H.* 1864, xiv. 348.

Skull broad and depressed behind. The frontal bones broad, band-like, transverse (see Cuvier, *Oss. Foss.* v. p. 375. t. 25. f. 1-4 of young, and f. 5-8 of adult animal). Tympanic bone rhombic, large; aperture oblong, only slightly contracted at the upper end, about two-thirds the length of the bone. Baleen thick, rather brittle; enamel thin; internal fibres numerous, thick, in several layers, rather intertwined, forming a thick rigid fringe. Cervical vertebrae all united by the neural apophyses into a single crest (*Cuv. op. cit.* t. 26. f. 13).

Fig. 6.



*Eubalæna Capensis, jun. Cuv. Oss. Foss. v. t. 25. f. 2.*

Ribs 15.15, all simple-headed, the last four pairs not reaching the vertebrae. Sternum oblong (*Cuv. t. 26. f. 11*). Blade-bone flat, rather broader on the upper edge than high, with a prominent acromion (*Cuv. t. 26. f. 7*). Arm-bones short; forearm-bones very short, scarcely longer than the humerus. Fingers 5, short, the middle longest, the second, first, and fifth successively shorter (*Cuv. t. 26. f. 23*). Os hyoides (see *Cuv. t. 26. f. 14*).

Cuvier observes that the skulls of *B. Mysticetus* and *B. australis* differ more from one another than the skulls of the species of Rorquals (*Oss. Foss. v. 375*).

### 1. *Eubalæna australis. The Cape Whale.*

Uniform black. Skull convex. The nose of the skull high, straight, and rather suddenly bent down in front; the nose and the

intermaxillary bones contract in the middle, and then continue of the same width in front. The hinder part of the jaw-bones is nearly perpendicular, and the temporal bones are broad and erect.—*Cuv. Oss. Foss.* v. t. 25. f. 5-7.

The fœtal skull is shorter, lower, and the hinder part of the jaw-bone is more slanting.—*Cuv. Oss. Foss.* v. t. 25. f. 1-3.

Cervical vertebræ all (1-7) anchylosed by the neural arches into one crest.—*Cuv. Oss. Foss.* v. 378.

The baleen is about 6 feet long, elongate triangular, rather rapidly tapering to a fine point. The internal fibres are rather coarse, but much finer than in *B. Japonica*.

*Balæna australis*, *Desmoulins, Dict. Class. H. N.* ii. 161. t. 140. f. 3 (fœtus); *Gray, Cat. Mamm. B. M.* 104; *Zool. Ereb. & Terror*, 15, 48. t. 1. f. 3 (baleen).

*Eubalæna australis*, *Gray, Proc. Zool. Soc.* 1864, 202.

Baleine du Cap, *Cuv. Oss. Foss.* v. 368. t. 25. f. 1-4 (skull of fœtus), f. 5-8 (skull of adult), t. 26. f. 7, 11, 13, 23, t. 27. f. 10, 15 (ear-bones), 24.

*Balæna antarctica*, *Owen, Brit. Foss. Mamm.* (not *Gray*).

The Cape Whale, or Right Whale of South-Sea Whalers, *Bennett, Narr. Whaling Voyage*, ii. 229.

Southern Whalebone Whale, *Nunn, Narrat. Favourite*, 181. fig. ?

Common Black Whale, *Ross, Antarctic Voy.* i. 169, ii. 327 ?

Inhab. Sea near the Cape of Good Hope, *Delalande*. Skeleton and fœtus, Mus. Paris.

a. Bone of forearm. Cape of Good Hope.

b, c. Two plates of "South-Sea whalebone." Pacific Ocean? Presented by Messrs. Smith and Simmonds.—The specimens figured in the 'Voyage of the Erebus and Terror,' p. 48. tab. 1. fig. 3.

d, e. Two plates of whalebone. Pacific Ocean?

f. Skull (imperfect), with the lower jaw, the vertebræ of the neck, the ribs, and the blade-bone. Cape of Good Hope.

The atlas, axis, and five cervical vertebræ are united into one by their bodies, and all the spinous processes are soldered into one crest.

Ribs 15. 15; the last four and the first two do not attain the body of the vertebræ, and are not attached to the transverse apophyses.

The first pair is flat and very broad, especially at the sternal end. The last three are slender and short. Vertebræ 49, viz. nuchal 7, dorsal 15, lumbar and caudal 27. The chevron bones commence on the eleventh and twelfth, and end at the twenty-sixth. The spinous processes form a nearly uniform series, inclined forwards. The thumb has two, the index four, the middle finger five, the ring finger four, and the little finger three joints, all ending in a cartilaginous dilatation.—*Cuv. Oss. Foss.* v. 379.

The tympanic bone is subcubical and rugose; the back is much swollen; the inner edge is protuberant, and forms an angle with the surface nearer the outer margin; the upper portion is prominent and subangular, and separated from the lower portion by two irregular depressions; the hinder margin is thick, convex, and rounded; the lower surface is rather flattened, with an irregular-

oblong, rather kidney-shaped aperture, which is very strongly plaited on the hinder margin, and nearly as long as the bone. The periotic bones, with the tympanic bones *in situ*, are figured by Prof. Huxley in 'Elem. Comp. Anat.' fig. 109, from a specimen presented to the College of Surgeons by Dr. G. Bennett. There are three specimens similar to this figure in the British Museum:—two, presented by H. H. Russell, Esq., as the ear-bone of the Sperm Whale; and one from South Africa, presented by G. Byham, Esq., to the Palæontological Department.

Var. ? In the British Museum there is a specimen of the periotic bones, with the tympanic bones attached, which was received, without any habitat, from Dr. Mantell. In several particulars it is very like the specimen of *E. australis*; but the hinder edge of the tympanic bones, instead of being very thick and rounded, is much thinner than any other part, and the periotic bones are much broader and more expanded. It may be only a variety of *E. australis*. I think it is right to give a short notice of it, for the sake of drawing the attention of future observers to the peculiarity.

Var. ? In the British Museum there is another imperfect worn tympanic bone, without any habitat, which resembles those of *E. australis* in general appearance; but the hinder margin is shelved off and thin, instead of broad and rounded as in the typical specimens of that species. This may indicate an allied species, or only a variety.

MM. Van Beneden and Adolphe Milne-Edwards inform me that the first rib in both specimens in the Paris Museum, from the Cape, has a single head, very like the second one.

The skull and cervical vertebræ of the fœtus from the South Seas are described by Prof. Owen in Cat. Osteol. Mus. Coll. Surg. ii. 440. The skull of this fœtus and the ear-bones of the adult are figured by Prof. Huxley in Elem. Comp. Anat. f. 107 at p. 270, and f. 109 at p. 273.

Mr. Warwick has kindly sent me some notes and the following measurements of a female whale of this species taken at False Bay Fishery, said to be full-grown, and considered by the whalers as of large size:—

	ft.	in.
“ Total length . . . . .	68	0
Height of the body . . . . .	14	0
Length of the head . . . . .	16	0
Width of tail . . . . .	15	6
Length of ribs . . . . .	10	6
Diameter of gullet . . . . .	0	2

“ I could not pass my hand through the gullet. Number of vertebræ 52. From all the conversations I have had with the whalers, I do not think the Cape Whale ever attains the size of the Greenland species. These whales of the Cape I constantly found covered with *Tubicinella Balænarum* and *Coronula Balænaris*; but the Spermaceti Whale was seldom or never so covered: they occur principally on the head, where they are crowded, and but rarely on the body, and then only single scattered ones.”

In False Bay they carry on the fishery from the shore, and during the time Mr. Warwick was there, only one bull out of sixty specimens was killed, the females coming into the bay to bring forth their young. He skinned one which was supposed to be not more than eight or ten days old; it was 20 feet long.

The females with their calves approach the shores of the Cape about the month of June. The female whales, at the end of the period of gestation, seem to visit the bights and inlets of the country which are next to their feeding-grounds. The same is the case round Van Diemen's Land and New Zealand.

"If 13 feet be the size of the calf in the Northern seas at the period of birth, as stated by Mr. Scoresby, it will be found to be much inferior to what is observed in the South Sea, for I have myself seen more than one extracted from the *uterus* which had attained the length of 19 feet."—*A. Smith, South Afr. Quart. Journ.* p. 130.

The baleen of this animal is sometimes called the Whale-fin of the "Blackfish," the name that has been applied to the *Physeter Microps* and to an *Orca*.

There are sometimes imported with the baleen a few yellowish-white "fins," which seldom exceed 2 feet in length; in these, the fibres as well as the enamel are white; they are not so transparent as the pale variety of the Greenland fins before referred to; they have the same coarse texture, and are brittle like the black southern specimens; and as they do not take so good a polish, they cannot be used for making shavings for plaiting, &c.

There has lately been brought by the South-Sea ships several hundredweights of a very small kind of whalebone, which is implanted in the remains of the palate, in three or four series, gradually diminishing in size towards the innermost series; each piece is linear, compressed, from  $\frac{1}{4}$  to  $\frac{1}{3}$  of an inch wide, rounded on the edge, varying from 5 to 8 inches in length, and ending in a tuft of black hair-like fibres. In texture, colour, and external appearance it exactly agrees with the baleen of the Southern Whales, and I suspect it must form the inner part of the "screening-apparatus" of that animal; and if that be the case, the existence of these separate pieces near the middle of the roof of the mouth will form a very peculiar character in this kind of whale. I am further strengthened in this belief by perceiving amongst some short pieces of "Southern Whale-fin," probably forming the end part of a "side," at the inner, or shorter, or palatine edge of each blade, two or three small, separate linear processes of whalebone ending in a parcel of hairs, similar to the pieces above described, but of a smaller size and rather more wavy. Scoresby, who gives a very detailed account of the position of the baleen in Greenland Whales (*Arct. Reg.* i. 457 and ii. 415), does not mention anything of the kind in that animal; but it is described as occurring in the Fin-back by Mr. F. J. Knox (see *Cat. Anat. Prep. Whale*, 7. n. 5).

The Black Whale or Right Whale is the one chased on the coast of New Holland. During the winter season many boats are sent out from the coast.



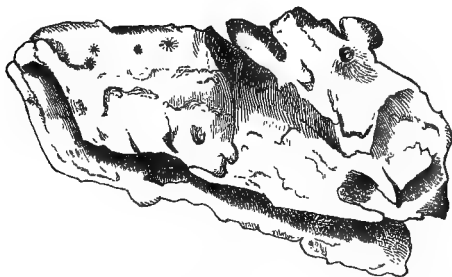
"The whale feeling herself covered and uncomfortable from barnacles on her skin, strikes in from the mouth of the river (Murray), and there plays and gambols for hours just outside or among the breakers. Having rolled the barnacles off in the fresh water, she takes to sea. It is the knowledge that the fresh water kills the barnacles that brings her in. Whenever it was practicable, my whalers, as well as those of the opposition fishery, were glad to take advantage of this peculiarity of the fish."—*Cadell, Journ. Roy. Geogr. Soc.* 1855, 179.

This is most probably distinct from *Eubalæna australis* (*Balæna australis*, Voy. Pole Sud).

Captain Sganzin (*Mém. de la Soc. du Mus. H. N. de Strasbourg*, iii. 2) states, that *Tubicinella Balænarum* is found on the large whales which are taken accidentally on the coast of Madagascar, but never on the young whales which are caught in the Canal of St. Maria. The latter have rarely some specimens of the *Coronula Diadema* attached to them. The old whales which are stranded on the shores of St. Maria, on the contrary, are often covered with large numbers of the *Coronula Balænaris*.

Mr. Holdsworth has presented to the British Museum a specimen which had been received from an American whaler, as "the Bonnet of *Balæna Mysticetus*, obtained at the Sandwich Islands."

Fig. 7.



The specimen is oblong, 11 inches long, and 8 inches wide, very irregular in outline, with a very rough pitted surface, four of the pits being much larger than the rest, and dividing the surface into six prominences. The whole substance seems to be formed of irregular horny layers placed one under the other, the lowest layer being the one last formed; and each of these layers is more or less crumpled and plicated on the surface; giving the irregular appearance to the mass.

The lower layer is attached to the skin of the whale, a part of the skin being attached to the inner surface of the mass or "bonnet," as it is called.

On showing the specimen to a foreign zoologist, he stated that it was an excrescence on the skin of a whale, formed by the adhesion

of the barnacles called *Coronula*, and that the irregularities on the surface of the bonnet were caused by the attachment and wearing action of these animals.

This is quite a mistake: the *Coronulæ* sink themselves into the epidermis of the whale, as is also the case with the genus *Tubicinella*. I have seen numerous specimens of both these animals *in situ*, and the skin round the cirripedes is scarcely altered in structure, and offers no resemblance to the horny excrescence called the bonnet. Any one who examines the bonnet will find that the plate of horn of which it is formed is plicated and folded when deposited; and this explains the irregularity of the general form of the body.

The zoologist referred to has since said that he believes it is caused by the irritation of the whale-louse, and that the irregularities on the surface are caused by them. This may perhaps have arisen from the surface of the specimen being covered with whale-lice when it was first procured from the whaler; but this may be only because the hollow on the surface forms a good hiding for them; and I think the supposition that they are the origin of the wart or horn requires further observation.

Mr. Holdsworth has since sent to the Museum a much smaller specimen, also obtained at the Sandwich Islands, which is oblong, elongate, and more symmetrical; but the upper surface is not so evenly channelled. It is 6 inches long and  $2\frac{1}{2}$  wide. It is spoken of by the whalers as a wart on the tip of the nose, and is commonly called the "Whale's bonnet."

I do not recollect observing any account of this "bonnet," or giant corn, or rudimentary frontal horn, as it may be regarded, in any account of the Right Whale, nor in that of the Spermaceti Whale. I have specially searched for it again in works by persons who have seen these whales alive, but without success.

It has been suggested by Mr. Holdsworth that the bonnet may be a natural development, and possibly characteristic of the species; he thinks that the "pale prominence" on the nose of *Balæna antarctica*, as figured in 'Fauna Japonica,' pls. 28 & 29, may be intended to represent it. In the description this part is only described as "une forte proéminence teinte de blanc."

In the excellent drawing of the male whale from the coast of New Zealand, which I figured under the name of *Balæna antipodarum*, in Dieffenbach's 'New Zealand,' vol. ii. t. 1, there is a rough roundish prominence on the front of the lower jaw, as well as on the front of the upper one.

I believe that a prominence of the kind is to be observed in all the species of the genus *Balæna*, although I have never seen them described as hard and horny; but that is no reason why this may not be the case.—*Gray, Proc. Zool. Soc. 1864.*

## 2. *Eubalæna Sieboldii*. *The Japan Whale.*

Black; the middle of the belly to the vent, and a spot on the chin and over the eye, white; the nose with a rounded prominence in

front. The head is two-fifths of the entire length; the pectoral fin large, pointed.—*Temm.*

*Balæna Sieboldii*, *Gray, Ann. & Mag. N. H.* 1864, xiv. 349.

*Balæna australis*, *Temm. Fauna Japon.* t. 28 & 29.

*Balæna Japonica*, *Gray, Zool. E. & T.* 15, 47. t. 1. f. 2 (baleen); *Cat. Cetac. B. M.* 1850, 17.

? *Balæna Japonica*, *Lacép. Mém. Mus.* iv. 473; *Desm. Mamm.* 528, 802; *Fischer, Syn.* 522.

? *Balæna lunulata*, *Lacép. Mém. Mus.* iv. 475; *Desm. Mamm.* 528, 803; *Fischer, Syn.* 522.

Inhab. Japan, visiting the coast periodically. The head is often covered with barnacles (cirripedes).

This species is only described and figured from a model, made in porcelain-clay by a Japanese, under the inspection of a Japanese whaler and M. Siebold; but no remains of the animal were brought to Europe; so that we do not know whether it is a *Eubalæna* or a *Hunterius*, or if it may not be an entirely new form.

*B. Japonica* and *B. lunulata*, *Lacép.*, are from Chinese drawings. They differ in colour from *Temminck's* figure.

Var. ? 1. North-west Whale, *Balæna Japonica*?, *Gray, Zool. Erebus & Terror*, 15. t. 1\*. f. 2 (baleen). Var. 1. *Gray, Cat. Cetac. B. M.* 1850, 17.

*a, b.* Two plates of "North-west Coast Whalebone." North-west coast of America. Presented by Messrs. Smith and Simmonds.—The specimens figured in the 'Voyage of the Erebus and Terror,' p. 47. tab. 1. fig. 2.

*c, d.* Two plates of "North-west Coast Whalebone." North-west coast of North America.

The baleen is nearly as long as the Greenland, varying from 7 to 12 feet long, and slender; but for the same length it is nearly twice as thick in substance, and it gradually diminishes in thickness towards the ends. The enamel, when the outer coat is removed, is not so polished as that of the Greenland, and when cut through, the central fibres are thicker, tubular, and occupy about one-fifth to one-eighth of the thickness—much more in proportion than they do in the Greenland fins, and the enamel and fibre are coarser in texture and much more brittle.

The fins or blades of this whalebone are generally flexuous, or "not kindly," so that when cut into strips they have the defect of being variously bent, and tapering towards the end, which, with their brittleness, greatly reduces their value.

Mr. Bennett observes that "the Right Whale, so abundant and so little molested in the northernmost waters of the Pacific, or off the north-west coast of America, is probably identical with the Greenland species" (*Whaling Voyage*, ii. 229). The whalebone or baleen shows it is more allied to the Cape species, but apparently distinct from it.

"There are three vertebræ, a pair of humeri, and a pair of scapulæ, which I have referred to *Balæna australis*, *Desmoulins*, in the Museum

of the Asiatic Society of Calcutta. Probably from the coast of India."  
—*Blyth*.

What is *Balæna indica*, Blyth, Journ. Asiat. Soc. xxviii. 488; Cat. Mus. As. Soc. Beng. 93?—Inhab. Indian Ocean; Bay of Bengal. Arabian Sea, occasionally entering the Persian Gulf.

Chamisso figures a species of Whalebone Whale as *Balæna Kulio-moch*, found in the Aleutian seas, from a wooden model made by the Aleutians (see N. Act. Nat. Cur. t. 17. f. 1). It is noticed as *B. Cullammak* by Pallas (Zool. Rosso-Asiat. i. 288).

### 3. HUNTERIUS.

Ribs 15.15; first double-headed, the rest single-headed. Tympanic bone rhombic, nearly like that of *Balæna*. Head large, forming above one-fourth of the entire length of the adult.

Hunterius, *Gray, Proc. Zool. Soc. 1864; Ann. & Mag. Nat. Hist. 1864, xiv. 349.*

The first rib very broad, with two heads, attached to the transverse processes of the first and second dorsal vertebræ; the sternal end deeply cut out. The first four cervical vertebræ soldered together, the second and third with lateral processes beneath. Vertebræ 55 (or 57): dorsal 16; lumbar 8; caudal 24; scapula, atlas, and cervical vertebræ —? The tympanic bone like that of *Balæna* and *Eubalæna*.

Baleen elongate, thick; enamel coat thin, the central fibres coarse, forming a rather rigid fringe.

“Total number of vertebræ 57 or 58. Pairs of ribs 15. Head less than one-third of the total length of the body. Nasal bones short and broad; orbital processes of the frontal moderately long, and widening considerably at their outer extremity, directed horizontally outwards. First five cervical vertebræ only anchylosed (?). Baleen-plates moderately long, and broad at the base.”—*Flower, P. Z. S. 1864, 390.*

#### 1. Hunterius Temminckii.

*Balæna australis*, *Temm. Fauna Japon. t. 28 & 29.*

*Balæna Mysticetus antarctica*, *Schlegel, Abhandl. 1841, 37.*

*Hunterius Temminckii*, *Gray, Ann. & Mag. N. H. 1864, xiv. 349.*

Inhab. Cape of Good Hope (*Horstock*). Skeleton of young animal (and skull of adult?), Mus. Leyden.

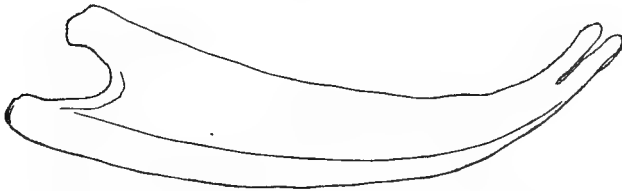
“It does not quite attain to the size of Greenland Right Whales. The head is proportionally smaller (taking up only a fourth of the entire length of the animal), but it becomes wider near the eyes. The snout is broader, with a hard elevation near the front part, slightly humped at the point. Upper jaw along the posterior part of the angle of the mouth much deeper downwards, and arching from the outside. Whiskers somewhat shorter. Pectoral fins a trifle longer, and more firmly spined at the point. Caudal fins not so deeply incised. The white of the underside limited to only a

small portion of the belly. The skull is proportionally smaller than in the Greenland Right Whale, much higher and broader behind. The muzzle viewed from above bulges at the sides. The frontal bone and the hindmost excrescence of the upper jaw are not oblique from behind, but (at least in maturity) laterally flattened; finally, the lower jaw is much more powerful.

“Our skeleton has seven vertebræ in the neck, of which the first four are soldered together, and only the second and third have lateral processes beneath. There are 15 pairs of ribs, of which only those nearest the middle, viz. the third to the seventh, are provided with a small crown; they do not, however, reach the vertebræ of the body.

“The first rib is unusually broadly and deeply inserted into the end of the sternum, or running straight out into two processes, and divided at the vertebral ends by a deep notch into two knobs, it is fastened to the lateral processes of the first and second vertebræ. There are only 16 dorsal vertebræ, 8 lumbar, and 24 caudal. The flipper has five well-articulated digital and clearly developed metacarpal bones.”—*Schlegel, Abhandl.* 1841, 37.

Fig. 8.



First rib of *Hunterius Temminckii*, in the Leyden Museum.  
(From a sketch by Mr. Gerrard.)

Mr. Flower has given me a drawing of the ear-bone from the same specimen; it is rhombic, very thick and swollen, like, but rather wider than, the ear-bone of *Eubalcena australis*.

“A very fine skull of an adult and a nearly complete skeleton of a young individual, both obtained from the Cape of Good Hope by Dr. Horstock, are contained in the Leyden Museum. These are briefly described by Schlegel in his ‘*Abhandlungen aus dem Gebiete der Zoologie*,’ &c. (Leyden, 1841), part 1. p. 37.

“The skull is 13' 5" in extreme length. To any one accustomed to the appearance of the skull of the adult *B. Mysticetus*, the differential characters exhibited by this specimen are very striking. The size is much inferior, both absolutely and as compared with that of the body of the animal. Its general contour is less regularly arched, as it rises abruptly in the occipital region to a very prominent and rounded eminence at the junction of the supraoccipital, frontal, and nasal bones, and then slopes gradually down to the apex of the beak. The articular processes of the squamosals are broader and less elongated. The supraorbital processes of the frontal are, as noticed by Schlegel, directed more horizontally outwards, shorter,

and very much stouter, especially at the extremity. The orbital processes of the maxillary are also stouter. One of the most marked differences from *B. Mysticetus*, and one which I have not before seen noticed, is the great breadth and comparative shortness of the nasal bones, and consequent great width of the posterior margin of the nasal aperture. The part of the upper surface of the two nasal bones uncovered by the frontal is  $13\frac{1}{2}$ " broad and 11" long; in a skull of *B. Mysticetus*, 17' in length, they are but 7" broad and 11" long. The malar, lacrymal, and tympanic bones are absent from this skull.

"The skeleton is that of a young animal; the epiphyses of all the vertebræ and of both ends of the humerus, radius, and ulna are not united. It wants the lacrymals, malars, sternum, hyoid and pelvic bones. The entire length is 31' 4", of which the head occupies 7'. The total number of the vertebræ is 56; and one, or perhaps two, may be wanting from the end of the tail. The first five of the cervical vertebræ are united together; the bodies of the other two are greatly compressed and close together, but not ankylosed. There are fifteen pairs of ribs. The first, as described by Schlegel, is of very singular shape, being divided at the upper end for a distance of 6" into two broad flat heads, anterior and posterior, and widening exceedingly at the lower end, in the middle of the border of which is a deep notch. It is 34" in length, measured in a straight line, 4" in breadth at the middle, and  $12\frac{3}{4}$ " at the lower end. The two divisions of the upper end are attached to the transverse processes of the first and second dorsal vertebræ, which disposition induced Schlegel to assign 16 dorsal vertebræ to this specimen; but this is probably an error of the articulator, as in the Fin-Whales with double heads to the first rib, these are connected with the seventh cervical and first dorsal vertebræ; and in *B. Mysticetus* the head of the first rib is placed altogether in front of the transverse process of the first dorsal vertebra, being intimately connected with the seventh cervical.

"The second rib is very thick and broad at the lower end. The last rib is much shorter and more slender than the others. There are nine chevron bones present. The scapula is 26" broad and 24" high, with very short acromial and coracoid processes. The humerus 15" long. The radius  $16\frac{1}{2}$ " long and 10" broad at its distal end. The ulna 8" broad at the same part. The thumb is absent; the digits differ but slightly from each other in length. The second, third, and fifth have, besides the metacarpal bones, each four phalanges; the fourth has five; but, as they are artificially articulated, these numbers are not entirely to be depended on."—*Flower, P. Z. S.* 1864, 396, 397.

The baleen sold in the market as "North-west Coast whalebone," which I figured in the 'Zoology of the Erebus and Terror,' t. 1. f. 4, is quite distinct, and fetches a different price from that called "South-Sea whalebone," which is said sometimes to be brought from the Cape—showing that the Whalebone Whale of the North Pacific is a distinct species.

## 4. CAPEREA.

The tympanic bone irregular rhombic, aperture irregular, much contracted at the upper end, and the wide part not half the length of the bone.

The scapula, atlas, ribs, and cervical vertebræ not observed.

Caperea, Gray, *Proc. Zool. Soc.* 1864, 202 (May 24); *Ann. & Mag. Nat. Hist.* 1864, xiv. 349.

1. *Caperea antipodarum*. *The New Zealand Whale*.

*Balæna antipodarum*, Gray, *Dieffenbach, New Zealand*, t. 1.

Right Whale, *Polach, New Zealand*, ii. 401.

*Balæna antarctica*, Gray, *Zool. Erebus & Terror, Cete*, 16. t. 1; *Cat. Cetac. B. M.* 1850, 18; (not Lesson nor Owen).

*Balæna Caperea antipodarum*, Gray, *Proc. Zool. Soc.* 1864, 202.

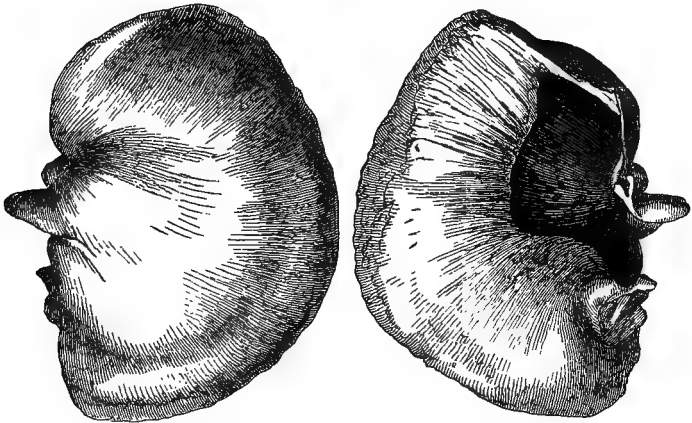
*Caperea antipodarum*, Gray, *Ann. & Mag. Nat. Hist.* 1864, xiv. 349.

Inhab. New Zealand; Jackson Bay.

Described from a very accurate drawing of a specimen taken in Jackson Bay; it is very like Temminck's figure of *B. australis*, but there is a roundish prominence on the front of the under jaw similar to the one on the nose; the latter only is figured in that species; the pectoral fin, as in that species, is about two-sevenths from the chin.

M. Milne-Edwards informs me that there is a skeleton of this whale in the Paris Museum.

Fig. 9.



Tympanic bones of *Caperea antipodarum*.

The tympanic bone oblong, rugulose; the upper and outer margin thick and rounded; the lower edge truncated; the back regularly convex, with a smooth, broad, slightly depressed portion just above the middle. The lower truncated end very broad, with a regular convexity on the inner half, and keeled on the outer half of the upper

margin; the lower margin angular. The lower surface is moderately convex, the aperture very irregular, narrow, and contracted above, truncated below (see fig. 9).

Inhab. New Zealand; Otago (*Mr. Stuart*).

"The beach at Tory Channel, New Zealand, was covered with remains of whales' skulls, vertebræ, huge shoulder-blades, and fins."—*Dieffenbach, New Zealand*, i. 35.

The figure in Dieffenbach's 'Voyage' "is from a cow whale 60 feet long, drawn while afloat, so that its shape was unaltered. The Black Whales of New Zealand appear to be inferior in size to those of the Northern seas. The cow whale figured was regarded as being of an unusually large size. Scoresby says he has measured Greenland Whales 70 to 72 feet long."

"The male or bull whale is very rarely caught on the shores of New Zealand, as it never approaches the land so near as the female and young do, and is more shy and wild. The season in which whaling is carried on is from May to October. In the beginning of May the cows approach the shallow coast and smooth waters for the purpose of bringing forth their young. This period lasts about four months, as in May whales are seen with newly-born calves, and cows have been killed in July in full gestation. During the same month also copulation is sometimes observed by the whalers. In company with the cows are also the calves of the preceding year or years; it is uncertain at what age the whale attains its full size or leaves its mother. The young whales are called *Scrags*, and they yield about four tuns of oil. The full-grown fœtus is 14 feet long."

"The whale is a truly migratory animal. They arrive at the coast of New Zealand in the beginning of May from the northward, and go through Cook's Strait, keeping along the coast of the Northern Island, and pass between the latter and Entry Island. They are never seen on the opposite coast, nor do they enter the northern entrance of Queen Charlotte's Sound. From Entry Island they sweep into Cloudy Bay, and at the end of October they go either to the eastward or return to the northward. From the month of June they begin to show themselves near Chatham Island, where their numbers increase with the termination of the season in the latter place. During the six remaining months of the year, the ships cruising in the 'whaling-ground' fall in with many whales. This whaling-ground extends from Chatham Island to the eastward of the northern islands of New Zealand, and from thence to Norfolk Island."

"The results of the whale-fishery on the coast of New Zealand are of very small amount in the British market, owing to the indiscriminate slaughter of the fish during the last fifteen years, without due regard to the preservation of the dams and their young. The shore-whalers, in hunting the animal in the season when it visits the shallow water of the coast to bring forth the young and suckle it in security, have felled the tree to obtain the fruit, and have thus taken the most certain means of destroying an otherwise profitable and important trade."



“The whales approach the shores and bays with the flood-tide, and quit them with the ebb. In their migration they seem to be influenced by the direction of the tides. Whales are often seen in places where the depth of the water does not much exceed their own breadth, rubbing their huge bodies against the rocks, and freeing themselves of the barnacles and other parasitic animals with which they are covered.”

“The maternal affection of the whale for its young is very great. As soon as the mother observes a threatened danger she clings as it were to the calf, tries to hide it, and often takes it between her fluke-fins and attempts to escape. The affection of the whale for her young is the principal means of her destruction. The calf, inexperienced and slow, is easily killed, and the cow is afterwards a sure prey. It is not known in what manner the cow suckles her calf. The whalers deny that they can or do. The teats are two in number, situated in membranous folds on both sides of the genital organs, and are small in size.”

“The cow was a velvet-like black, with the exception of a milk-white spot round the navel. They are said to be sometimes speckled and entirely cream-coloured, which are albinos.

“The calf said to be six weeks old was 24 feet long. The brain weighed 5 pounds 1 ounce. The baleen was very soft and useless. There were 200 plates on each side of the roof of the upper jaw.

“About 120 whales are captured yearly at four stations.

“The whalers easily distinguish the bull from the cow at a considerable distance, the elevation near the spout-holes, called the *top-knot*, being much higher in the bulls, and this part is always above the water.”—*Dieffenbach, New Zealand*, i. 44-54.

What is *Balæna australis*, “Desmoul.,” Schrenck, Amur-Lande, i. 193; *Balæna antarctica*, Schlegel, Fauna Japon. Mamm. 18?—Inhab. Island Sachalin: called “*Kalm*.”

Lesson, Œuvr. Buffon, i. 391 (Tab. Règ. Anim. 202); Wagler, N. S. Amph. 33, give the name of “*B. antarctica*” to the “Right or Black Whale of the whalers of the Antarctic seas.”

II. *Atlas separate from the other cervical vertebræ, which are all united into a single mass; the lower lateral process of the second and third cervical vertebræ rounded.*

### 5. MACLEAYIUS.

Macleayius, *Gray, Proc. Zool. Soc.* 1864.

The atlas vertebra distinct, separate, with short, broad, truncated lateral processes occupying the upper two-thirds of the side of the body of the vertebra, the lower side of the body forming a section of a circle; the neural arch strong, with a high central ridge forming a distinct keel.

The second, third, fourth, fifth, sixth, and seventh cervical vertebræ united into a single mass by their bodies and neural apophyses; the upper lateral process rudimentary, more or less anchylosed; the

lower processes of the second and third cervical vertebræ large, thick, short, truncated; the neural arches very broad and strong, united together, the anterior one forming a large, broad, convex, hood-like body over those of the other cervical vertebræ.

This genus is established on the cervical vertebræ existing in the Museum at Sydney, New South Wales, of which Mr. Krefft has sent me a photograph, showing the atlas and other cervical vertebræ, seen in front, and the cervical vertebræ without the atlas, seen obliquely. These latter bones seem to me to clearly indicate a species of whale which has not yet been described. On a comparison of them with the figures of the cervical vertebræ of the *Balæna Mysticetus* (Cuv. Oss. Foss. v. t. 26. f. 18) and of *Eubalæna australis* (Cuv. Oss. Foss. v. t. 26. f. 13), they appear to be more nearly allied to the genus *Eubalæna* than to *Balæna*, but are very distinct from either. These bones differ from both those genera in the atlas being separate and free from the other cervical vertebræ, instead of being all united together into a single mass. In this respect they agree with the cervical vertebræ of the Sperm Whale (*Catodon*); but they cannot belong to that genus, on account of the general form of the vertebræ, and especially the form of the neural arch. In both these particulars they much more nearly resemble the genera *Balæna* and *Eubalæna*.

Genera which have the cervical vertebræ united into one or two masses may be distinguished thus:—

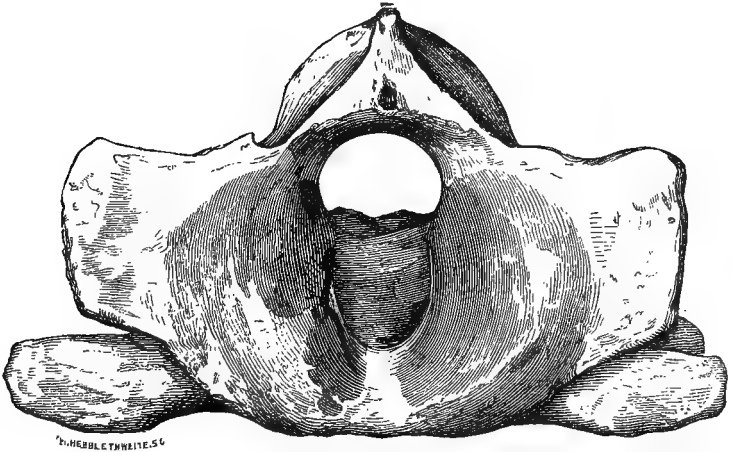
- A. *The neural arch of atlas with a strong well-developed ridge on its upper edge, forming a keeled crest.*
- a. *The lateral processes of the atlas on the upper part of the side.* Balænidæ.
- \* *The atlas vertebra united with the other cervical vertebræ into a single body.* Balæna and Eubalæna.
- \*\* *The atlas vertebra free from, and separate from, the other cervical vertebræ.* Macleayius.
- b. *The lateral process of the atlas and other cervical vertebræ on the lower part of the side of the body.* Hyperoodon and Lagocetus. Orca crassidens?
- B. *The neural arch of atlas low, scarcely raised, keeled on the upper edge; the lateral processes very wide, occupying nearly the whole side-edge of the body of the vertebra.* Catodontidæ. Catodon.

The form of the atlas at once distinguishes this genus from *Catodon*, or the Sperm Whale. In that genus the atlas is oblong, transverse; the lateral processes occupy the entire side of the body of the bone, and are truncated at the end; the lower edge is gradually curved from the centre to the end of the lateral processes; the upper edge is rather shorter, the middle part over the neural arch being only slightly raised and keeled, and scarcely higher than the upper outer edge of the lateral processes.

I have named this genus after Mr. MacLeay, the former Secretary of the Linnean Society, and his son William Sharp MacLeay, two naturalists who have done so much for science; and to the latter

every student of Whales must be indebted for his work on the South-Sea Sperm Whale and the very extraordinary *Euphysetes Grayii*.

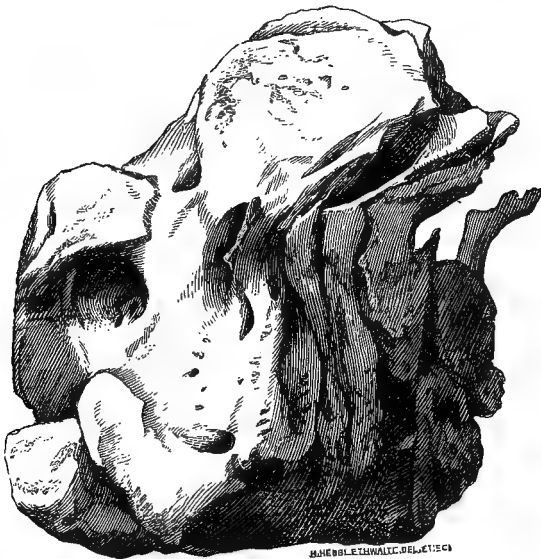
Fig. 10.



H. HEBOLD TH. WHITE SC.

*Macleayius Australiensis*. Front view of atlas and cervical vertebrae.

Fig. 11.



H. HEBOLD TH. WHITE DEL. & SC.

*Macleayius Australiensis*. Oblique view of the second to the seventh cervical vertebrae.

I have ventured to make these fragments of an animal (as they may be called) into a genus; for I think we can only study the gigantic whales as we study fossils, from the parts which are preserved to us. It is to be hoped that at some future time more perfect skeletons will be collected and preserved, and then the description of the genus will be filled up.

## 6. PALÆOCETUS.

Atlas free. The second cervical vertebra with a prominent rounded lateral process with a small basal perforation. The third to fifth cervical with —.

*Paleocetus*, *Seeley, Geol. Journ.* 1865.

This genus, in the form of the lateral process of the atlas or second cervical vertebra, has some resemblance to the Finner Whales (*Balænopteriidæ*). It is probable that when it is better known it will form a family (*Palæocetidæ*), to be placed between *Balænidæ* and *Balænopteriidæ*.—See also *Professor Owen, Brit. Foss. Mamm.* pp. xv & 520; *Palæontology*, p. 355.

### 1. *Palæocetus Sedgwickii*.

*Paleocetus Sedgwickii*, *Seeley, Geol. Journ.* 1865, tab. f. 1, 2.

*Fossil in the Crag.* The cervical vertebra, *Woodwardian Museum, Cambridge.*

## Family 2. BALÆNOPTERIDÆ.

Dorsal fin distinct. Belly longitudinally plaited. Baleen short and broad, triangular, twisted. Maxillary bones broad, expanded, sharp-edged. Tympanic bone oblong or ovate. Frontal bone flat, expanded, broad over the orbit; orbit large. Pectoral fin lanceolate; fingers 4. Vertebrae of neck free, or some rarely ankylosed. Scapula broader than high, with or without a coracoid. The lateral process of the axis or second cervical vertebra produced, ring-like, with a basal perforation. The ring is not completely ossified until adult age, so that the skeleton sometimes presents two short processes more or less encircling a basal aperture.

Balænoptera, *Lacép. Cétac.*

Mysticetus, *Wagler, Syst. Amph.*

Rorqualus, *F. Cuvier, Cétac.*

Balænidæ (B.), *Gray, Cat. Cétac. B. M.*

Finne-fisch, Balænoptera, *Schlegel, Abhandl.* 1841, 38.

Balænopteriidæ, *Gray, P. Z. S.* 1864; *Ann. & Mag. N. H.* 1864, xiv.

“The head less than one-fourth of the total length of the body. A dorsal fin. Skin of the under surface of the throat and chest provided with numerous parallel longitudinal furrows. The bones of the cranium very slightly arched. The rostrum broad at the base, gradually tapering, depressed. The orbital processes of the frontal moderately prolonged, broad, and flat on the upper surface. Tympanic bones elongated, ovoid. The coronoid process of the lower jaw

more or less developed. Baleen-plates short. Cervical vertebræ usually all free. Hand narrow and tetradactylous."—*Flower, P.Z.S.* 1864, 391.

The anatomy of these animals, and especially a description of their bones, has been given by Albers, *Anat. Comp.* t. 1; Camper, *Cétacés*, t. 11 & 12; Rudolphi, *Berl. Abhandl.* 1820, t. 1-4; Cuv. *Oss. Foss.* v. 564. t. 26. f. 5; Ravin, *Ann. Sci. Nat.* 1841, 337; and by Van Breda, Van der Linden, and J. Dubar, in separate pamphlets on the specimen cast ashore at Ostend, which was exhibited in London some years ago; and the anatomy of *Megaptera* and *Balænoptera* has been given in detail by Eschricht, who has carefully examined fetal specimens of these whales.

Cuvier (*Oss. Foss.* v. 264) figures the skull of a specimen described by Lacépède, from the Mediterranean, under the name of *Rorqual de la Méditerranée* (t. 26. f. 5), and he gives a copy of the head of the skeleton of *Balæna rostrata* of Rudolphi (*Berlin. Abhandl.* 1820, t. 1, 2, 3, 4), under the name of *Rorqual du Nord* (*Oss. Foss.* v. t. 26. f. 6).

Polach (*New Zealand*, ii. 407) describes these whales as having three fins on the back; this is probably only a false translation of Ray's *B. tripennis*, referring to its having a dorsal as well as two pectoral fins.

O. Fabricius (*Fauna Grœnlandica*, 36) describes *B. Boops* with the blower on a common tubercle, and covered by a common valve!

From the study of Professor Eschricht's paper, and from personal communication with him, and from the examination of the several skeletons of this genus, in different collections, I am satisfied that there are several distinct species.

The proportions given by the tables quoted in the previous edition of this Catalogue, and the measurement of other specimens (all of which I drew from scale on paper), have shown that they were permanent, and to be considered as specific or generic distinctions rather than variations in the growth of the same species. These distinctions were further confirmed by the examination of the skeletons; for it was found that the bones of the neck of the small species (which had been considered to be the young of the larger ones) were ankylosed together, while those of the larger ones were free; and it also showed that the form of the lateral process of the nuchal vertebra was the same in specimens of different sizes from the same locality, proving that the structure of these bones depended on the mobility of the neck of the different species, fitting it for their different habit and manner of life, indicated by the size of the fins and other external characters.

It is only necessary to refer to Dr. Jacob's very interesting paper in the 'Dublin Journal of Science' for 1825, p. 332, where he attempts to prove that all the Finner Whales found in the North Sea are of one species. To show how dangerous it is to reason on such subjects, his arguments are scattered to the wind directly a reference and comparison is made to specimens. The examination and comparison of the skeleton, after making every allowance for

changes which may take place in the development of the bones during growth and the variations that may occur in individuals of the same species, show that the species of Finner Whales which inhabit the northern hemisphere are much more numerous than was formerly suspected; and it is probably the same with those that inhabit the southern half of the globe.

Professor Eschricht, in 1846, had so little confidence in the number of species of Whales inhabiting the North Sea, that he considered that he had made an advance when he thought it was proved that there were at least three different species having their abode in the North Sea (4th Mem. p. 157).

Cuvier, in his essay in the 'Ossemens Fossiles,' admits three kinds of Finner; each of them now forms the type of a genus: Rorqual du Cap=*Megaptera*; Rorqual de la Méditerranée=*Physalus*; Rorqual du Nord=*Sibbaldius* and *Balænoptera*. Van Beneden, in 1861, progresses one step further; he admits four—that is, separates the Rorqual du Nord into two species: thus,—1. *Pterobalæna minor*=*Balænoptera*; 2. *Pterobalæna communis*=*Physalus* (and perhaps *Benedenia*); 3. *P. gigas*=*Sibbaldius*; 4. *Kyphobalæna longimana*=*Megaptera*. (See Nouv. Mém. Acad. Roy. Brux. 1861, xxxii. 38.)

The whalers recognize three kinds:—1. The Humpback (*Megapterina*); 2. The Finner (*Physalina*); 3. The Beaked Whales (*Balænoptera*), considered in this Catalogue as tribes.

“Sometimes chase is given to the Finback and the Humpback Whales, but these are seldom caught, not only on account of their superior cunning, greater wildness and celerity—by means of which they are enabled to run out the longest line—but also because giving less oil than the Black Whales they are not so frequently pursued.”—*Dieffenbach, New Zealand*, i. 42.

It is possible, indeed not improbable, that the lateral processes of the cervical vertebræ of all the Finner Whales are more or less ring-like in the cartilaginous state, and that the different form of the processes seen in the prepared skeletons may depend on the extent to which the cartilage becomes ossified. If this is the case, the extent to which the cartilage does become ossified seems to be different in the various species, and therefore offers a good character by which to determine them. In some species the ring is entirely ossified, while in others a large, and in others, again, only a small part of the base of the lateral processes becomes bony. In species which have a great part of the processes ossified, sometimes the two processes unite into a ring on one side of the vertebra, and the processes keep separate on the other. Yet, as far as I have been able to examine the subject, the extent to which the processes become ossified seems to be a good character of the species—of course liable to a certain extent of variation, as all characters are. Some authors even seem to believe that the lateral processes of the cervical vertebræ are liable to great variation in this respect during the age and decadence of the animal. Yet the special form of the lateral bones which form the more or less perfect rings, the comparative thickness of the upper and lower processes with respect to each other, and their thickness

as compared with that of the processes of the same vertebræ in other species, seem to afford most excellent specific characters, and such as do not appear to vary, so far as I have as yet examined them, in the different ages of the same kind of Whale.

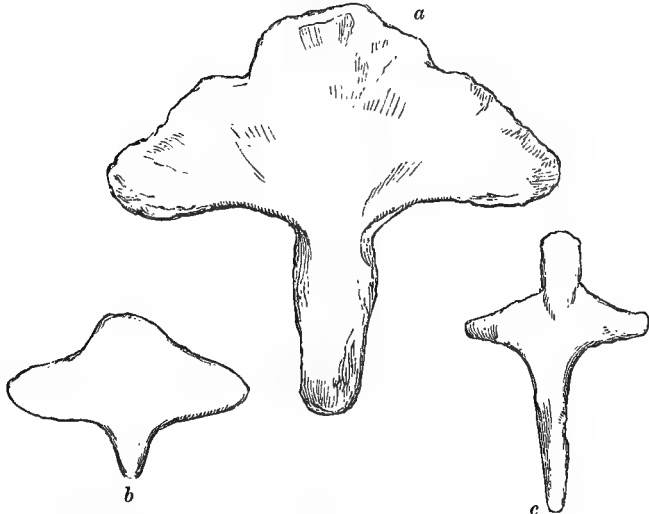
These characters have shown that we have several kinds of Finner Whales inhabiting our shores; and I have little doubt that when the skeletons of the whales that inhabit other seas have been similarly examined and compared, there will be found to be many more species of these animals than has hitherto been supposed. Indeed this is proved to be the case when we examine and compare the baleen, the ear-bones, and other remains brought from different localities.

“It will help much in determining specific identity of new or little-known species, if we can show, among those that are well known, what is the usual amount, and what the limit, of variation in size; for we may assume that it is at least probable that the same laws govern the different members of a group so well defined as the Whales. No species of Balænoïd Cetacean is so well determined as the Northern Right Whale (*Balæna Mysticetus*), and of none are we able to adduce any approach to the number of instances of the size that various individuals of the species have attained. A skeleton in a late stage of the adolescent period in the Museum at Brussels measures a little over 50' in length; and Scoresby, as is well known, states that out of 322 examples examined by him, not one exceeded 60' in length; indeed the largest measured was 58', being one of the longest, to appearance, that he ever saw. The adult animals must then have a tolerably limited range of variation, within a few feet of either side of 55'. Again, the common and well-marked species *Balænoptera rostrata*, the dwarf of the family, is still in the adolescent stage at 25' long, and there is no instance recorded in which it exceeded 31'. The adult Humpbacked Whale (*Megaptera longimana*) appears to range within 45' and 50' in length. In the common Fin-Whale (*Physeter antiquorum*) we have evidence of variation at an adult age, and in the same (male) sex, of from 60' (Rosherville Gardens) to nearly 70' (Alexandra Park and Antwerp Zoological Gardens). It is possible that this species may sometimes attain a few feet longer, but all the cases in which this is stated require fresh investigation. The alleged length of a whale in the flesh is rarely to be depended on, and even the given measurements of skeletons are often inaccurate, as much depends upon the method of articulation. Size being in the popular mind a point of vital importance in a whale, the tendency to exaggerate this quality is a constant obstacle to exact investigation. We may conclude, then, that all the evidence at present available tends to prove that the idea which some naturalists entertain, that whales have no definite limit to their growth, is incorrect, and that, as in other mammals, there is an average size to which each species attains, subject to individual differences within a moderate range.”—*Flower, P. Z. S.* 1864, 387.

“The number of vertebræ and number of ribs have been supposed to be subject to considerable individual variation, partly in consequence of several distinct species having been confounded, and partly

from the loose way in which these bones have been counted from defective or badly articulated skeletons; but, in fact, subject to the exceptional circumstances about to be mentioned, they are quite as constant among the Cetacea as among other Mammalia, and are therefore characters of the highest importance in determining species. Every example of *Balænoptera rostrata* that I have examined in museums, or found recorded, has eleven pairs of ribs, and a total number of vertebræ amounting to 48 or 50. In like manner skeletons of *Physalus antiquorum*, when complete, appear always to have 15 pairs of ribs and 61 or 62 vertebræ; *Megaptera longimana* has 14 pairs of ribs and 53 vertebræ; *Balæna Mysticetus* 12-13 pairs of ribs and 54 vertebræ. It frequently happens that the last pair of ribs only attain a rudimentary condition, and, their heads not articulating with the vertebræ, they are lost in preparing the skeleton. This condition of the last (15th) pair of ribs is well seen in the skeleton of *Physalus antiquorum* in the Alexandra Park, prepared by Mr. Gerrard, jun.; they measure, the one  $19\frac{1}{2}$ " in length, the other 27", and taper to a point at their upper extremity, being suspended in the position they originally occupied, far removed from the vertebral column. A small rudimentary additional rib, or pair of ribs, attached to the first lumbar vertebra, is sometimes developed; but a fully formed pair of ribs above the normal number is, I believe, never met with.

Fig. 12.



Sternal bones of Fin-Whales of different genera,  $\frac{1}{10}$ th nat. size.

a. *Physalus antiquorum*. Alexandra Park.

b. *Sibbaldius Schlegelii*. Mus. Leyden.

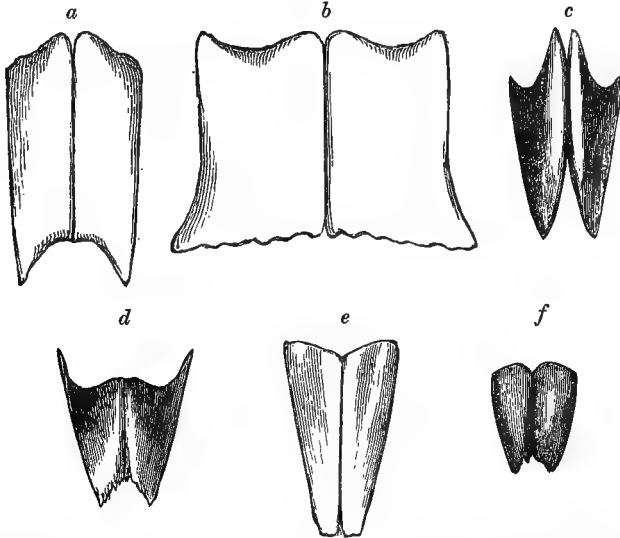
c. *Balænoptera rostrata*. Mus. Roy. Coll. Surg.

Flower, P. Z. S. 1864, 393.



“As to the number of vertebræ, a small amount of latitude may usually be allowed on account of the difficulties connected with the terminal bones of the tail. Very often in specimens in museums several of these are wanting, owing to carelessness in preparing the skeleton; and, by a less excusable carelessness, the circumstance may not be noted in published accounts of the number of vertebræ possessed by the specimen. But even if all are present, slight discrepancies in enumeration readily occur. In early periods of life, the last vertebra, although certainly formed in cartilage, is not ossified, and the penultimate has so much the appearance afterwards assumed by the last, as frequently to be taken for it; or, again, later in life two or even three of the terminal vertebral elements grow together so as to form a single osseous mass, which is counted as one or several bones according to the discretion of the observer. Therefore, even in well-described skeletons, a discrepancy of one or two in the given number of caudal vertebræ is of no great consequence; but there is no evidence to prove the occurrence of any greater variation in any given species.”—*Flower, P. Z. S. 1864, 388.*

Fig. 13.



Upper surface of nasal bones of Whales of different genera,  $\frac{1}{16}$ th nat. size.

- a. *Balena Mysticetus.* Mus. Roy. Coll. Surg.
- b. *Hunterius.* Mus. Leyden.
- c. *Megaptera longimana.* Mus. Brussels.
- d. *Physalus antiquorum.* Mus. Roy. Coll. Surg.
- e. *Sibbaldius Schlegelii.* Mus. Leyden.
- f. *Balænoptera rostrata.* Mus. Roy. Coll. Surg.

*Flower, P. Z. S. 1864, 390.*

Cuvier (Oss. Fos. v.) determined by the form of the head three kinds of Finner Whale, but he was doubtful if they might not be varieties of age of the same species. These kinds are the types of three genera: viz. Rorqual du Cap = *Megaptera*, Rorqual de la Méditerranée = *Physalus*, Rorqual du Nord = *Sibbaldius*.

“In the first three columns of the following Table are given the actual length of the cranium, greatest breadth (at the squamosals behind the orbit), and breadth across the middle of the beak, in inches; and in the last two, the proportionate breadth of the skull and beak to the total length, the latter being reckoned at 100.

	Length of cranium.	Breadth of cranium.	Breadth of beak.	Proportion to length.	
				Breadth of skull.	Breadth of beak.
<i>Physalus antiquorum.</i>					
Adult. Antwerp .....	184	96	33	52	18
Adult. Louvain .....	179	78	32	44	18
Adult. Alexandra Park .....	186	86	36	46	19
Adult. Rosherville Gardens .....	168	75	34½	45	20
Young. Leyden .....	126	60	26	48	21
Young. Mus. R. Coll. Surg.....	111	56	22½	50	20
<i>Cuvierius latirostris.</i>					
Utrecht (Mus. Lidth de Jeude) ...	118	60	32	51	27
<i>Sibbaldius borealis.</i>					
Adult. Ostend. (Approximation } from Dubar's measurements.) . . }	256	118	...	46	
<i>Sibbaldius laticeps.</i>					
Adolescent. From Java, in Ley- } den Mus. ....	116	57	22	49	19
Young. Leyden.....	79	40	16	51	20
<i>Sibbaldius Schlegelii.</i>					
Young. Brussels .....	80	38	15	48	19
Young. Berlin. (Approximation } from Rudolphi's figure.) .....	78	36	18	46	22
<i>Balænoptera rostrata.</i>					
Adolescent. Brussels .....	63	34	13	54	21
Adolescent. Mus. R. Coll. Surg....	65	35	15	54	23
Young. Mus. R. Coll. Surg. ....	48	24	...	50	20

“It is seen by this that the individual differences among specimens of *Physalus* and *Sibbaldius* are considerable, the proportionate breadth of skull ranging in the first case between 44 and 52, and of the beak between 18 and 21, and in the second genus between 46 and 51, and 19 and 22; and these differences do not seem at all to be regulated by age. A slight allowance must certainly be made for errors arising from the difficulty of measuring straight lines with exactness, especially single-handed, upon these large irregular objects. On the whole, however, the specimens of *Sibbaldius* have no advantage on the score of breadth. The examples of *Balænoptera rostrata* are slightly broader than the others in proportion to their length.

“Van Beneden is of opinion that this specimen, as well as that at Berlin, is referable to the same species as the very large female Whale taken near Ostend in 1827, the skeleton of which was exhi-

bited some years ago at Charing Cross; and as this animal was 87 feet in length (larger than the ordinary size attained by the common Fin-Whale), he has given it the specific name of *gigas*. Unfortunately this skeleton, having been shipped for the United States, is no longer available for examination; and the only descriptions and drawings we have of it are not made with the scientific accuracy necessary to settle the question. It certainly agrees in many important points—the number of vertebræ (54, a few wanting from the end of the tail) and of ribs (14), the double head of the first rib, and the small broad sternum. Its generic identity is therefore undoubted.

“One difficulty which arises in my mind is about the size. The 32'-long examples of *Sibbaldius* at Leyden and Brussels are, as I have said, in the *young* stage; but still the general condition of the bones shows them to be by no means in the earliest period of youth. A common Fin-Whale (*Physalus antiquorum*) that I examined at the Hague, 40' long, had the bones much softer, more spongy, and incomplete at the ends of the processes than in either of these; whereupon I should *à priori* have said that the latter belonged to a species which, when adult, was smaller than the common one. As far as we know at present, the young of Fin-Whales are from one-fourth to one-third of the length of the mother at the time of birth, which would give a very early age to our specimens if derived from such a parent as the Ostend Whale. As these speculations upon the size and growth of Whales are, however, based upon very slight foundation, I must still admit the possibility of the specific relationship of the Ostend Whale with the representatives of *Sibbaldius laticeps* in the museums of Berlin, Leyden, and Brussels.”—*Flower, P. Z. S.* 1864, 399, 400.

The examination of the skeleton has shown that there are several species found in the North Sea, characterized by the bones of the neck and by the external colour; and I think there is little doubt that, when we have had an opportunity of comparing the skeletons of the Finner Whales found in other seas, especially of those in the southern hemisphere, it will be seen that they are perfectly distinct from those here described.

#### SYNOPSIS OF THE GENERA.

I. *Dorsal fin low, broad. Pectoral fin very long, with 4 very long fingers of many phalanges. Vertebræ 55 or 60. Cervical vertebræ often ankylosed. Lateral process of axis tardily ossified. Neural canal large, high, triangular. Ribs 14 or 15. Megapterina, or Hunch-backed Whales.*

1. MEGAPTERA. Blade-bone without acromion or coracoid process. Body of cervical vertebræ subcircular.
2. POESCOPIA. Blade-bone with small coracoid process. Body of cervical vertebræ nearly square.
3. ESCHRICHTIUS. Blade-bone with large coracoid process. Body of cervical vertebræ separate, small, roundish, oblong. The neural canal very broad, high.

II. *Dorsal fin high, erect, compressed, falcate, about three-fourths the entire length from the nose. Pectoral fin moderate, with 4 short fingers of 4 or 6 phalanges. Vertebrae 55 or 64. Cervical vertebrae not ankylosed. Neural canal oblong, transverse. Ribs 14 or 15.*  
Physalina, or Finner Whales.

\* *Vertebrae 60 or 64. First rib single-headed.*

4. **BENEDENIA.** Rostrum of skull narrow, attenuated, with straight slanting sides. Second cervical vertebra with two short truncated lateral processes. First rib single-headed.
5. **PHYSALUS.** Rostrum of skull narrow, attenuated, with straight slanting sides. Second cervical vertebra with a broad lateral process with a large perforation at the base. First rib single-headed. Sternum trifoliate, with a long slender hinder process.
6. **CUVIERIUS.** Rostrum of skull broad, the outer side curved, especially in front. The second cervical vertebra with two short thick lateral processes. First rib single-headed. Sternum oblong ovate, transverse.

\*\* *Vertebrae 55. First rib double-headed.*

7. **SIBBALDIUS.** Second cervical vertebra with a broad lateral process perforated at the base. First and second ribs double-headed. Lower jaw compressed, with distinct coronoid process. Vertebrae 55.

III. *Dorsal fin high, erect, compressed, about two-thirds of the entire length from the nose. Pectoral moderate, with 4 short fingers. Vertebrae 50. Cervical vertebrae sometimes ankylosed. Neural canal broad, triangular. Ribs 11. 11.* Balænoptera, or Beaked Whales.

8. **BALÆNOPTERA.** Second cervical with a broad lateral expansion perforated at the base. First rib single-headed. Lower jaw with conical coronoid process.

The student must not run away with the idea that, because the characters of the genera here given are taken from a few parts of the skeleton, they are the only differences which exist between the skeletons of the different genera and species. The form of the head and the peculiarities of the cervical vertebrae, of the ribs, and of the blade-bone have been selected after a long and careful comparison of the skeletons, as the parts which afford the most striking characters, that can be most easily conveyed to the mind of the student in a few words, and therefore best adapted for the distinction of the genera and species.

The careful examination of many skeletons has proved to me that almost every bone of each genus is peculiar—that is to say, that no bone is exactly alike in any two genera; but the difference between them is often very slight, so slight that it would be almost impossible to convey an accurate conception of it to the reader by words alone, yet it is permanent and characteristic. Though the same bones of the different skeletons of the same species of *Megaptera* or *Physalus* which I have examined offer a certain amount of variation in minor particulars, yet almost every bone of each species has a character of its own; so that a person conversant with the subject, and fresh from the study and comparison, can say at once to which

genus or species any bone that might be shown to him belongs, even if it were only a phalange or a rib.

The ear-bones of each genus, as far as I have been able to examine, seem to afford very good characters; but, unfortunately, they are often sent to the Museum separate from the skull and other bones of the animal to which they belong.

Skeletons of whales are shown in museums and gardens, without any large and expensive building; indeed slight special buildings are best, permitting more ventilation. In Paris, the whale's skeleton is exhibited under a glass roof in the quadrangle of the Museum; at Antwerp it is shown in a building formed of galvanized iron; and they are shown in a similar manner at Edinburgh, the Isle of Wight, and other localities.

- I. *Dorsal fin low, broad. Pectoral fin very long, with 4 very long fingers of many phalanges. Vertebrae 55 or 60. Cervical vertebrae often anchylosed. Lateral process of the axis tardily ossified. Neural canal large, high, triangular, as high as broad. Ribs 14 or 15. Coronoid process of lower jaw rudimentary. Frontal bone broad, narrowed at the orbital end. Orbit moderate.* Megapterina, or Hunchbacked Whales.

Balænopterus, Geoffr. *Leçons, Mamm.* 67, 1835.

Megaptera, Gray, *Zool. Ereb. & Terror*, 16; *Cat. Cetac. B. M.* 23, 1850; *P. Z. S.* 1864, 203.

Megapteron, Gray, *Zool. Ereb. & Terror*, 51.

Mysticetus, sp., Wagler, *N. S. Amph.* 33, 1840.

Balænoptera, § Boops, Brandt, *Voy. All. Orient.* 4to, 1845.

? Cyphonotus, Rafin. *Anal. Nat.* 61, 1815 (no character nor type).

Kyphobalæna, Eschricht, *Nord. Wallthiere*, xv, 1845, fol.

Balænoptera leucopteron. Lesson, *in the Nouv. Tab. Règ. Anim.* 202, gives this name to "La Humpback des pêcheurs" of the "Hautes latitudes S."

Rorqual du Cap, Cuv.

Megapterina, Gray, *P. Z. S.* 1864, 205.

Megapterinæ, Flower, *P. Z. S.* 1864, 391.

Bunch Whale, Dudley, *Phil. Trans.* xxxiii. 1725, no. 387, p. 258.

Humpback Whale, *Whalers, Beale, Hist. Sperm W.* 12; Gray, *P. Z. S.* 1864, 350.

Balæna nodosa, Bonnat, *Cét.* 5.

Balænoptera (pars), Lacép.

The Bunch Whales are easily known from the Finners (*Balænoptera*) in being shorter and more robust, the skull nearly one-fourth of the entire length, the head wider between the eyes, the mouth larger, the lip warty, and the nose large and rounded; the plaits of the belly and throat are broad; the dorsal is more forward; the pectoral larger and narrow, about one-fifth of the length of the body; and the tail is wider, and the lobes generally more pointed.

The skull of this genus is intermediate in form between that of *Balæna* and *Balænoptera*.

This kind of whale was noticed by Dudley (*Phil. Trans.* xxxiii. 258). He says, "The Bunch or Humpbacked Whale has a bunch standing in the place where the fin does in the Fin-back; this bunch is as big as a man's head, and a foot high, shaped like a plug pointing

backwards. The bone (whalebone) is not worth much, though somewhat better than the *Fin-back*. His fin (pectoral) is sometimes 18 feet long, and very white. Both *Fin-backs* and *Humpbacks* are shaped in reeves (folds), longitudinally from head to tail, on their belly and sides, as far as their fins, which are about halfway up the sides."

This description is the origin of *Balæna nodosa* of Bonnaterre and other authors. The French authors have evidently not understood the word "reeves," and have therefore arranged these with the smooth-bellied finless whales; and Bonnaterre translates the position of the fins on the sides into "presque au milieu du corps," instead of halfway up the sides. Dudley, when speaking of the Spermaceti Whale, says, "He has a bunch on his back like a Humpback," which explains what he means by a bunch.

The Humpbacks are well known to the whalers, for Beale says, "The Humpback Whale possesses, like the Greenland Whale, the baleen, and spouts from the top of the head, yet has a hump not very dissimilar to that of the Sperm Whale." (p. 12.)

Professor Eschricht, in the 'Danish Transactions,' 1846, has figured the dorsal fin of this genus, and shows that it is more properly a *bunch*, as Dudley calls it, than a fin.

Cuvier (Oss. Foss. v. 367) thinks that the Humpback Whale was probably only a whale of another kind whose fins had been injured, not recognizing in his Cape Rorqual the genus of whale here noticed.

Olafsen speaks of a whale under the name of *Hnufubakr* (French translation, iii. 22), which is said to have a smooth belly, and a horn instead of a fin on the back; but the account of the animals in this work is evidently only a compilation, and this appears like an incorrect translation of Dudley.

Dr. Bennett observes—"The Humpback of the southern whalers derives its trivial name from an embossed appendage or hump on the posterior part of the back. It has two spiracles or nostrils on the summit of the head, and its mouth is furnished with plates of short whalebone. When seen on the surface of the water, it bears a close resemblance to the *Sperm Whale* in colour and the appearance of the hump, as well as in a habit it has of casting its tail vertically in the air; when about to dive, the hump slopes towards the tail in a more oblique manner than does the similar appendage in the Sperm Whale.

"It is seldom molested by whalers, and is never a chief object of their pursuit, although the oil it produces is superior to that from the Right Whale (*Balæna*), and but little inferior to sperm oil.

"It is a species (genus?) frequently seen in the Atlantic and Pacific Oceans, where it occurs in small herds, and seldom at any considerable distance from land, although the vicinity of the most abrupt coast would appear to be its favourite resort. Examples are occasionally seen in the neighbourhood of the islands of the Pacific, and very frequently in the deep water around the island of St. Helena.

The highest south latitude in which we noticed the species (genus) was 49°; the highest north latitude 40°, on the western side of the continent of America. Most abundant off the bold coast of Cape St. Lucas, California."—*Bennett, Whaling Voyage*, ii. 232.

Captain Sir James Ross observed them as far south as 71° 50'.

Professor Eschricht believes the *Keportak* of Greenland and the *Bermuda Whale* to be the same species, and that it migrates from Greenland to Bermuda, according to the season; and he states that he cannot find any sufficient distinction in the skeleton of the *Cape specimen* in the Paris Museum, to separate it as a species from the Greenland examples.

Schlegel considers *Balæna longimana* of the North Sea, the *Rorqual du Cap*, and the drawing he received from Japan, as all belonging to a single species, though he owns there are differences between them. I am inclined to doubt these conclusions, and therefore, until we have more conclusive evidence, have considered it advisable to regard them as separate; especially as Cuvier's (Oss. Foss. v. 381) description of the union of the lateral processes of the cervical vertebræ of the Cape specimen is very different from that of the lateral processes of the Greenland specimens in the Museum, received from Professor Eschricht (see Proc. Zool. Soc. 1847, 88).

### 1. MEGAPTERA. *Hunchbacked Whales.*

Blade-bone without an acromion or coracoid process. Body of the cervical vertebræ oblong, wider than high. Neural canal broad and high. First rib single-headed, without any internal process.

Megaptera, *Gray, Ann. & Mag. N. H.* 1864, 207, 350.

Pectoral fin elongate, about one-fifth of the entire length of the animal. Dorsal fin low, truncate. Second cervical vertebra with two short truncated lateral processes. First rib simple-headed, without any internal process.

Head broad, moderate, flattened. Throat and chest with deep longitudinal folds. Dorsal fin low or tuberos, behind the middle of the body. The pectoral very large, one-fifth of the entire length of the animal, as long as the head, consisting of only four fingers. The eyes above the angle of the mouth. The navel is before the front edge, the male organs under the back edge of the dorsal, and the vent nearer the tail; the female organs are behind the back edge of the dorsal, with the vent at its hinder end.

Skull: nose narrow, broad behind, and contracted in front. Temporal bone broad. Interorbital space wide. The upper maxillary bone is rather broad, with a convex outer margin; the intermaxillaries are moderately broad; the nasal very small. The frontal bone is broad, much and gradually narrowed and contracted over the orbit. The lower jaw slender, much arched, subcylindrical, with a compressed ridge-like ramus near the base (see Eschr. & Reinh. f. a, p. 542). Cervical vertebræ well developed, more or less anchylosed.

The atlas vertebra with an oblong body, and with a large and short broad lateral process from the upper part of each side. The upper and lower lateral processes of the second cervical vertebra very thick, short, blunt, and separated at the ends; of the other cervical vertebrae slender, more elongate, separate. Neural arch of the cervical vertebrae strong, high, with a large subcircular cavity for the spinal marrow. The bodies of the cervical vertebrae oblong, roundish, or subquadrangular, rather wider than high. The scapula short and broad, without any, or a very small, coracoid process. The arm-bone long; wrist with a broad flat spur; the fingers four, elongate, very unequal in length, the third longest, the second rather shorter, the fourth much shorter, and the first shortest; the longest is formed of eight joints (see Eschr. Dan. Trans. 1845, t. 2. f. D, & t. 3. f. 4). The front ribs thick, oblong, compressed, without any swelling or compressed dilated part near the condyle.

The baleen is short, broad, triangular, much longer than broad at the base, rapidly attenuated, edged with a series of bristle-like fibres, which become much thicker and more rigid near and at the tip. Rather twisted, especially when dry. The tympanic bones are like those of the *Balænoptera*, oblong, but shorter and more ventricose.

The foetal specimens exhibit numerous rudimentary teeth in both jaws. These are figured by Eschricht (Danish Trans. iv. t. 4. f. a, b) from specimens 35 and 45 inches long (copied Zool. Erebus & Terror, t. 30. f. 2-14).

“Orbital process of frontal much narrowed externally. Scapula high and narrow; acromion and coracoid process absent or rudimentary. Metacarpus and phalanges greatly elongated. Vertebrae 53. Ribs 14. Coronoid process of lower jaw low, obtuse. Nasal bones narrow, pointed at both ends, rising to a sharp ridge in the middle line, and deeply hollowed at the sides.”—*Flower, P. Z. S.* 1864, 391.

In the foetal state the forearm-bones are very much longer than the humerus. The third finger is the longest, but not much longer than the second; the fourth, and then the first, are shortest. The spur at the wrist is falcate. The first finger has 3, the second 8, the third 8, and the fourth 3 phalanges. (See Eschricht, Wallthiere, t. 3. f. 4.)

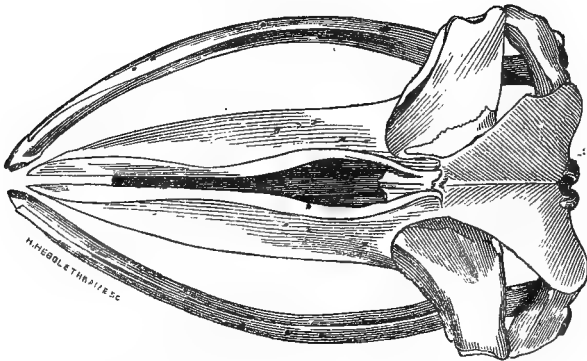
In the ‘Catalogue of Cetacea,’ p. 24, by a slip of the pen, the first rib is incorrectly said to be forked at the end near the vertebra.

The cervical vertebrae are liable to be more or less anchylosed together. In two specimens, one of *M. longimana*, in the Museum, all the cervical vertebrae are free. In the young specimen in the Derby Museum at Liverpool, which is probably *M. longimana*, the second and third cervical vertebrae are very thin, and anchylosed both by the body and the neural arch. In the specimen of *M. Poeskop* in Paris, according to Cuvier, the second and third cervicals are united by the upper part of their body; and in a specimen, apparently of the same species, from the Cape, in the British Museum the second and third cervical vertebrae are only anchylosed by *one side* of the neural arch, and free everywhere else. The breast-bone is irregular rhombic; in one specimen of *M. longimana* from Greenland it is



pierced with a large central perforation; in another adult specimen of the same species it is imperforate.

Fig. 14.



*Megaptera longimana.* Eschr. Nordhv. t. 3. f. 2.

1. *Megaptera longimana.* *Johnston's Humpbacked Whale.*

Black: pectoral fin and beneath white, black varied; lower lip with two series of tubercles; pectoral nearly one-third of the entire length; dorsal elongate, the front edge over end of pectoral; throat and belly grooved.

Female: upper and lower lip with a series of tubercles; dorsal an obscure protuberance.—*Johnston, Trans. Newc. N. H. Soc.* t. 1.

? *Balæna musculus*, *Ascan. Icon. Rer. Nat.* iii. t. 26, *cop. Bonnat. Cêt. E. M.* t. 371; *Schreb. Säugeth.* t. 335.

? *Balæna Boops* (Keporkak), *O. Fabr. Faun. Grænl.* 36? (not *Lin.*); *Turton, Brit. Fauna*, 16; *Nilsson, Skand. Fauna*, 639.

Keporkak, Langhaandede Finhval, or *Balæna Boops*, *Eschricht, K. Danske Vid. Selskabs Afh.* 1845, xi. 239. t. 1, 3, 4.

*Kyphobalæna* (Boops), *Eschricht, Nord. Wallthiere*, 1849.

*Kyphobalæna longimana*, *Van Beneden.*

*Kyphobalæna Boops*, *Eschricht, Nord. Wallthiere*, 1849.

*Balæna longimana*, *Rudolphi, Mem. Acad. Berl.* 1829, 133. t. 12 (mas), *cop. Brandt & Ratzeburg*, t. 15. f. 2.

*Balænoptera longimana*, *Rapp, Cetac.* 35.

Whale, *Johnston, Trans. Newcastle N. H. Soc.* i. 6. t. 1 (female, on back).

*Megaptera longimana*, *Gray, Zool. E. & T.* 17; *Proc. Zool. Soc.* 1847, 92; *Cat. Cetac. B. M.*; *Proc. Zool. Soc.* 1864, 207. f. 5, 6, 7; *Ann. & Mag. N. H.* 1864, xiv. 350.

*Megapteron longimana*, *Gray, Zool. E. & T.* 51; *Proc. Zool. Soc.* 1847, 89.

Inhab. North Sea; mouth of the Maese (*Rudolphi*). Newcastle (*Johnston*).

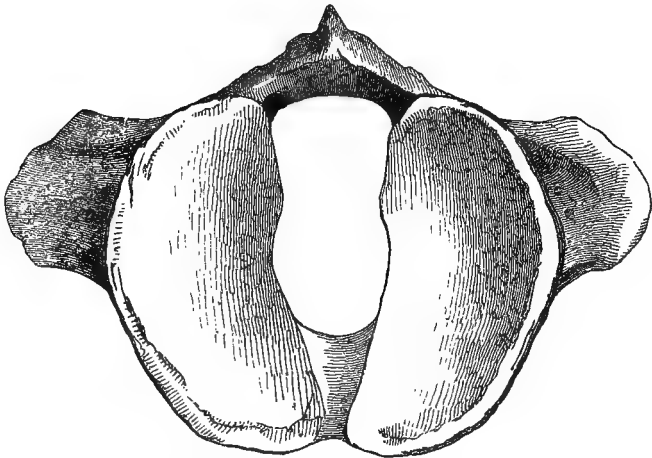
a. Stuffed specimen, young. Greenland. Professor Eschricht's Collection, as *Megapteron Boops*, Eschricht.

- b. Skull of adult. Greenland. Professor Eschricht's Collection.  
 c. Baleen of skull b. Greenland. Professor Eschricht's Collection.  
 d. Skeleton. Greenland. Professor Eschricht's Collection.

The cervical vertebræ are all free. The second cervical vertebra has two very large, thick, converging lateral processes, as long as half the diameter of the body of the vertebra; the third, fourth, fifth, sixth, and seventh have elongated slender superior lateral processes which bend rather downwards, and the sixth and seventh rather forwards; the fourth and fifth have a very short rudimentary inferior lateral process, which is smaller on the left side; the other vertebræ are without any.

The upper part or the spinous process of the second vertebra is very large and convex, covering this part of the next vertebra.—*Gray, P. Z. S. 1847, 92.*

Fig. 15.



Atlas vertebra of *Megaptera longimana*.

Extreme width 20 inches; height 13 inches.

Var. 1. The cervical vertebræ are all free. The second cervical is very thick; the third, fourth, fifth, sixth, and seventh are thicker and of nearly equal thickness, the seventh being rather the thickest. The upper lateral processes are developed and nearly equal in all of them, those of the third and fourth being directed backwards, the fifth straight out, and those of the sixth and seventh directed backwards at the end. The lower lateral processes are generally wanting; the fourth and fifth vertebræ have a rudimentary process on each side; the processes are of very unequal length on the two sides of the same vertebra, the largest being not more than an inch and a half long, and the rest mere rounded tubercles. The breast-bone is irregular subrhombic, with a large central perforation.

In a second imperfect skeleton in the British Museum, which had been mounted, the cervicals are all free. Fourth cervical like that in the Greenland specimen; but it has elongated, simple, straight lower lateral processes on each side. Seventh like that bone in the Greenland specimen, without any lower lateral process.

Fig. 16.

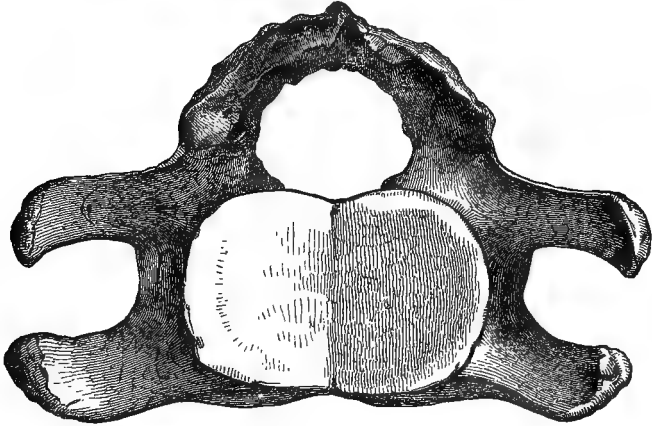
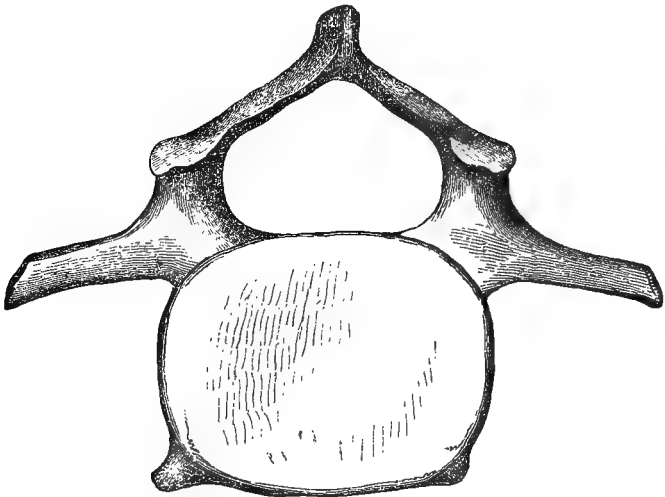
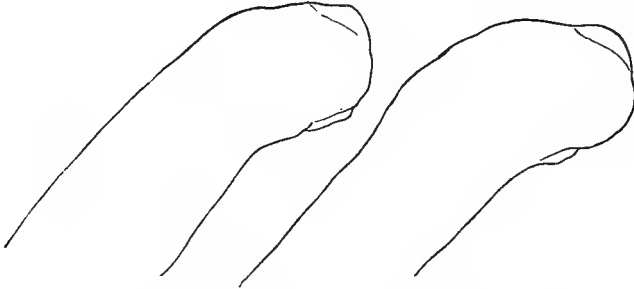
Second cervical vertebra of *Megaptera longimana*.

Fig. 17.

Fifth cervical vertebra of *Megaptera longimana*.

Sternum rhombic, without any central perforation. The tympanic bone is oblong, ventricose, smooth, very solid, with a rough depression on the convex outer side. It is very like that of the genus *Physalus*, but shorter, more ventricose, and more solid.

Fig. 18.



Top of the first and second ribs of *Megaptera longimana*.

Var. 2. MOOREI. The second and third cervical vertebræ very thin, anchylosed together by the body and neural arch. The body of the cervical vertebræ oblong, transverse, much wider than high. The neural arch rather slender, with a subcircular oblong cavity, which is fully two-thirds as high as wide.

Inhab. Estuary of the Dee (1863, *Thos. Moore*). Skeleton in the Free Museum, Liverpool; a young female 31 feet long.

The atlas is very thick; the second cervical nearly as thick as the atlas, with the upper and lower lateral processes separate, short; the fifth, sixth, and seventh cervicals all similar to the third and fourth; the fifth thin, and the seventh the thickest. The second cervical vertebra has two short broad thick processes, with a rounded interrupted perforation between them; the third and fourth have a thin long shelving-down upper, and a short straight lower process; the fifth, sixth, and seventh are similar, but have only an upper lateral process; the fifth is the thinnest, and the seventh the thickest. The arms were 10 feet long; the cartilage between the bones of the arms and the fingers is nearly half as long as the arm-bones; there are four bones immersed in it, small, variously shaped and sized; the cartilage between the elongated finger-bones is nearly half as long as the phalanges; the phalanges nearly all of the same oblong shape, and subsymmetrical in form. The bones of the skull are so fragile as scarcely to bear their own weight.

Moore, in the lithographic 'Naturalist's Scrap-Book' (printed in Liverpool) for July 17, 1863, observes, "It yielded no oil; the blubber was like a cow's udder, as exposed in the market for sale in Liverpool. Length 31 feet 4 inches. Bought by a manufacturer of oil and grease, who made nothing of it." "All black; belly mottled and streaked with white; pectoral fins milk-white, with a black

blotch here and there. Baleen very closely packed together, thirty-eight blades in a foot; the largest blade was nearly 2 feet long." "Female: length 31 feet 4 inches, of gape 8 feet, from snout to eye 8 feet, of eye 3 inches, from snout to base of pectoral 11 feet, of pectoral 10 feet; extreme width of tail 11 feet, from snout to beginning of hump 18 feet, of hump 3 feet 3 inches, from snout to cloaca 21 feet." "Stomach contained shrimps."

Eschricht figures a new-born specimen of this species, from Greenland, which was 35 inches long; it has several series of bristles on the lips, parallel with the gape (see K. Dansk. Vid. Selsk. xi. t. 3. f. 1, and the teeth as seen in the jaws, t. 4).

"There is a nearly complete skeleton of a young animal, obtained from Greenland through Eschricht, in the Leyden Museum. It is 28' 7" long, of which the skull is 7' 7". There are but thirteen ribs present."—*Flower, P. Z. S. 1864, 397.*

In the Museum at Louvaine is a "complete skeleton of young, 32' 2" long, of which the head is 8' 6". Vertebræ: C. 7, D. 14, L. and C. 31=52. Ribs 14 pairs. Sternum with a very deep notch in the middle of the upper border. Upper and lower transverse processes of the axis more open at the ends than in the Brussels specimen. Upper processes of the third, fourth, fifth, and sixth slender, almost straight, and of nearly equal length; lower processes much shorter, and gradually diminishing from the third to the sixth; absent in the seventh."—*Flower, P. Z. S. 1864, 418.*

There is "a very fine and complete skeleton, 46' long, of a nearly adult individual in the Brussels Museum. The vertebral formula is C. 7, D. 14, L. 11, C. 21=53. Ribs 14 pairs. The enormous size of the fins is grandly displayed in this specimen; they measure 12' from the head of the humerus to the tip of the phalanges. The cervical vertebræ are all free; the second to the fifth have the upper and lower transverse processes separate in all, but not complete at the ends. Those of the second are short, thick, and convergent, but still with a wide interval between their ends; this, according to Eschricht, is completed in the living animal by cartilage, which may in old age become ossified; but the tendency to it is certainly less than in the *Balænopteridæ*. According to the same excellent authority, the processes of the succeeding vertebræ are not continued in cartilage so far as to meet; so that we could never expect to find osseous rings on them. In the Brussels specimen the upper processes increase, and the lower ones decrease in length, from the third to the fifth. There is no inferior process on the sixth or seventh."—*Flower, P. Z. S. 1864, 416.*

Dr. Johnston's description chiefly differs from Rudolphi's in both lips having a row of tubercles, and in the dorsal being said to be a small obscure protuberance; but the animal was lying on its back, sunk in the sand.

Rudolphi (Berl. Abhandl. 1829, t. 1, 4) figures the bones of this species, with enlarged details of the skull. They nearly resemble the skull of the Cape Rorqual of Cuvier in form, but the nasal bones are broad, and nearly of the same width from the front of the blow-

holes to near the tip, where they gradually taper; the temporal bones appear more quadrangular. The skeleton is in the Berlin Museum. It was taken in the Elbe, 1822.

According to Professor Eschricht, this is the most common whale in the Greenland seas. In the 'Danish Transactions' he has given a figure of this species, and a very detailed account of its anatomy and development, chiefly founded on the examination of the fœtus.

He observes, "This animal is always infested with *Diadema Balænarum*, and with a species of *Otion*, which he regards as new, while the Cirripedes are never found on any species of *Balænoptera*. On the other hand, the *Tubicinella*, *Coronula Balænaris*, and *Otions* are often found on the *Balæna Mysticetus* or Right Whale of the Southern Seas" (see Eschricht, 144).

The following descriptions must be referred to this species with doubt, as both agree with true *Balænoptera* in the position of the genital organs and vent compared with the dorsal fin, and Fabricius especially says the pectoral fin is composed of five fingers.

Ascanius (Icon. Rer. Nat. iii. t. 26) gives a figure of a female Rorqual with a plaited belly, 66 feet long, from the North Sea, which he thought might be *B. musculus* of Linnæus (it is not well copied by Bonnaterre, E. M. t. 3. f. 1, and Schreber, t. 335); it has a large pectoral fin, about two-ninths the length of the body; but the drawing is not so good as the others in the work, and the fin is so awkwardly applied to the body, that perhaps its size may depend on the incompetence of the artist. The dorsal fin, which is only indicated as if doubtful in the original figure, is continued to the tail, but in Bonnaterre's copy it is represented as of equal authority with the other part.

O. Fabricius (Faun. Grœnl. 37), five years after, described a *Balænoptera* under the name of *B. Boops*, Linn., which appears to differ from *B. Physalus*, for he says—"Pinnæ pectorales magnæ, obovato-oblongæ, margine postica integra, regione cubiti parum fractæ, antica autem rotundato-crenatæ." And, he continues, "Ante nares in vertice capitis tres ordines convexitatum circularium, huic forsitan peculiare quid,"—"Pinna dorsalis compressa, basi latior, apice acutiuscula, antice sursum repanda, postice fere perpendicularis," and "Corpus pone pinnam dorsalem incipit carina acuta in pinnam caudalem usque pergens."

Rudolphi, and after him Schlegel, refer *B. Boops*, O. Fabricius, to this species; and Professor Eschricht has no doubt that *Balæna Boops* of O. Fabricius is intended for this species, as it is called *Keportkak* by the Greenlanders. If this be the case, Fabricius's description of the form and position of the dorsal fin and the position of the sexual organs is not correct.

Brandt, in the list of Altaian animals (Voy. Alt. Orient. 1845, 4to), has adopted this opinion, and formed a section for *Balænoptera longimana*, which he calls *Boops*, merely characterized as "Pectoral elongate."

Schlegel refers the *Rorqualus minor* of Knox to this species, probably misled by the inaccurate figures of this species in Jardine's

Nat. Lib. vi. t. 6. He points out that Rudolphi and M. F. Cuvier, in their description of *B. longimana*, have confounded the figure of *Baleine du Cap* and *Rorqual du Cap*, of Cuvier's 'Ossemens Fossiles,' together.—*Faun. Japon.* 21, note.

Gervais (Zool. et Paléont. Franç. t. 38. f. 7) figures some tympanic bones under the name of *Rorqualus de Bayonne*. They are very like those of *Megaptera longimana*, and are larger than those of *Balænoptera rostrata*.

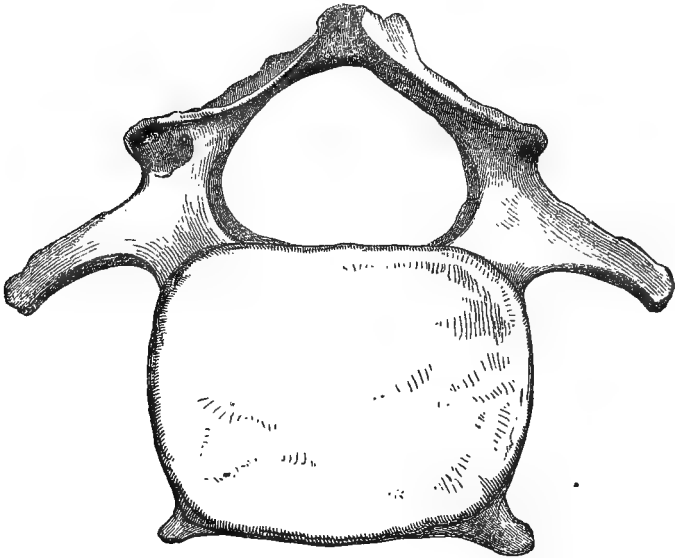
## 2. POESCOPIA.

Blade-bone with a small coracoid process. Body of the cervical vertebræ nearly square, with the angles rounded.

Inhab. South Sea.

Megaptera, § Poescopia, Gray, *Proc. Zool. Soc.* 1864, 207; *Ann. & Mag. N. H.* 1864, xiv. 350.

Fig. 19.



The fifth cervical vertebra of *Megaptera Lalandii*.

Ribs 14; the second, third, and fourth attached to the vertebræ, the rest to the processes. Vertebræ 52.—*Cuv. Oss. Foss.* v. 382.

The humerus very short; forearm-bones nearly twice as long as the humerus; fingers 4, very long, the second longest, twice as long as the lower arm-bone. Phalanges 3 . 8 . 8 . 4, the third finger nearly as long as the second, the first and fourth much shorter, not half as long as the first, thicker.—*Cuv. Oss. Foss.* vi. t. 26. f. 22.

According to Cuvier, it differs from the Greenland *Megaptera* in the following particulars:—

Axis vertebra distinct (Cuv. t. 26. f. 19); second and third cervicals united by spinous apophyses (t. 26. f. 20); the fourth (t. 26. f. 21), fifth, sixth, and seventh free. Blade-bone short, much broader than high, with a small acromion (Cuv. t. 26. f. 9). Humerus short, thick; the forearm-bones elongated; hand very long; fingers four, very long, the two middle much the longest (Cuv. t. 26. f. 22). Pelvis crescent-shaped (Cuv. t. 26. f. 24).

The cervical vertebræ which are in the British Museum (see fig. 19), received direct from the Cape, present several very important characters, especially the square form of the bodies of the vertebræ, which afford most striking specific distinctions; but perhaps Professor Eschricht may not have been able to examine the form of this part, as the skeleton in the Paris Museum is articulated, and the articular surfaces of the cervical vertebræ are not shown.

Professor Eschricht, who seems to have formed a theory that the number of species of Whales was very limited, states that he could not find any distinction in the skeleton of the Cape specimen in the Paris Museum to separate it as a species from the Greenland examples. I cannot make any observation as regards the Paris skeleton; but it is said to have been brought by Delalande from the Cape, and is probably from those seas.

M. Van Beneden, in his "Researches on the Cetacea of Belgium," also regards the Cape species as the same as the Greenland one (see *Nouv. Mém. Acad. Roy. Bruxelles*, xxxii. 38, 1861). He now considers them as distinct, and is about to publish a description of the Paris skeleton.

### 1. *Poescopia Lalandii*. *The Cape Humpback*.

Blade-bone with a very small coracoid process (Cuv. *Oss. Foss.* t. 29. f. 9). Dorsal nearly over the end of the pectoral. Intermaxillary narrowed and contracted in front. Temporal bone broad, triangular. "Second and third cervical vertebræ united by the upper part of their body."—*Cuvier*.

Rorqual du Cap, *Cuv. Oss. Foss.* v. 370. t. 26. f. 1-4 (skull), t. 26. f. 19-21 (verteb.), f. 9 (blade-bone), f. 22 (fins), f. 24 (pelvis), t. 25. f. 15 (tongue-bone): all from *Delalande's specimen*.

Balæna Poeskop, *Desmoulins*.

Balæna Balænoptera Poeskop, *Desmoulins, Dict. Class. H. N.* ii. 164, from *Delalande's MSS.*

Balæna Lalandii, *Fischer, Syn.* 525, from *Cuvier*.

Balænoptera Capensis, *Smith, S. African Quart. Journ.* 130.

Megaptera Poeskop, *Gray, Zool. E. & T.* 17; *Cat. Cetac. B. M.* 1850, 29.

Rorqual nouveau, *Voy. Pole Sud*, t. 24 (fem. not described).

Balænoptera leucopteron, *Lesson, N. Tab. Règ. Anim.* 202.

Humpbacked Whales, *Ross, Antarctic Voy.* i. 161, 191 (?); *Mitchell, Trav. Austr.* ii. 241 (?); *Beale, H. Sperm W.* 12, 30 (?).

Megaptera Poescopia Lalandii, *Gray, Proc. Zool. Soc.* 1864, 207; *Ann. & Mag. N. H.* 1864, xiv. 350.

Inhab. Cape of Good Hope (*Delalande*); called *Poeskop*. Skeleton, Mus. Paris.



a. Cervical vertebræ. Cape of Good Hope. Purchased. The two are united on one side and free on the other. Anterior with short lower lateral process, sixth and seventh without any lower lateral process.

“Head depressed, slightly convex above, with a small projection on each side of spiracle; the apex of the upper jaw acutely rounded; lower jaw much longer and broader than the upper jaw, and with three or four subglobular elevations on each side near tip. Back slightly arched, with a carinated and slightly elevated hunch towards the tail, highest about its middle, whence it slants off to each extremity; hinder part of the body carinated above and below. Throat and breast strongly marked with elevated longitudinal rugæ, with deep corresponding furrows between them. Eyes a little above the angle of the mouth; the opening of the spiracles rather in front of them. Laminæ of whalebone 300 on each side, of a bluish colour, and margined on the inner side with stiff horny bristles.

“Back and sides black; belly dull white, with some irregular black spots. Pectoral fin narrow, both its anterior and posterior edges irregularly notched; upper surface black, under surface pure white. Hinder edge of tail fin nearly square, with a slight notch at its middle, opposite the back-bone, on each side of which it is slightly convex, towards points a little concave.

“Length from tip of lower jaw to hinder margin of tail fin  $34\frac{1}{2}$  feet, from tip of lower jaw to angle of mouth  $7\frac{1}{2}$  feet, from tip of upper jaw to angle of mouth 6 feet, from angle of mouth to base of pectoral fin 9 feet; width of pectoral at base 2 feet, near point 1 foot; width of tail from tip to tip 9 feet. Length of whalebone near angle of mouth 1 foot.

“Inhab. the seas about the Cape of Good Hope. The *Humpback* of the whalefishers.

“The only specimen of the species which I have had an opportunity of examining had lost the skin of the hinder portion of the back before I saw it, so that I am unable to describe the hunch from my own observation. Those who have been in the habit of seeing and killing this species all agree as to the character of the hunch, and from what I have myself observed at a distance through a telescope, I should feel inclined to regard their description as correct. They unite in asserting that there is nothing of the appearance of a regular fin; and all that I could distinguish, from watching the animal when in motion, and partly above the surface of the water, was a sort of semilunar elevation towards the tail and somewhat above the line of the back.”—*A. Smith, African Quart. Journ.* p. 131.

Delalande’s account was published by Desmoulins, who merely gives the following particulars, except what appears to be common to the genus. He says, “it has a boss on the occiput, and its dorsal is nearly over the pectoral;” in the European and Bermudean figures it is over the end of these fins.

Cuvier’s figures of the adult skull differ from Rudolphi’s figure of *M. longimana* in the intermaxillaries being narrower and contracted in front of the blowers, and then rather widened again and linear,

and the temporal bone is broader and more triangular—which made me believe it to be a distinct species before I obtained the cervical vertebræ.

M. Desmoulins, in describing this species, pointed out the most important character of the genus, viz. the length of the pectoral.

The following species are probably *Megapterinæ*, but they are too imperfectly known to determine to what genus they belong.

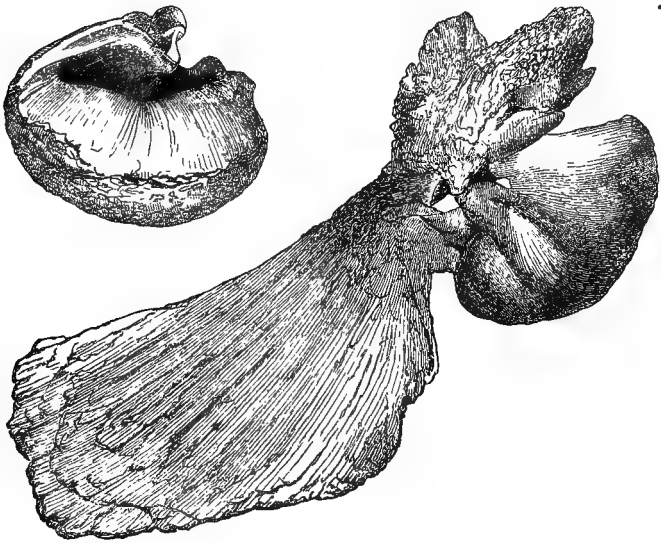
### 1. *Megaptera Novæ-Zelandiæ*.

The tympanic bones very like those of *M. longimana*, but shorter and more swollen, and the periotic bone broad and expanded; the rest of the skeleton, unfortunately, is unknown.

*Megaptera Novæ-Zelandiæ*, Gray, *Proc. Zool. Soc.* 1864, 208; *Ann. & Mag. N. H.* 1864, xiv. 351.

Inhab. New Zealand.

Fig. 20.



Ear-bones of *Megaptera Novæ-Zelandiæ*.

The specimens in the British Museum of the bones of the ear, with tympanic bones attached, were sent from New Zealand by Mr. Stuart, and are very like these bones in the *Megaptera longimana* from Greenland in the Museum collection, but differ in the tympanic bone being rather shorter and more swollen. The latter is nearly regularly oblong, and very convex at the upper part, with a somewhat hemispherical outline, and rather wider below.

The bones attached to the tympanic are broad and expanded, very unlike the same bones in the Greenland species.

This species may be the same as the one from the Cape; but it is well to indicate the existence of a Humpbacked Whale in this district, in the hope of inducing naturalists to give an account of it, or to send a skeleton of it to England for comparison.

M. Van Beneden states that there is the incomplete skull of a *Megaptera*, brought from Java by Professor Reinhardt, in the Leyden Museum, but Mr. Flower informs me that it is more like the skull of a young *Sibbaldius*.

## 2. *Megaptera* ? *Burmeisteri*.

Balænoptera allied to *B. Lalandii*, *Burmeister*, *MSS.*

Inhab. coast of Buenos Ayres. Mus. Buenos Ayres. Skeleton complete, without the fore fins (*Burmeister*).

The skeleton is allied to *B. Lalandii* of the Cape of Good Hope, figured in Cuvier's 'Ossemens Fossiles.' The shape of the skull is different. The ribs 14.14.

"The vertebræ are also peculiar. After the fourteen dorsal, which bear the ribs, follow twelve lumbar without any under processes (hæmapophyses), and then follow three with processes. The first of these is very remarkable for the shortness and peculiar figure of its small transverse processes, and especially for the very large size of the body of the vertebra, which seems to me to indicate clearly the sacral vertebra, or the beginning of the tail."—*Burmeister*, *Letter*, 24th Sept. 1864.

## 3. *Megaptera Americana*. *The Bermuda Humpback*.

Black; belly white; head with round tubercles.

Whale (Jubartes?), *Phil. Trans.* i. 11 (1665).

Bunch or Humpbacked Whale of Dudley, *Phil. Trans.* xxxiii. 258.

*Balæna nodosa*, *Bonmaterre*, *Cêt.* 5, from Dudley.

*Megaptera Americana*, *Gray*, *Zool. Ereb. & Terror*, 17.

*Megapteron Americana*, *Gray*, *Zool. Ereb. & Terror*, 52.

Inhab. Bermuda, March to end of May, when they leave.

I have a tracing of the Bermuda Whale, but do not know whence it was derived: it is said to be common in that island. It is very like the figure of *Megaptera longimana*, but the dorsal fin is represented as lower, and the tail wider. This is doubtless the whale described in *Phil. Trans.* i. 11 and 132, where an account is given of the method of taking it. It is described thus:—"Length of adult 88 feet; the pectoral 26 feet (rather less than one-third of the entire length), and the tail 23 feet broad. There are great bends (plaits) underneath from nose to the navel; a fin on the back, paved with fat like the caul of a hog; sharp, like the ridge of a house, behind; head pretty bluff, full of bumps on both sides; back black, belly white, and dorsal fin behind."

"Upon their fins and tail they have a store of clams or barnacles, upon which he said rock-weeds and sea-tangle did grow a hand long.

“They fed much upon grass (*Zostera*) growing at the bottom of the sea: in their great bag of maw he found two or three hogsheads of a greenish grassy matter.”—*Phil. Trans.* i. 13.

Baleen from Bermuda, called *Bermuda finner*, is extensively imported; it is similar to the baleen of the Grey Finner.

#### 4. *Megaptera Kuzira*. *The Kuzira*.

Dorsal small, and behind the middle of the back; the pectoral fin rather short, and less than one-fourth the entire length of the body; the nose and side of the throat have round warts; belly plaited.

*Balæna antarctica*, *Temm. Faun. Japon.* 27.

*Balænoptera antarctica*, *Temm. Faun. Japon.* t. 30 (not t. 23).

*Megaptera antarctica*, *Gray, Zool. Ereb. & Terror*, 17; *Cat. Cetac. B.M.* 1850, 30.

? *Balænoptera longimana*, *Schrenck, Amur-Lande*, 192.

Inhab. Japan. ? Amur-Land.

Skull in Mus. Leyden, *vide* Van Beneden.

The figure in the ‘Fauna Japonica’ is from a drawing brought home by M. Siebold, not accompanied by remains. M. Siebold observes that the Japanese distinguish three varieties:—

1. *Sato Kuzira*. Black; nose more elongate and rounded, and the pectoral long; the belly and lower face of the pectoral are grey, with white rays.

2. *Nagasu Kuzira*. Paler; nose more pointed; the belly has ten plaits. In both, the lower jaw is larger than the upper.

3. *Noso Kuzira*. Distinguished from the first because the back and fins are white-spotted.—*Faun. Jap.* 24.

Chamisso figures a species of this genus from the Aleutian seas, under the name of *Aliomoch* or *Aliama*; when young, *Aliamaga dach* (N. Acta Nat. Cur. xii. 258. t. 18. f. 5; Fischer, Syn. Mamm. 527. n. 4), from a wooden model made by the Aleutians: and Pallas (*Zool. Rosso-Asiat.* i. 288) calls it *Balæna Allamack*. The pectoral fins are long; they, and the underside of the tail are white.

Pallas, under the name of *B. Boops?* (*Zool. Rosso-Asiat.* i. 291), describes a whale which appears to belong to this genus, found at Behring’s Straits by Steller, when he was shipwrecked. The head was  $\frac{1}{4}$ , the pectoral fin  $\frac{1}{5}$ , the entire length, and the vent  $\frac{7}{10}$  from the head, as shown by the following measurements:—length, 50 feet; head, 12 feet; pectoral fin, 10 feet long and 5 feet wide; tail, 16 feet wide, and the vent 35 feet from the head. If these measurements are correct, the pectoral fin is shorter and much wider than it generally is in this genus. The position of the dorsal fin is not noted.

In the *Zoologia Rosso-Asiat.* 293, Pallas described a whale under the name of *B. musculus*, observed by Merle at Kamtschatka. It was long and slender, ash-brown, white-clouded above, snow-white beneath, and spotted on the sides. It was 22 feet 6 inches long; the dorsal was 6 feet from the tail, and 1 foot 11 inches high; behind the fin the back was two-keeled; the pectoral fin was rounded at the

end, and 10 feet 7 inches distant from the tip of the beak, 4 feet 2 inches long, and 1 foot 2 inches wide: behind the vent, 7 feet before the tail, and 3 feet from the vent, is a kind of white fin, and the genital organs are 1 foot 3 inches before the vent. If this description and these measurements are correct, it must be a most distinct species, if not a peculiar genus: the pectoral fins are nearly in the middle of the body; and I know of no whale with a fin behind the vent beneath, and with the genital organs nearly under the pectorals. The pectoral is almost one-fifth of the entire length.

Schrenck (Amur-Lande, i. 192) mentions a whale called *Keng*, which he refers to "*Balænoptera longimana*, Rudolphi," as inhabiting the south coast of the Ochotskian seas.

Forster, in 'Cook's Voyage,' appears to have met with a species of this genus between Terra del Fuego and Staten Island. He says, "These huge animals lay on their backs, and with their long pectoral fins beat the surface of the sea, which caused a great noise, equal to the explosion of a swivel."

Lesson (Tab. Règ. Anim. 202) gives the name of *B. leucopteron* to the "Humpback of the whalers in the high southern latitudes."

Mitchell (Travels in Australia, ii. 241) speaks of a Hunchbacked Whale which inhabits Portland Bay, Australia Felix.

This genus is also found in the seas of Java, for there is an imperfect skull, brought from that country by Professor Reinhardt, in the Leyden Museum.—*F. Japon.* 24.

In the Museum of the Asiatic Society, Calcutta, there are portions of a Whale skeleton, presented by Mr. Swinton, as recorded in the 'Gleanings of Science,' ii. 70. They consist of a nearly perfect skull, a rib, an injured scapula, and 34 vertebræ. Mr. Blyth thinks this species agrees with the *Rorqual du Cap* (Cuv. Oss. Foss. viii. 276. t. 227. f. 1, 4). A *Megapteron*, according to Gray (see Proc. Zool. Soc. 1847; Ann. & Mag. N. H. 1847, 282).—*Blyth's Reports*.

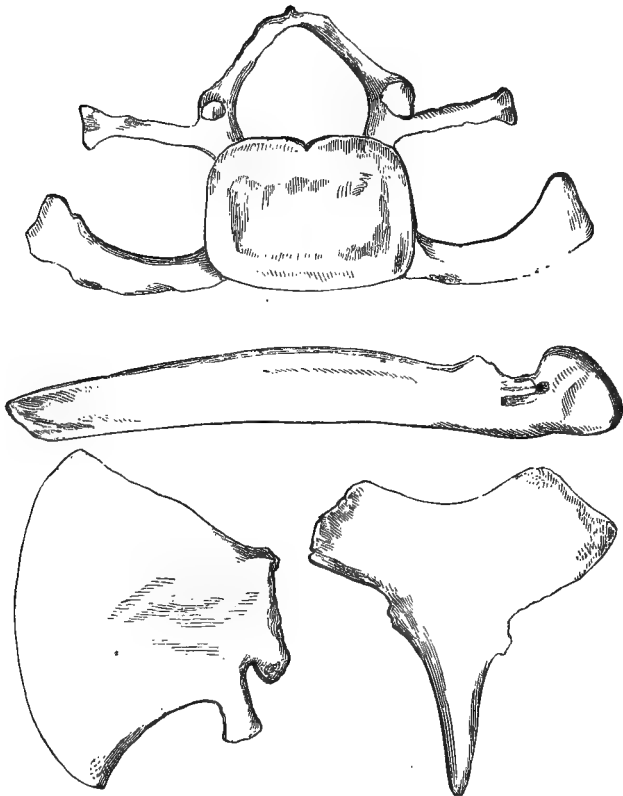
The *Rorqual nouveau*, Hombr. & Jacq. Zool. Dumont-d'Urville, t. 24 (*Balænoptera Astrolabiæ*, Pucheran, Mag. Zool. 1854, and Arch. Naturg. 1855, 42), is probably a Humpback Whale.

### 3. ESCHRICHTIUS.

Dorsal fin —? Pectoral fin —? The lower jaw-bone rather compressed, with a very low, slightly developed coronoid process. Cervical vertebræ free; the second —?, the third, fourth, and sixth with the lateral processes elongate, and separate at the end; body small, thick, solid; the canal of the spinal marrow very wide, trigonal, and nearly as wide as the body of the vertebra, almost as high as wide, with rounded angles. The blade-bone broader than high, with an arched upper edge, and with a strongly developed acromion and coracoid process. Breast-bone trigonal, rather longer than wide; front part arched out on the front edge, truncated at the sides; the hinder part at first suddenly tapering for half its length, then gradually tapering to a point behind. Vertebræ 60. Ribs 15.15; the first rib simple-headed; the first, second, and third

with a compressed slender process below the condyle. The humerus short, thick; the forearm-bones broad, compressed, rather longer (about one-third) than the humerus.

Fig. 21.



Third cervical vertebra, lower jaw, blade- and breast-bone of *Eschrichtius robustus*. (From drawings by Professor Lilljeborg.)

Professor Lilljeborg refers these bones to the genus *Balænoptera*, because the blade-bone has a well-developed acromion and coracoid process as in that genus, and because they are not developed in *Megaptera longimana*; but the acromion is partially developed on the blade-bone of *M. Lalandii* from the Cape, and there is no reason why it may not be more developed in another species allied to it. He says, "it is distinguished from *B. longimana* by the strongly developed acromion and coracoid process on the blade-bone."

I am induced to refer it to *Megapterina* on account of the form of

the canal of the spinal marrow of the cervical vertebræ, and the want of development of the ramus of the lower jaw.

The ribs and the blade-bone are more like *Physalus* than *Megaptera*. This combination of characters induces me to think it should form a genus by itself.

These observations are founded on some drawings of the bones of the tropical specimen which Professor Lilljeborg has kindly sent to me.

1. *Eschrichtius robustus*. *The Gräsö Whale*.

*Balænoptera robusta*, Lilljeborg, *Foredag Kiøbenh.* 1860, t. 611. f. 1, 2; *Skand. Hvalartade*, 77.

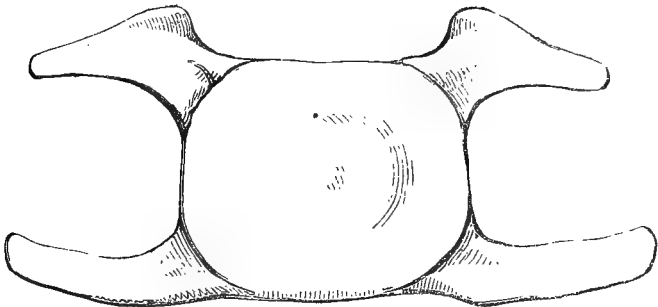
*Megaptera*? *Eschrichtius robustus*, Gray, *Ann. & Mag. N. H.* 1865. *Eschrichtius robustus*, Gray, *P. Z. S.* 1865.

Inhab. North Sea. The British Channel; Babbicombe Bay, Torbay, Devonshire (*Mr. Pengelly*, 24th Nov. 1861).

a. Cast of the fifth cervical vertebra, from a specimen cast ashore at Babbicombe Bay, Devonshire, 1861. Presented by Mr. Pengelly, 1864.

The Danish skeleton was discovered buried from 2 to 4 feet below the surface, about 840 feet from the beach, and about 12 to 15 feet above the surface of the sea. It is imperfect, having only the first, third, fourth, and sixth cervical vertebræ, a right scapula, a left humerus, the right lower arm-bones, six carpal, four metacarpal, and four phalangeal bones. Approximate length 45 or 50 feet; length of under jaw 8' 2"; breadth of atlas 1' 5½"; thickness of body of third cervical 2¼", breadth of body 8¾ inches, width of including transverse processes 2 feet; length of breast-bone 11¼ inches, breadth 1 foot; length of shoulder-blade 2' 8½", width 3' 6½"; length of humerus 1' 9½", width 11½"; length of radius 2' 3", breadth in middle 7"; length of ulna 2' 2½", breadth in middle 4".

Fig. 22.



Worn cervical vertebra. Devonshire.

The body of the fourth or fifth cervical vertebra of this whale was cast on the shore of Babbicombe Bay on the 24th of November,

1861. It is very thick, and of nearly uniform thickness; front and hinder articulations nearly flat; the sides nearly straight, the lower side being the widest or most arched out. The upper and lower lateral processes are very strong, the upper one subtrigonal, and bent down nearly on a level with the articulating surface of the centrum; the under one rather compressed above, broader, rather flattened on the lower edge. Width of the body  $7\frac{1}{2}$ , height 6 inches; the upper process  $3\frac{3}{4}$ , and the lower  $4\frac{1}{2}$  inches; but they are evidently broken, and the ends worn.

- II. *Dorsal fin high, compressed, falcate, about three-fourths of the entire length from the nose. Pectoral fin moderate, with 4 short fingers of not more than 6 phalanges. Vertebrae 58 or 64. Cervical vertebrae not ankylosed; body oblong, transverse; neural canal oblong, transverse, broad and low. Ribs 14 to 16, first with an internal compressed process. Lower jaw with a conical coronoid process.*  
Physalina, or Finner Whales.

Physalina, Gray, P. Z. S. 1864, 211.

Balæna tripennis, Sibbald, Phal. 1692.

Balenapterus, sp., Lacép.

Balenopterus, sp., Lacép.; F. Cuv. D. S. N. lxi. 518.

Balænoptera, sp., Lacép. Cét.

Balænoptera, Sect. 2 & 3, Gray, Zool. Ereb. & Terror, App. 50, 1846.

Pterobalæna (pars), Eschricht, Nord. Wallthiere, 1849.

(Cetoptera or) Cetoptera, Rafin. Anal. Nat. i. 219, 1815.

Mysticetus, sp., Wagler, N. S. Amph. 33.

Balæna, sp., Linn.; Illiger, Prodr. 142, 1811.

Physalis, Fleming, Brit. Anim. 1828.

Physalus, Lacép. Cét.; Gray, Proc. Zool. Soc. 1847, 90; Cat. Cetac. 1850, 34; Brandt.

Physelus, Rafin. Anal. Nat. 60, 1815.

True Finners, Gray, Ann. & Mag. N. H. 1864, xiv. 351.

“Orbital process of frontal nearly as broad at the outer extremity as the base, or somewhat narrowed. Scapula low, broad, with a long acromion and coracoid process. Metacarpus and phalanges of moderate dimensions.

“Van Beneden (“Faune Littorale de Belgique,” Acad. Roy. Belg. 1860, xxxii.) has recognized the distinctive characters of three species belonging to this group, which he calls *Pterobalæna communis*, *P. gigas*, and *P. minor*. Dr. Gray (Proc. Zool. Soc. 1864, p. 215) constitutes these three species as the types of distinct genera, which he has named *Physalus*, *Sibbaldius*, and *Balænoptera*; he also makes a fourth genus, *Benedenia*. Although I am as little disposed as any one to multiply generic names (a tendency of modern times of which we are all apt to complain), I cannot help admitting that, if the genera of Whales are to be at all equivalent in value to those now generally received in other groups of mammals, the first three of these are perfectly valid. Of the genus *Benedenia* I speak with more hesitation, as it is constituted only upon the examination of a very young individual, which I confess I am unable to distinguish from a *Physalus*. As the diagnostic characters given by Dr. Gray



are brief, and limited to certain parts of the organization, I may be permitted perhaps to give more detailed characters taken from the skeleton generally, which will, I think, fully confirm his views as far as these genera are concerned. Into those characters, taken from the external form, position of dorsal fin, or from the visceral anatomy, it is not my purpose to enter at present."—*Flower, P. Z. S.* 1864, 391.

A. *Vertebræ* 60 to 64. *The first rib single-headed.*

#### 4. BENEDENIA.

The maxilla gradually and regularly tapering in front, with a straight outer edge. Second cervical vertebra with two short truncated lateral processes; first rib simple-headed, with a compressed internal process. Neural arch of cervical vertebrae oblong, transverse, broad and low, not more than two-thirds the width of the body of the vertebrae; coracoid process distinct, high behind.

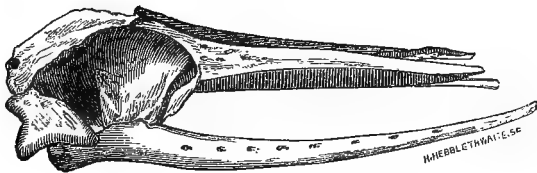
*Physalus*, § *Rorqualus*, *Gray, Cat. Cet.*

*Benedenia*, *Gray, P. Z. S.* 1864, 211; *Ann. & Mag. N. H.* 1864, xiv. 351.

Pectoral fins moderate; dorsal fin falcate. Skull rather broad; maxillæ broad, with nearly straight outer margins. The second cervical vertebra with two separate, broad, strong, nearly equal-sized lateral processes, which are rather expanded and truncated at the tip (as in *Megaptera*). The third, fourth, fifth, and sixth cervical vertebrae with elongated slender upper and lower lateral processes, which are attenuated and separated at the end (not forming rings). The bodies of the cervical vertebrae oblong, transverse; the canal of the neural arch low, oblong, transverse, much wider than high. The scapula short, broad, with a strong, well-marked coracoid process.

*Vertebrae* 60. Ribs 15, all simple; the front ones compressed and dilated at the end; the first with a broad rounded lobe on the inner side; the second with an elongate, slender, rounded internal process.

Fig. 23.



*Benedenia*. Brit. Mus.

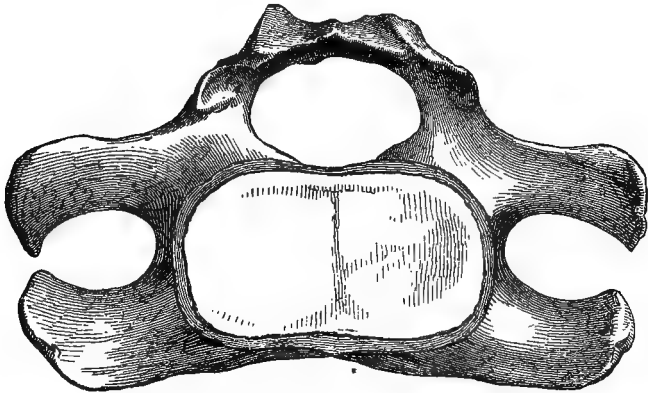
This genus is only described from the skeleton of a young specimen; it combines the characters of *Megaptera* and *Physalus*. Its second cervical vertebra has the form of that of *Megaptera*; and it has the low neural arch and the oblong transverse canal for the spinal marrow, the blade-bone with the strong anterior process, the same kind of front ribs, and the short pectoral fins of the genus *Physalus*.

It has been suggested to me by a comparative anatomist of considerable experience that perhaps the lateral processes of the cervical vertebræ of this whale might be lengthened in the adult, and the end of the upper and lower processes united into a broad expanded plate as in the genus *Physalus*.

In the skeleton of the small fœtus of *Balænoptera*, only 9 inches long, figured by Eschricht in the 'Royal Danish Transactions' for 1846, t. 14. f. 2, the lateral processes of the second vertebra are very nearly of the same shape as in the adult, forming a broad expansion, with a perforation at its base. The cervical and other vertebræ of this fœtus seemed to agree, in all details of form, with the same bones in the adult.

I do not deny that the lateral process of the first cervical vertebra may not be continued in cartilage, and be of the same form as that of the genus *Physalus*; but at any rate we have no proof, if this be the case, that the cartilage at the end ever becomes ossified in this genus any more than in the genus *Megaptera*, both genera agreeing in the equality of the thickness and strength and shortness of the lateral processes.

Fig. 24.



Second cervical vertebra of *Benedenia Knoxii*.  
Extreme width 19 inches; height 10 inches.

The genera *Megaptera* and *Benedenia* have separate, short upper and lower lateral processes, which are rather dilated and truncated at the end, having an interrupted circular perforation between their inner bases. It has been suggested that, in the latter genus at least, the separated processes may be only the imperfectly developed state of the broad lateral process of the genus *Physalus*, the end that is wanting in the skeleton probably existing in the living animal in the state of cartilage. But if this should be the case (which I much doubt), the form of the margin of the perforation and the perforation itself must undergo great change during the ossification of

the end of the process for there to be any resemblance between the lateral processes of these genera and that of the genus *Physalus*. From what I have observed, I believe that no such change takes place, and that the form of the processes and the situation of the perforations afford good characters for the separation of the species into groups and the species from each other.

Fig. 25.

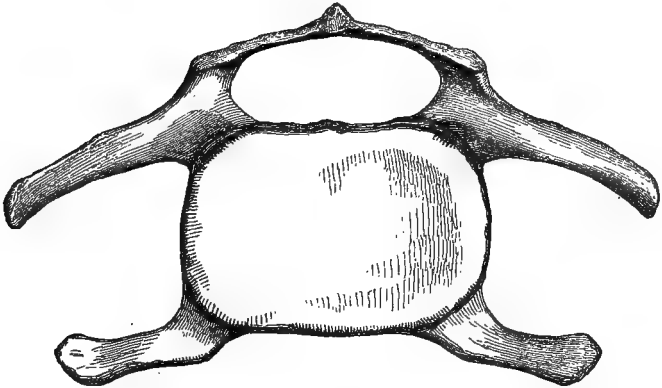
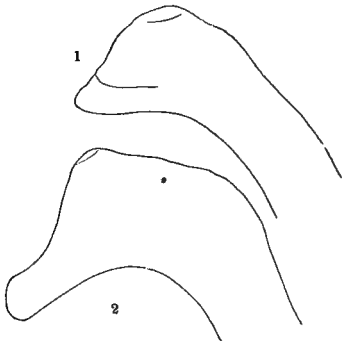
Fifth cervical vertebra of *Benedenia Knoxii*.

Fig. 26.

First and second ribs of *Benedenia Knoxii*.

1. *Benedenia Knoxii*.

*Balænoptera antiquorum*, junior, *Gray, Cat. Osteol. Spec.* 142.

*Physalus* (*Rorqualus*) *Boops*, *Gray, P. Z. S.* 1847, 91; *Cat. Cetac.* 41, 1850.

*Benedenia Knoxii*, *Gray, P. Z. S.* 1864, 212. f. 8, 8 a, 8 b.

The lower jaw with a distinct, low, long impression; coronoid process as high as half the height of the lower jaw-bone. Cervical vertebræ all free; the upper lateral processes bent down; the lower ones ascendant at the end, with a more or less acute angle on the lower edge near the base. The second cervical vertebra moderately thick; the third, fourth, fifth, sixth, and seventh rather thin, and all nearly of the same thickness. The upper lateral processes of the third and fourth very slightly bent back at the end; of the fifth similar, but nearly straight; of the sixth and seventh broader and stronger to the end, and rather bent forwards towards the head at the end. The lower lateral processes of the third, fourth, and fifth vertebræ compressed, high, nearly similar, and nearly equally strong, with an obscure angular prominence on the lower edge near the base; of the sixth vertebra not so long, high, and compressed at the base, tapering at the end, and with a decided angular projection on the lower edge, where the end bends up. The seventh vertebra without any lower lateral process on either side. The breast-bone broad above, with an arched upper edge, narrow and rather produced below, with concave sides, and without any central perforation. The front (first, second, and third) ribs thin, compressed, dilated at the end; the first with a short, broad, rounded, the second with a larger, slender, produced process on the inner side.

The skull is 108 inches long and 54 broad at the broadest part of the brain-case, 34 at the base, and 25 in the middle of the upper jaw. The lower jaw is 118 inches long.

a. Skeleton of animal taken on the coast of Wales and towed into Liverpool in 1846.

The length is 38 feet; the head is 9 feet long; the vertebræ are 60 in number, and there are 15 pairs of simple ribs.

The specimen here described was mentioned in the papers of the day as a *Spermaceti Whale*!

This whale, or some of the same genus, has also probably been caught on the coasts of France and Spain. M. Van Beneden, having met with skeletons of whales, one at Bayonne and the other at Abbeville, which he considered the young of *Physalus antiquorum*, observes that, in both, the two apophyses of the axis were not yet united; the ribs, he observes, are wanting (*Nouv. Mém. Acad. Roy. Bruxelles*, xxii. 37).

I am aware that Eschricht and Reinhardt (*Essay on the Northern Whale*) seem to doubt the distinctness of this species. Unfortunately I do not understand Danish sufficiently to quite make out what is their objection; but I feel that, excellent as is their essay on the animal which they describe, some part of their argument would be much modified if they had been able to examine a larger collection

of skeletons from different localities, and if they could have examined those in other museums and from other localities more in detail; but they give their opinions on specimens which they have not seen, and, like many other Continental naturalists, without making sufficient allowance for the very large extent of the collection in England, or considering that the species here described are not separated until after careful consideration and comparison. There is an inclination in many of the Continental naturalists to believe that all the species they do not possess are the same as, or only slight variations of, those they have—an idea that is a fertile source of confusion and error in reasoning. This theory of the limited number of species of Whales greatly detracts from the value of M. Eschricht's observations on the anatomy of Whales, in his papers in the 'Danish Transactions'; for he constantly speaks of variations which would only be true if they were found in the same kind of Whales, but are peculiarities and important differences when they are found in different species or kinds of animals.

### 5. PHYSALUS.

Pectoral fin moderate. Dorsal fin falcate, three-fourths the entire length from nose. Cervical vertebræ all free; the second with a broad, expanded lateral process, with a large perforation in the upper part of its base. Neural canal of cervical vertebræ oblong, transverse, broad and low, not more than three-fourths of the width of the body of the vertebræ. Tympanic bone oblong, elongate. Vertebræ 60 or 64. Ribs 14 to 16. First rib simple, compressed, not divided; head with a compressed internal process near the condyle. Lower jaw thick, convex on the sides, with a conical coronoid process.

*Physalus*, Lacép.; *Gray*, *P. Z. S.* 1847, 88; *Cat. Cetac.* 34, 1850; *P. Z. S.* 1864, 215

*Physalis*, *Fleming*, *B. A.* 1828.

*Physelus*, *Rafin.*

*Balæna tripennis*, *Ray* (Razorback).

*Balænopterus*, sp., *Lacép.*

*Balænoptera*, sp., *Lacép.*

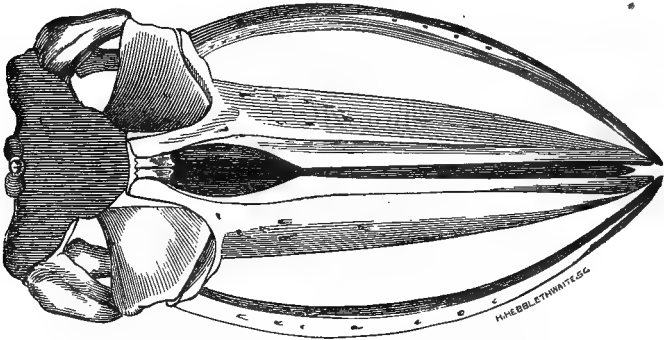
*Pterobalæna*, sp., *Eschr.*

*Ogmobalæna*, *Eschr. Wallthiere*, 7, 1849.

The head elongate, flattened, about one-eighth the whole length. The eye is near the angle of the mouth, and the blowers lunate, covered by a valve and separated by a longitudinal groove. The throat and chest with deep longitudinal folds and very dilatile. The dorsal fin compressed, falcate, three-fourths the length of the body from the nose, behind the line over the orifice of generation. The pectoral moderate, about one-eighth the length of the body, one-fourth the length of the body from the nose, of four fingers. The vent under the front of the dorsal fin. Male organs two-fifths from the chin, in front of line of dorsal; female near vent. Vertebræ 60-64; cervical vertebræ all separate and free. The skull is broad, depressed; nose broad, gradually tapering, with straight sides, with a narrow interorbital space (*Cuv. Oss. Foss.* v. 373. t. 26). Maxilla

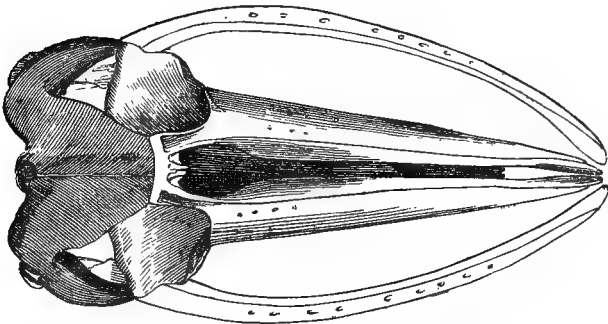
and intermaxilla narrower than in *Megaptera* (see Eschr. & Reinh. Nordhv. t. 3. f. 3). The baleen is short, broad, triangular, rather longer than broad at the base, and edged with a series of elongate, unequal, bristle-like fibres, which become much thicker and more rigid near the upper tip. It is internally formed of one or two crowded layers of thick tubular fibres, covered on each side with a thin coat of enamel, which becomes thinner and thinner near the edge, where the fibres are free; always twisted.

Fig. 27.



*Physalus antiquorum.* Eschr. Nordhv. t. 3. f. 3.

Fig. 28.



*Physalus antiquorum.* Cuv. Oss. Foss. t. 26. f. 3.

“Total number of vertebræ 61–64. Ribs 15 (or 16) pairs. Orbital process of frontal bone considerably narrowed at its outer end. Nasal bones short, broad, deeply hollowed on their superior surface and anterior border. Rami of the lower jaw massive, with a very considerable curve, and a high, pointed, curved coronoid process. Neural arches of the cervical vertebræ low; spinous processes very slightly

developed. Transverse process of the atlas arising from the upper half of the side of the body, long, tapering, conical, pointed directly outwards. Upper and lower transverse processes, from the second to the sixth vertebræ, well developed, broad, flat (and united at the ends in the adult, forming complete rings?). Head of the first rib simple, articulating with the transverse process of the first dorsal vertebra. Second, third, and sometimes the fourth ribs with capitular processes, reaching nearly to the bodies of the vertebræ. Sternum broader than long, in the form of a short broad cross, of which the posterior arm is very narrow; it might perhaps be compared to the heraldic trefoil; it is subject, however, to considerable individual modifications."—*Flower, P. Z. S.* 1864, 392.

The upper maxillary bone is rather broad, gradually tapering, with a straight outer edge; the intermaxillaries are moderate, and the nasal very small. The frontal bone is broad and short, suddenly narrowed on the outer side, and truncated over the orbit. The lower jaw slender, arched, with a distinct elevated ramus near the base (see Eschr. & Reinh. p. 544). The atlas vertebra with a sub-circular body; the lateral processes cylindrical and near the middle of the side. The second cervical vertebra has a broad, more or less elongated lateral process, which is pierced near the base with an oblong perforation: the upper margin of the perforation is narrow, and the lower edge much broader. The other cervical vertebræ have two lateral processes, which are often united at the ends into a more or less broad ring. The body of the cervical vertebræ is oblong, transverse, broader than high. The neural arch is long, with an oblong transverse canal for the spinal marrow, which is much broader than it is high. The front ribs compressed, thin, with a broad, more or less elongated expansion on the inner edge near the condyle. The scapula high, with a broad coracoid process near the joint.

The baleen forms three or four concentric lines on the palate, the rows forming transverse lines. The plates of the inner rows are short, of the outer elongate triangular; they are all fringed on the inner oblique side. (See Ravin, *Ann. Sci. Nat.* v. 270. t. 11. f. 5-10; see also Rosenthal, *Abhandl. K. Acad. Berlin*, 1827, 127.)

The shape of the lateral process of the second cervical vertebra seems to be a good character of the genus. The perforation at the base of it is rather above the middle of the base of the process, so that the upper margin is narrower than the lower. In the genus *Balænoptera* it is nearly in the centre of the base.

"The first pair of ribs is not articulated to the first dorsal vertebra, nor to any vertebra whatever; the head of it is buried in a mass of ligament which connects all the upper lateral processes of the cervical and the first dorsal vertebra together.

"No articulating surface exists in these processes on the first dorsal vertebra. The articulating surfaces are well marked on all the other dorsal vertebræ. This shows the use of the lateral apophyses and their great development in some species."—*Heddle, P. Z. S.* 1856, 197.

"In a glassy sea near Wick, a Finner rushed round us in every

direction, with its upper jaw above the water, blowing with great violence and noise, and diving sometimes tranquilly, sometimes in a seething wave created by its fin and tail. It was evidently feeding on herrings, as every now and then it would rush headlong into portions of the sea where the smooth surface was broken by the shoals of fish. The blowholes were at times flat and unprojecting, at others boldly prominent, the animal evidently having the power of raising or depressing these organs. The Fin-whales of Orkney and Caithness every season are observed in pursuit of herrings."—*Heddle, P. Z. S.* 1856.

These animals are often called *Razor-backs* and *Piked Whales* by the sailors.

The baleen or fin of the Finners is only used to split into false bristles, but for this purpose they are inferior to the Southern or lowest kind of baleen of the *Balæna*.

Martens (Spitz. 125. t. 2. f. c) figures a whale, under the name of *Fin-fish*, which agrees in all points with this group; but, as there are no folds on the belly in the figure, Ray, and after him Brisson and Linnæus, established for it a species under the name of *Balæna Physalus* (S. N. i. 186). As, however, the name *Fin-fish*, used by Martens, is the one now given by the Greenland whalers to these fin-backed whales with plaited bellies, and as Martens does not mention the colour, nor say a word about the belly, and as Scoresby says, from report, that the skin of the *Fin-fish* is smooth, "except about the sides of the thorax, where longitudinal rugæ or sulci occur," I think there can be little doubt that this whale was only a common Finner, and that the absence of the plaits arose from a mistake of the artist. This renders the existence of the section which Lacépède calls *Rorquals à ventre lisse*, and which Dr. Fleming transformed into a genus under the name of *Physalis*, very doubtful.

Lacépède referred to the smooth-bellied Rorquals the "Hunch-back" of Dudley, who distinctly says the belly is "reeved"; but Lacépède did not understand that word to be synonymous with plaited.

Sibbald (*Phalænologia Nova*, 1692) figures two specimens of Finners, caught on the coast of Scotland. Ray (*Hist. Piscium*, 17) noticed these specimens. Brisson and Linnæus regarded them as separate species. Linnæus designated the one with the skin under the throat dilated, probably by the gas in the abdominal cavity, *B. musculus*, and the other with this part contracted and flat, *B. Boops*. I proved, by the examination of the specimen we have in the British Museum, when alive, and M. Ravin observes (*Ann. Sci. Nat.* v. 275), that this skin is very dilatable; so that these characters appear to depend on the manner in which the specimen might lie when drawn, and the quantity of gas which might have been produced by the decomposition of the interior. These species have been retained by Turton, Fleming, Jenyns, and other authors who have compiled works on the British fauna, except Bell, who cut the Gordian knot by uniting them and the *Balæna rostrata* of Hunter into a single species! The author who appears to have best understood the



British species is Mr. F. J. Knox, who took some pains to examine these animals and their anatomy.

For the purpose of convenient comparison the bones of these large animals (indeed of all animals) are best kept separate. I believe that it is having them separate that has enabled me to determine some of the species here mentioned which had before been overlooked, —a single specimen of each family or genus being mounted to show the general form of the animal and the position the bones naturally bear to each other.

Ray calls these whales *Balæna tripennis*, thus separating them from those which have no dorsal fin; but Polach misunderstood him, and says they have three fins on their back.

Mr. F. J. Knox, having purchased a whale 84 feet long, which was stranded near North Berwick on the 5th of October, 1831, and another 10 feet long, taken in the stake nets at Queensferry, Firth of Forth, in February 1834, determined by anatomical differences that they were distinct species, in a 'Catalogue of Anatomical Preparations illustrative of the Whale,' by F. J. Knox, Conservator of the Museum in Old Surgeons' Hall, 8vo, Edinburgh, 1838. He distinguished the former by the name of *Balæna maximus borealis*, and the latter as *Balæna minimus borealis*. As no description of the colour of the animal, or any account of the nuchal vertebræ, is given, it is impossible, from his account, to determine the species of the former; but the catalogue contains some most interesting particulars relative to the anatomy of these animals.

Fortunately the skeleton of the larger whale was purchased by the Town Council of Edinburgh, and was exhibited in the Zoological Gardens of that city. As far as it was possible to examine it at the height at which it was suspended, it appeared to be a *Physalus*; and the same as, or very nearly allied to, the species described in this Catalogue under the name of *P. antiquorum*. This skeleton was last year moved to the New Museum, but the walls would not support the weight, and they have to be rebuilt. The *B. minimus borealis* appears to be a young specimen of the *B. rostrata* or *Pike Whale* of Hunter. Mr. F. J. Knox's drawing of this specimen, as suspended, in the act of swimming, is represented in Jardine's 'Naturalist's Library.'

This was the first time that the *Northern Finners* had been separated on an actual examination and comparison of specimens. But the pamphlet in which these observations were published being a mere guide to the exhibition, has been overlooked, and I could only procure a copy after great trouble, and from the family of the author.

- \* *The upper and lower lateral processes of the third, fourth, fifth, and sixth cervical vertebræ elongate, united, forming a ring; the bodies of the cervical vertebræ oblong, transverse, much wider than high, the upper and lower edge nearly straight; the lateral process of the second cervical elongated. Ribs 14. 14.*

### 1. *Physalus antiquorum.* *The Razorback.*

Slate-grey, beneath whitish. Baleen slate-coloured; under edge blackish, inner edge pale streaked.

Razorback of the whalers. "B. *Physalus*, Linn. B. Gibbar, Lacép."—*Scoresby, Arct. Reg.* i. 479.

*Balæna maximus borealis*, Knox, *Cat. Prep. Whale.*

Great Northern Rorqual (*Knox*), *Jardine, Nat. Lib.* t. 6 (skeleton).

*Physalus antiquorum*, Gray, *P. Z. S.* 1847, 96; *Cat. Cetac.* 38; *P. Z. S.* 1864, 216. f. 9–12; *Heddle, P. Z. S.* 1855, 195, fig. verteb. bad.

Rorqual de la Méditerranée, *Lacép.* t. 5. f. 1; *Cuvier, Oss. Foss.* v. 370. t. 26. f. 5.

*Balæna*, *Shaw, Zool. Misc.* t. 720, from *Lacép.* t. 5. f. 1.

*Balæna antiquorum*, *Fischer, Syn.* 525 (from *Cuvier*).

*Balænoptera antiquorum*, *Gray, Zool. E. & T.* 50.

*Balæna Physalus*, *Turton, B. F.* 15; *Jenyns, Man.* 47; *Nilsson, Skand. Fauna*, 636.

*Balænoptera Boops* (part.), *Fleming, B. A.* 31; *Jenyns, Man.* 47.

*Balæna musculus*, *Turton, B. F.* 16; *Jenyns, Man.* 47; *Malmgren, Arch. Nat.* 1864, 97.

*Balænoptera musculus*, *Fleming, Brit. Anim.* 30; *F. Cuv. Cétac.* 335; *Eschr. & Reinh. Om Nordhv.* t. 3. f. 2 (skull), t. 4. f. 6; *Liljeborg, l. c.* 42; *Malmgren, Arch. Nat.* 1864, 94.

*Balænoptera acuto-rostrata*, *Scoresby, Arct. Reg.* i. 485. t. 13. f. 2.

*Balænoptera Boops*, *Bell, B. Quad.* 520. f. 1.

*Balænoptera Physalus*, *Schleg. de Dieren*, 101. t. 20.

*Rorqualus antiquorum*, *Gervais, Compt. Rend.* 1864, 676.

*Balæna Physalus*, *O. Fabr. Faun. Grœnl.* 35.

*Physalus vulgaris*, *Fleming, Brit. Anim.* 32.

*Balænoptera Gibbar*, *Scoresby, Arct. Reg.* i. 478.

*Balænoptera arctica*, *Schleg. Abhandl.* 10. t. 9.

*Balænoptera borealis* (part.), *Rapp, Cetac.* 51.

*Pterobalæna communis*, *Eschricht, Van Beneden, Bull. Acad. Brux.* ser. 1. 1857, i. 390; *Bull. Acad. Belg.* xxii. 464; *Nouv. Mém. Acad. Brux.* xxxii. (1861) 37; *Arch. Naturg.* 1858, 57.

Baleine de Sainte Cyprien, *Companyo, Mem.* 4to, 1830; *Carcassonne & Farines, Mem.*; *F. Cuv. Cétac.* 337.

The following may probably belong to this species:—

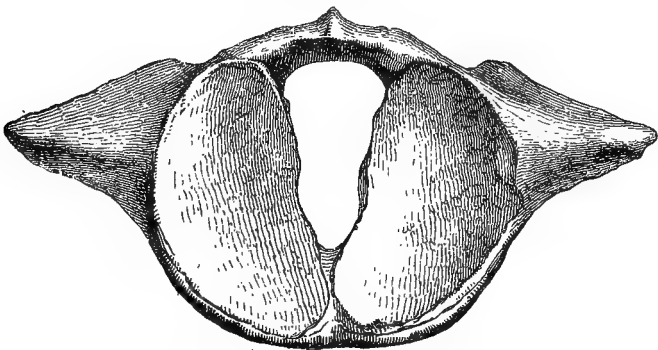
1. *Balæna tripennis* quæ rostrum acutum habet, *Sibbald, Phalænoł.* 29. t. 1. f. D, E, cop. *Bonnat. Cét. E. M.* t. 3. f. 2; *Schreb.* t. 354.—Nov. 17, 1690, O. S. (46 feet long).  
Pike-headed Whale, *Penn. B. Zool.* iii. 40.  
*Balæna Boops*, *Linn. S. N.* i. 106.  
*Balæna borealis*, var. *Boops*, *Fischer, Syn.* 524.  
*Balænoptera Jubartes*, *Lacép. Cét.* 120. t. 4. f. 1.  
Jupiter-fish, *Anderson, Isl.* 220.  
Pike-headed Mysticete, *Shaw, Zool.* ii. 492. t. 227.
2. *Balæna tripennis* quæ maxillam inferiorem rotundam &c., *Sibbald, Phalænoł.* 33. t. 3; (edit. 1792) 78. t. 3, cop. *Bonnat. Cét. E. M.* t. 3. f. 1.  
Round-lipped Whale, *Pennant, Quad.* iii. 42.

- Balæna musculus*, *Linn. S. N.* i. 106.  
*Balæna borealis musculus*, *Fischer, Syn.* 524.  
*Balænoptera Rorqual*, *Lacép. Cét.* 126. t. 1. f. 3.  
 Under-jawed Mysticete, *Shaw, Zool.* ii. 495.  
 3. Finne Fische, *Égede, Grœnl.* 48, fig.  
 4. Fin-fisch, *Mart. Spitzb.* 125. t. Q. f. c, cop. Fin-backed Mysticete, *Shaw, Zool.* ii. t. 227; *Enc. Méth.* t. 2. f. 2.  
*Balæna Physalus*, *Linn. S. N.* i. 106; *Schreb. Säugeth.* t. 333, from *Martens*, t. 5. f. 2.  
*Balæna Gibbar*, *Desm. Mamm.* 528. *Balænoptera Gibbar*, *Lacép. Cét.* 114. t. 1. f. 3, from *Martens*.  
*Balæna edentula*, &c., *Ray, Syn.*  
 5. Fin Whale, *Neill, Wern. Trans.* i. (1811) 261 (♂ 43 feet long).  
 6. *Balæna sulcata*, *Walker, MSS.*?; *Neill, Wern. Trans.* i. 212 (41 feet long, Burntisland, 10th June 1761).  
 7. *Balæna sulcata arctica*, *Schlegel, Verhand. Nederl. Ins.* i. 1828, t. 1, 2; *Abhandl.* t. 6. f. 1, 2.  
 8. *Balænoptera arctica*, *Schlegel, Abhandl.* ii. 10. t. 9 (length 40½ feet).  
 9. *Balænoptera sulcata*, *Jacob, Dublin Journ. Sci.* 1825, 333.

Inhab. North Sea; North Berwick, 1831 (*F. J. Knox*); skeleton at Zoological Gardens, Edinburgh. Coast of Hampshire, 1842; skeleton at Black Gang Chine. Plymouth, 1831; skeleton in British Museum. The Hope Reach, near Gravesend, 1858 or 1859?; skeleton at Rosherville Gardens, 1864. Alloa, Frith of Forth (*Neill*), male. Burntisland, 10th June, 1862 (*Walker*). Plymouth, 1863 (*Gerrard*); skeleton in Alexandra Park.

- a. Two plates of baleen. Needles, coast of Hampshire. From the skeleton at Black Gang Chine.  
 b. Several plates of baleen united together. Greenland. From Mr. Müller's collection.  
 c. Skeleton, 74½ feet long. Plymouth.

Fig. 29.

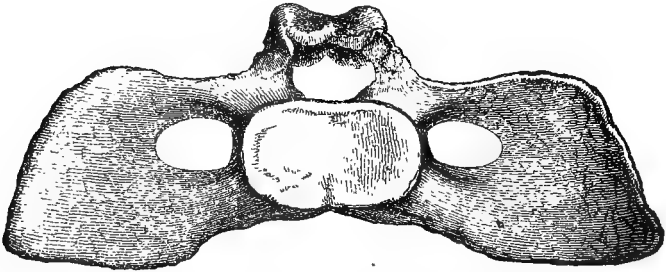
Atlas vertebra of *Physalus antiquorum*, from Devonshire.

Extreme width 26 inches; height 13 inches.

In the normal state of the cervical vertebræ of this species, both the upper and lower lateral processes of all of them are developed

and united into rings. This is the case in the skeleton in the British Museum, and in that, from the Thames, in Rosherville Gardens. But this is subject to some variation: in the specimen from Plymouth, prepared by Messrs. Gerrard, now in Alexandra Park, the lower processes of the sixth and seventh cervical vertebræ are abortive—in the sixth they are reduced to small tubercles, and are entirely wanting in the seventh.

Fig. 30.

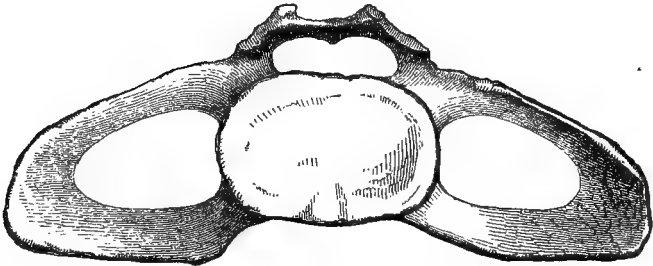


Second cervical vertebra of *Physalus antiquorum*, from Devonshire.

Extreme width 43 inches; height  $13\frac{1}{2}$  inches.

Width of articular surface 10 inches; height 8 inches.

Fig. 31.



Fifth cervical vertebra of *Physalus antiquorum*, from Devonshire.

Extreme width  $35\frac{1}{2}$  inches; height  $10\frac{1}{2}$  inches.

Width of articular surface 12 inches; height  $7\frac{1}{2}$  inches.

The different English skeletons of this whale which I have examined and which are adult, or at least nearly of the same size (that is, from 70 to 80 feet long), exhibit considerable variation in the form and in the size of the perforation, and in the development of the rings of the lateral processes of the hinder cervical vertebræ, showing that there are several species, or, what is more probable, that their bones are liable to a considerable amount of variation.

The British Museum specimen was found floating on the sea in a

decomposed state, on the 2nd of October 1831, in Plymouth Sound, and is said to have been 102 feet long and 75 feet in circumference; but most likely the abdominal cavity was distended by the internal decomposition.

It formerly travelled the country, curiously mounted in three caravans, the first containing the head, the second the thorax, and the third the middle of the tail; when placed one after the other so as to exhibit the parts of the skeleton in their proper situation, the ends of the caravans were removed, and the cervical vertebræ, the lumbar vertebræ, and the caudal vertebræ were suspended in their proper situation between or beyond the caravans. The proprietor had placed a blade of Greenland whalebone (*Balæna Mysticetus*) on one side, and several blades of South-Sea whalebone (*Balæna australis*) on the other side of the upper jaw, in the place of the true baleen of *Balænoptera*.

Fig. 32.

Tympanic bones of *Physalus antiquorum*, from Devonshire.

The cervical vertebræ are all free and separate; the second with a broad lateral expansion, pierced at the base; the third, fourth, fifth, and sixth with rings, the ring of the third being the broadest; the seventh with only a superior lateral process, without a small tubercular rudiment of a lower process; the lateral processes of the second and third cervical bent backwards, of the fourth straight, and of the fifth and sixth bent forwards. The hinder vertebræ large and heavy. Caudal vertebræ without chevrons 7, with chevrons 10, lumbar 17, dorsal 13, and cervical 7=54. The sternum is sinuous; but the front edge is truncated, on a line with the widest part; it is

18 inches wide and  $14\frac{1}{2}$  inches long. The transverse apophyses are as broad as the body of the vertebra, and the latter is oblong, half as broad again as high. The lateral processes of the cervical vertebræ are much longer than the width of the body of the vertebræ; the lateral process of the second cervical has a small, nearly central perforation, and this perforation gradually becomes larger on each succeeding vertebra, until it nearly occupies the whole disk of the lateral process in the sixth; the seventh being formed with only a narrow elongated process from the upper edge, the lower process being reduced into the form of a small tubercle. The ribs are simple. The lumbar vertebræ are thick and large; both these characters must render this Finner much more powerful and active in the water than any of its allies. The lower jaw is 17 feet long; the blade-bone 32 inches by 51. The upper arm-bone is 20 inches long by  $10\frac{1}{2}$  wide; the lower arm-bone 31 inches long. The chest-bone is 28 inches wide and 18 inches long. The lumbar vertebræ are 11 inches long and 14 inches wide; the first rib 59 inches long and  $10\frac{1}{2}$  inches wide at the sternal end.

There is a nearly perfect skeleton of this species (which I some years ago visited in company with Professor Eschricht) exhibited at Black Gang Chine, in the Isle of Wight, which was caught in April 1842, near the Needles. When first found, it was dark grey above and whitish beneath.

The baleen is slate-coloured, with white streaks on the near or inner side; nearly black and with a few darker streaks near the outer or straight side. It was 75 feet long. The skull is 16 feet 7 inches long, 5 feet wide at the notch, and the edge of the beak from the notch is 12 feet long; the lower jaw 16 feet 9 inches; the upper arm-bone 2 feet, and the larger forearm-bone 33 inches long. In this skeleton the scapula and the chest-bones are wrongly placed, and the bones of the carpus and finger. The lower processes of the vertebræ, as well as some of the smaller parts of the head, are deficient. There are 7 cervical vertebræ; the second very broad, with a very large lateral process, on each side pierced with a hole near the body; and the three following have a ring-like lateral process. There are 14 thoracic vertebræ. The ribs are long; the first simple, shortish and broadish, the rest almost of equal size and length, the last being very nearly as long as the others. The lumbar vertebræ are 15, with considerably thicker bodies than the others. Caudal vertebræ 18, exclusive of those contained in the fin of the tail, which is preserved entire.

The skeleton at Rosherville is said to be 70 feet long, and was taken in the Hope Reach in 1858 or 1859. The lateral process of the second cervical is large, elongate, produced, obliquely truncated at the upper edge; the perforation is moderate, not half the length of the process, on a line with the lower edge of the opening. The lateral processes of the third, fourth, fifth, and sixth cervical vertebræ are narrow, ring-like, thin, with a large central cavity; the seventh, like the dorsal, has only an upper lateral process. Lower jaw 13 feet long; paddle 14 feet.

In the skeleton from Plymouth, prepared by Mr. Gerrard, now in the Alexandra Park, the lateral processes of the second cervical are large, produced, obliquely truncated, with a moderate-sized oblong perforation, not half the length of the process, on a line with it, and not more than one-third of the length of the lower edge; of the third, fourth, and fifth vertebræ ring-like, not quite so long as those of the second vertebra, slender, thin, and weak; the processes of the fifth vertebra are the thickest and strongest, especially below; the sixth has upper processes only, which are very thin and slight; in the seventh they are like the sixth, but much thicker and larger, and bent back so that the two processes are close together at the upper edge; the sixth vertebra has small short tubercles in the place of the lower lateral process; none are present in the seventh vertebra. The bodies of the second and third cervical vertebræ are oblong, transverse, much broader than high.

The os hyoides elongate, transverse, broad in the middle, more or less tapering at each end, with a deep wide notch in the middle of the front edge, which has an elongate thick cylindrical process on each side of it, and a slightly rounded scollop in the middle of the hinder edge, with a slight prominence at each end of it. The forearm-bone half as long again as the humerus. The breast-bone is subtrifoliate, the upper part very broad, subtriangular, with a slight broad notch in the middle of the upper sides, and the hinder part more or less produced into a kind of broad flat stem. The shoulder-blade with a large coracoid and acromion process; the upper edge arched, angle acute at each end, hinder end produced.

The skeleton of a specimen, taken at Margate in 1850, was exhibited at Shoreditch in 1864. It was not quite adult, and not in a good condition.

Dr. P. Neill describes a male Fin-Whale stranded near Alloa in the Frith of Forth, on the 23rd October 1808. It was 43 feet long. The dorsal fin, called a *pike* by the whalers, was placed far down the back, about 12 feet from the end of the tail, and nearly over the vent. The lower jaw rather the longest, 14 feet long, and somewhat wider than the upper. The tail was 10 feet wide. The blubber was 2 inches thick, firm in texture, not unlike the fat of pork. The baleen dirty bluish.

Sibbald's specimen came ashore near Burntisland, 17th Nov. 1690, O. S.; it was 46 feet long.

Dr. Walker mentions one from near Burntisland, 10th June 1761, 46 feet long (see Neill, Mem. Wern. Soc. i. 201).

This species seems to be not uncommon, and most usually comes to the Cornish coast in the winter.

A female was found dead at sea, and towed into Plymouth, 27th Sept. 1831. Length 79 feet (*Couch*). Gullet found filled with a large quantity of pilchards, by which it was supposed to have been choked. Said to have visited the coast before.

Plymouth, 1831, Dr. Moore (*Loudon's Mag. N. H. i. n. s.*). It had frequented the Cornish coast a long time previously in pursuit

of young herrings, multitudes of which it was seen to devour.—*Couch, Cornish Fauna*, 9.

Several specimens of this enormous species are seen on the Cornish coast every year, feeding on the smaller gregarious fishes.—*Couch, Cornish Fauna*.

Mr. Heddle observes, "The pectorals (of this and the Laman Whale) measured from tip to head of humerus exactly  $\frac{3}{25}$ ths of the length of the body. The head of each bears very nearly the same proportion to the whole length. The cervical bones were so alike that one drawing would do for either, except with some very minor differences. In the Laman Whale the upper and lower transverse processes of the fifth cervical vertebra are united, and the lower process of the sixth is short, whereas in the Copinshay Whale the transverse processes of the fifth are not united, and the lower process of the sixth is as long as those of the third, fourth, and fifth."

The comparative union and disunion of the processes of the second vertebra, the comparative length of the processes as regards the body of the vertebræ, and the form of the angular aperture of the ring appear to constitute the best characters for the separation of the species.

"The Orkney Whales seem to resemble *P. Boops* of the Museum Catalogue in some respects, but then the processes are longer, and the wing of the second cervical vertebra in the Orkney Whales, with its perforation, is very different from the short development of the second cervical in *P. Boops*. In *P. antiquorum* the processes rise from the plane of the body of the vertebræ; in the Laman and Copinshay Whale they fall (see figs. P. Z. S. 1856, pp. 195, 196). In fact, in some points the Orkney Whales seem to connect the characters of the two sections of Dr. Gray's genus *Physalus*, resembling, however, *P. Boops* more than *P. antiquorum*. The colours of the whale were identical with those of the Laman Whale. The under jaw is wider. The length from the tip of the under jaw to the notch in the tail is  $45\frac{1}{2}$  feet, from tip of upper jaw to eye  $8\frac{1}{2}$  feet, to anterior pectoral 15 feet, tip of lower jaw to penis 28 feet, to anus  $31\frac{1}{2}$  feet, length of pectoral to anterior junction  $4\frac{1}{2}$  feet, length of cranium  $10\frac{1}{3}$  feet.

"The epidermis was  $\frac{1}{16}$ th of an inch thick, easily torn, and finely striated, except on the fins, tail, jaws, lips, &c. Where black, the pigment was easily removed by washing, and from the inner surface was readily communicated to the fingers.

"Where the body was black, the furrows and their interspaces were black also, being covered with skin of the same texture as the body. Where the black of the body began to wash off into the white of the lower parts, the furrows were black and the interspaces pure white. On the lower surface, where the colour was white, the plicæ when separated were lined with a rosy epidermis. Vertebrae 62: viz. cervical 7, dorsal 15, lumbar and caudal 40; the last not larger than a walnut, and partly cartilaginous. The last six diminished in circumference very rapidly. Ribs 15.15; the first pair simple, the second, third, and fourth with necks directed for-



wards, but not reaching the bodies of the vertebræ, the rest simple. The greatest length of the cranium was  $11\frac{1}{2}$  feet, the greatest length of the lower maxilla  $11\frac{1}{4}$  feet, from the tip of the pectoral to the head of the humerus  $6\frac{1}{4}$  feet. The colour of the back of the head and of the sides to a line passing from the tail beneath the pectoral, black. The jaws, and under and upper sides of both pectorals and tail, black. The black *washed off* at the sides into a brilliant white, of which colour were all the other parts, except the hollows between the folds. Scattered irregularly over the back were greyish spots, three or four in a square foot, resembling the appearance produced by touching the skin with a slightly whitened finger. The polished surface gave the whole body a *greyish* appearance, and it was said to be *grey*.

“The baleen towards the snout gradually gave place to narrower plates, three or four occupying the place of one. This change commenced from the inside. At the snout the plates were still more broken up, and there assumed the appearance of small, slightly compressed rods of baleen, of the thickness of a crow-quill, each tipped with a tuft of long white bristles. The baleen completed the circuit of the snout at a distance of 4 inches within the upper lip. At the snout, the base of the baleen was 1 inch in width, gradually increasing until, where the largest plates were inserted, it attained the breadth of 9 inches, whence it decreased to a rounded point at the interior angles of the mouth. Here the baleen entirely resolved itself into white hair, which took its rise from the gums, without the intervention of the quill-like rods of the anterior extremity.

“The *gum* (or *cheese* of the whalefishers) was from 2 to 4 inches thick, and between the bones of the jaw intervened a callous bed of muscular substance.

“The tongue flesh-coloured above, and beneath leaden grey, without distinct edges, of a very loose tissue.

“The throat easily admitted the closed hand.

“The trunk only separated from the head by a very slight depression behind the spiracles, the upper edge forming a beautiful and even curve from head to tail, with the exception of the protuberance of the dorsal fin.

“The expansion of the tail continued 2 or 3 feet along the side of the trunk, giving, with the dorsal and ventral keels, a rhomboidal form to that part of the animal. These keels consist entirely of fatty tendinous substance, permeated through their entire length by strong round tendons an inch in diameter, and when these were removed the parts became round like the rest of the trunk.

“A female: length from point of lower jaw to notch in tail 50 feet, girth beneath the pectorals  $23\frac{1}{2}$  feet, point of lower jaw to umbilicus  $24\frac{1}{2}$  feet; to termination of the plicæ 26 feet, to reproductive organ 30 feet.

“The external ear in a shallow groove, with small aperture the size of a quill.

“The blowholes (see P. Z. S. 1856, t. 45. f. 1, 2, 3) in a hollow on the summit of a low rounded eminence, immediately in front of a

depression directly over the eyes, with a shallow groove between them, and with a ridge in front gradually disappearing ere it reaches the snout. The sides of the blowholes elastic, opening laterally. The *nares*, each 4 inches in horizontal diameter, protected above and at the sides by cartilaginous arches, which extend nearly to the surface of the spiracles behind. The whole lining of the spiracles, breathing-canals, and bronchial cavities was of a deep black. The septum between the *nares* membranous.

"The eyes on bony prominences which projected outwards and downwards; about 4 inches long. The *conjunctiva* whitish, the *iris* very dark brown, the *crystalline lens* two-thirds of an inch in diameter.

"The lower jaw covered for nearly half its depth by strong firm lips, turned inwards above. The jaw nowhere projected much over the folds on the throat, and beneath the eye passed imperceptibly into the general surface. The lower jaw fitted accurately into hollows in the upper. The baleen extended from within 4 inches of the snout to the angles of the mouth. The plates in the middle of the series largest. The back of the mouth and the throat thinly covered with soft white hair, inserted on the wrinkled skin.

"An ideal section of both jaws, partially opening, showing the palatine ridge, the projecting baleen, and the overlapping under-lips, with the tongue in the distended pouch, is represented in P. Z. S. 1856, t. 45. f. 6."

"The broad wing of the second cervical of the *Nybbster Whale* was perforated by a hole as in the Copinshay and Laman Whales, and the vertebræ appeared to correspond with theirs. The external characters and colour also corresponded. The length was 65 to 68 feet, the pectoral from the head of the humerus nearly 8 feet, the cranium 15 feet long. The blubber or *speck* was 8 or 10 inches thick. They are not *P. Boops*, for three out of the four specimens captured, all of which were examined, agreed with each other, and differed from *P. Boops* in the upper and lower lateral processes of the second cervical vertebra being united, leaving a subcentral foramen."—*Heddle*, P. Z. S. 1856, 187-198.

Mr. F. J. Knox, under the name of *Balæna maximus borealis*, Knox (Cat. Prep. Whale, p. 5, and Edin. New Phil. Journ. 1833, 181), notices a specimen of a whale found off North Berwick which was 80 feet long, the head 23 feet, and the tail 20 feet wide from tip to tip. He describes it as having 13 dorsal and 43 lumbar, sacral, and caudal vertebræ (Edin. N. Phil. Journ. 1834, 198). The skeleton of this whale, purchased by the Town Council, was in the Zoological Gardens, Edinburgh, and is figured in Jardine's 'Naturalist's Library,' vi. t. 5. It was last year removed to the New Museum in Edinburgh, but on suspending it from the roof, the walls yielded to the weight, and it had to be removed.

The baleen is black? Cervical vertebræ separate. Second lateral process very large; third, fourth, and fifth large, ringed; sixth very imperfect, upper process elongate, bent down, lower short, rather depressed; seventh upper process elongate, lower wanting. The

third and fourth cervicals thinnest and of nearly equal thickness, fifth rather thicker, sixth thicker still, seventh thickest, and the thoracic vertebræ becoming gradually thicker. Ribs 15. 15, first narrower at the vertebral end, second, third, and fourth dilated and produced on the inner side of the vertebral end, rest simple. Chest-bones in three series: first simple, second larger with processes, third cordate, with the first pair of ribs on the hinder end. Vertebræ: 10 caudal, 15 with chevron, 17 lumbar, 15 thoracic, 7 cervical.

A dead specimen occurred in the Channel, near Brighton, 63 feet long, 29th December 1830. The baleen was called the *gills* by the fishermen at Brighton.—*Mantell, Mag. N. H.* iv. 163. At Overstrand, Norfolk, March 1822; length 57 feet, pectoral  $6\frac{1}{2}$  feet. And at Cromer, autumn 1822.

M. Van Beneden described the skeleton of a whale found by the fishermen near the Isle Urk on the 23rd November 1851, and floated to the Isle Vlieland, which is now mounted in the Gardens at Antwerp.

“It is a male, 22 metres long and 12 metres in circumference, and the head  $5\frac{1}{2}$  metres. The head and back bluish grey; the belly white. The dorsal was half a metre long, and 3 metres from the tail.

“The skeleton is 21 metres long. The baleen black, white on the inner side, the front plates all white. Skull like that described by Rudolphi (?). Cervical vertebræ 7, all free, of the same thickness (not complete); the second with enormous transverse apophyses, 40 centimetres wide, with a perforation 18 centimetres in diameter. The third, fourth, fifth, and sixth with a circle; in the fourth to the seventh the apophyses diminish consecutively in length; in the seventh the circle is incomplete.

“The vertebræ 61. The dorsal 14 or 15; the body of the first very thin, like the cervical, gradually becoming thicker. The lumbar vertebræ 15, very large and strong, with 17 chevron bones. The ribs 14, or perhaps 15 pairs; the first simple, without any appearance of ossification. The sternum triangular, short in front, and subtrifoliate, without any hole. No lacrymal bone.”

Eschricht has observed that the number of vertebræ in whales varies according to the species, but is fixed in each, there being the same number in the foetus as in the adult.

“In the Zoological Gardens at Antwerp is a very fine articulated skeleton of a male (*Physalus antiquorum*, Gray). The specimen has already been the subject of a paper by Professor Van Beneden, entitled “Sur une Baleine prise près de l’île Vlieland, et dont le squelette est monté au Jardin Royal de Zoologie d’Anvers” (Bull. Acad. Bruxelles, 2<sup>e</sup> sér. tome i. 1857, p. 390).

“The skeleton is complete, with the exception of one of the pelvic bones, the tympanic bones, the last pair of ribs (probably), and one or two caudal vertebræ. As at present mounted, the intervertebral spaces appear to me too wide, especially in the cervical and caudal regions; and yet the skeleton measures in a straight line but 67' 6", viz. 15' 4" for the skull and 52' 2" for the vertebral column. The length of the animal is given by Van Beneden at 22 metres, or

72' 1". It exhibits all the signs of adult though not extreme age. All the epiphyses of the vertebræ are completely joined, as well as those of the humerus and the upper end of the radius and ulna. Those of the lower end of the last two bones are partially united. The upper border of the scapula is still incomplete towards the two extremities. The number of vertebræ is sixty-one, the last being modelled in wood; but from the character of the sixtieth I should say that there ought to be two behind it. Seven are cervical and fifteen dorsal, and, according to Van Beneden, fourteen or fifteen lumbar, though the place of attachment of the first chevron bone in the skeleton indicates but thirteen as belonging to this series. The characters of the atlas and the other cervical vertebræ are quite typical of the species; the upper and lower transverse processes, from the second to the sixth inclusive, are united to form complete rings. The breadth of the atlas is 25"; of the axis 44"; of the third 37". The aperture in the base of the great wing-like lateral process of the axis is  $6\frac{1}{2}$ " long and 3" deep. The inferior process of the seventh is represented by a tubercle.

"The cranium and lower jaw present little worthy of special notice, except that the articular processes of the squamosals are unusually developed laterally, giving great breadth to the posterior part of the head. The dimensions are given at p. 166. A circumstance that I have not observed in any other Whalebone Whale is that a considerable mass of bone of irregular form projects forwards from below the nasal bones in the trough of the vomer, to the extent of about two feet, only attached posteriorly. This is evidently an ossification developed in the ethmoidal cartilage.

"There are fourteen pairs of ribs present; but as the fourteenth has not the characters usually met with in the last rib, and as the fifteenth vertebra has the end of the transverse process thickened and showing traces of an articular surface, it is most probable, as Van Beneden supposes, that the fifteenth pair has been lost, and therefore that the skeleton, if complete, would present no exception to the normal number. The first rib is simple, 51" in extreme length, and  $13\frac{3}{4}$ " in breadth at its lower end. The second and third have capitular processes which reach nearly to the bodies of the vertebræ; that of the second is rather the longest. There are corresponding rough tuberosities on the sides of the bodies of the first and second dorsal vertebræ. The neck becomes rudimentary in the fourth, and obsolete in the fifth and all succeeding ribs.

"The sternum is trifoliate, differing from the one figured at p. 110 chiefly in having the posterior process shorter, broader at the base, and more tapering to the point. Its extreme length is 19", and breadth 24". The hyoid has the usual shape; its extreme breadth is 38", and length 14". The stylo-hyals are 19" in length, and  $5\frac{1}{2}$ " in greatest breadth.

"One pelvic bone is present, suspended on the left side; the other is modelled in wood. It is 15" long and 3" in greatest breadth, simple, straight, much compressed, slightly twisted on itself, broader generally at one end than the other, but pointed at both extremities.

One edge is smooth and rounded, but furrowed by a deep linear groove; the other is irregularly tuberculated and spiculated. This form is quite different from that of the pelvic bones of the specimen in the Alexandra Park, where they are each  $18\frac{1}{2}$ " long, gently curved, flattened, quite smooth along the edges, and with a prominent angular projection from near the middle of the convex border.

"The scapula is 31" in height and 51" in breadth; the acromion is 12" long; the coracoid  $5\frac{1}{2}$ ". The humerus 19" long, 9" in greatest diameter, and  $26\frac{1}{2}$ " in girth at the middle. The radius is 32" long,  $7\frac{1}{2}$ " in breadth at the upper and 9" at the lower end. The ulna 36" in extreme length, from the end of the olecranon, 30" from the middle of its surface for articulating with the humerus, 10" in breadth above and  $6\frac{1}{2}$ " below. There are six ossifications in each carpus. The phalanges appear complete. It should be stated that the latter are not very exact, as the ends of the bones are more or less concealed by the composition which replaces the cartilage. The baleen is present in both sides. The largest plates measure about 28" in length.

"The recent discovery of a large number of fossil remains of Cetaceans in the excavations occasioned by the fortification of the city of Antwerp has given a great impulse to the study of the osteology of the existing members of the order in Belgium, and, chiefly by the exertions of Professor Van Beneden of Louvain, a very fine collection has been brought together, in great part obtained from the Northern seas, through the cooperation of the late Professor Eschricht of Copenhagen. Many of the specimens enrich the admirable anatomical collection of the University of Louvain; but most of the larger ones have passed from the hands of Van Beneden to the Royal Museum of Natural History at Brussels, where they are arranged and displayed to great advantage, under the able direction of M. Du Bus."—*Flower, P. Z. S.* 1864, 414-416.

"In December 1841 a male Fin-Whale about 40 feet long was stranded at Katwijk-aan-Zee, about six miles from Leyden. Dr. Schlegel gave a figure and description of its external characters, with some notes on its anatomy, in the second part of his 'Abhandlungen.' The skeleton passed into the hands of a person at Scheveningen, at which place it was for some time exhibited. It has been transferred to the Leyden Museum.

"The skeleton was evidently that of a very young individual of the genus *Physalus*, agreeing in every particular, as far as I could ascertain, with *P. antiquorum*. The bones were spongy, and the epiphyses on the limb-bones and vertebræ all non-united, even that on the hinder surface of the axis. The skull was about 9 feet long; the nasals were deeply excavated; the orbital process of the frontals narrowed at the extremity. The lower jaw had a considerable curve and a long coronoid process. As mentioned by Schlegel, the vertebral formula was C. 7, D. 15, L. 14, C. 24=60. The form of the atlas and of the bodies of the cervical vertebræ were as in *Physalus* generally; the transverse processes were not developed, being in fact mere stumps. The upper and lower processes were not united even

in the axis. The lower process of the fifth very short. Ribs 15 pairs; the first with a simple head. Sternum small, undeveloped, with two broad lateral lobes at the anterior part, and a deep notch between them on the front border, prolonged posteriorly into a handle-like process; its entire length was 9", its breadth 10". Scapula 20" in height, and 32" in breadth. Humerus 14" long. Radius 22" long."—*Flower, P. Z. S. 1864, 409.*

"A fine cranium from the Jutland coast, in the Louvain Museum, about 15' in length. It is rather narrow posteriorly in proportion to its length; and the nasal bones, though of the general form characteristic of the genus, are very narrow, and pointed at their hinder ends."—*Flower, P. Z. S. 1864, 418.*

"A skull of a young specimen in the Leyden Museum, agreeing in all its characters with *P. antiquorum*, Gray; marked '*Balænoptera Physalus*, Mer Sept.' Its length, from the condyles to the tip of the beak in a straight line, is 10' 6"."—*Flower, P. Z. S. 1864, 397.*

Pallas, under the name of *B. Physalus* (*Zool. Rosso-Asiat. 290*), described a specimen of this genus found in the North Sea in 1740. It was 84 feet long; the pectoral 9, the head 22 feet long, and the tail 14 feet wide. He describes the skin as brown.

The young male, 42 feet long, caught near the mouth of the Somme, on the coast of France, described and figured by Ravin (*Ann. Sci. Nat. x. 266. t. 11, xv. 337. t. 9*), under the name of *Balænoptera rostrata*, from the form of the skull, seems to be a species of the genus *Physalus*, probably *P. antiquorum*; but the details of the skeleton have not been given. The tympanic bones are drawn of a very small size (*l. c. t. 9. f. 2 r, 3 r*). It is described:—

"Black above, beneath white. Pectoral black. Dorsal and caudal with white scar on the edge. Baleen of the first part of the series white; of the rest blackish blue, the colour changing suddenly from one to the other.

"Inhab. coast of France, Somme (*Ravin*)."

M. Ravin (*Ann. Sci. Nat. n. s. xv. t. 9*) figures the skull; but although it resembles generally Cuvier's figure above quoted, it is shorter and broader in proportion, being only twice the length of the width of the jaws in front of the orbit.

Lacépède (*Cétac. t. 5, 7*) describes and figures a whale, stranded near the Isle of Marguerite on 20th March 1797. It is described as 60 feet long; distance from nose to pectoral  $14\frac{1}{2}$ , thence to dorsal  $10\frac{3}{4}$ , and from dorsal to caudal  $8\frac{3}{4}$ . But there must be some mistake, as this accounts for only 34 feet. The pectorals are 5 feet long (that is, only one-twelfth of the total length), and all black. Cuvier figured the skull of this whale (*Oss. Foss. t. 26. f. 5*), and founded on it his *Rorqual de la Méditerranée*. M. F. Cuvier (*Cétac. 334*) regarded this as the type of his *Balæna musculus*. The skull and some of the bones are at Paris (see Gervais, *sur la Baleine de la Méditerranée*, 8vo, 1862, Montpellier).

M. Comanyo describes a male whale cast ashore near St. Cyprien. The entire length was 82 feet, of the head 16 feet; and the pectoral was 13 feet long. Vertebrae 61, viz. cervical 7, dorsal 14, lumbar

15, caudal about 25. It was dark grey, with the throat and sides of the pectoral white; the belly blue, white-banded; the pectoral greyish. M. F. Cuvier refers this to the *B. musculus*, or Mediterranean Rorqual. The skeleton was at Lyons in 1835.

M. Van Beneden (Ann. Sci. Nat. n. s. vi. 159) says the tympanic bones brought from Iceland by M. Quoy belonged to the *B. musculus* of Cuvier (*P. antiquorum*).

Lesson records a young female taken at Ile d'Oleron, 54 feet long, 10th March, 1827.

There is a skeleton in the Zoological Gardens, Antwerp (see Bull. Acad. Roy. Brux. xxiv. 3). A skeleton not mounted, Museum Paris. And a skeleton, Museum Louvain, 1836, 60 feet long; Holland, 1836.

Professor Eschricht has two heads of this species at Copenhagen, from Greenland. There are a head and some vertebræ at Paris, and some vertebræ at Berlin.

M. Van Beneden observes that the *Rorqual de la Méditerranée* of Cuvier is the *Mysticetus* of Aristotle and the *Musculus* of Pliny. It is the only whale that has as yet been observed in the Mediterranean. It may be doubtful if the Mediterranean whale is the same as the one from the Atlantic Ocean here described. Cuvier described the species from the head of a specimen, now in the Paris Museum, which was cast ashore on the Isle of Marguerite on the 20th of March 1797. M. Van Beneden says it is the same as his *Pterobalæna communis*, but at the same time he observes that the skull of the specimen from Antwerp which he describes has "la plus grande ressemblance avec cette qui a été décrite par Rudolphi, et qui se trouve au Muséum de Berlin; elle offre exactement les mêmes proportions." Now, Professor Rudolphi's specimen is the type of M. Cuvier's *Rorqual du Nord*, which is separated from the Mediterranean Rorqual on account of the very great difference in the form and proportions of the head. However, the Antwerp specimen has the simple first ribs of the true *Physalus*, and I suspect that in comparing the skull with the Berlin skull some characters must have been overlooked.

"It is seen from time to time on the French coasts, especially those of the Pyrénées orientales and the Var. In 1862 a female, with her young, remained for more than a month chiefly in the small bays of Paulilles, Port-Vendres, and Collioure. This was perhaps the cetacean which, some months later, ran ashore at the rock of Borro, on the Spanish coast, and was towed to Llanza, where M. Gervais saw it."

This species is found in the Mediterranean. M. Gervais observes that "such Cetaceans rarely run aground on the sandy shores of Languedoc and La Camargue; but the great whale with a channelled belly, mentioned by Daléchamp as having come ashore in his time near Montpellier, must be regarded as a Rorqual, and the jaws of this species preserved at Frontignan have probably a similar origin.

"There is a skeleton of a whale 17 feet long in the museum of Perpignan. The large whale taken at St. Cyprien has been de-

scribed by Farines and Carcassonne as *Balænoptera Aragos*. That at St. Tropez, in 1833; those of the Ile Sainte Marguerite, one in 1797, described by Lacépède and Cuvier, and the other in 1864; and two or three others taken near Toulon, of which the skull or the entire skeleton have been preserved."—*Comptes Rendus*, 28 Nov. 1864, 876; *Ann. & Mag. N. H.* 1865, xv. 77.

Albers (*Icon. Anat.* 1822, t. 1) figures, under the name of *Balæna Boops*, the skeleton of a whale cast ashore at Vegisack, near Bremen, in 1669. The length was 29 feet; length of pectoral fin 3, width of tail 9 feet. Camper (*Cétac.* 74. t. 11, 12) figures the skull of this specimen. Cuvier says he compared this skull with the one from Ile St. Marguerite, figured by Lacépède, and could see no difference between them. Albers's figures would lead to the idea that the lower jaw was scarcely wider than the upper; this is corrected by Camper. Professor Eschricht considers Albers's specimen the same as Hunter's *B. rostrata*; but it agrees with the whales of this genus in having 34 and 35 lumbar and caudal vertebræ.

\*\* *The upper and lower lateral processes of the third, fourth, fifth, and sixth cervical vertebræ elongate, slender, free at the ends; the upper one bent down; the lateral process of the second cervical large, truncated. Body of the cervical vertebræ oblong, ovate, not much broader than high; the upper edge concave; the lower very slightly convex. Ribs 15. 15.*

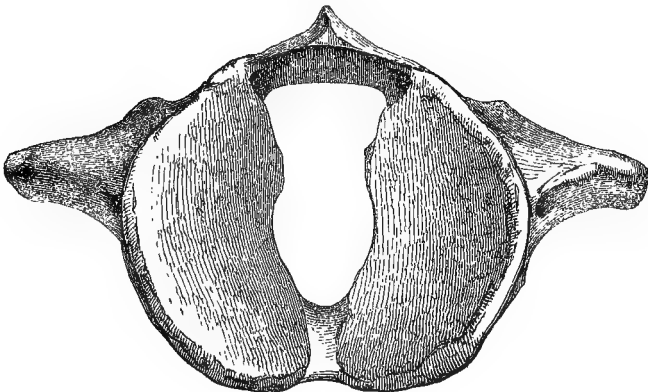
## 2. *Physalus Duguidii*.

The Orkney Whale (*Physalus Duguidii*), *Heddle, Proc. Zool. Soc.* 1856, 187, *Mamm.* t. 44 & 45, anat. ♂ & ♀; *Arch. Naturg.* 1858, 56.

*Physalus Duguidii*, *Gray, P. Z. S.* 1864, 221. f. 13, 14, 15; *Ann. & Mag. N. H.* 1864, 352.

Inhab. Orkney (*Heddle*).

Fig. 33.



Atlas of *Physalus Duguidii*.

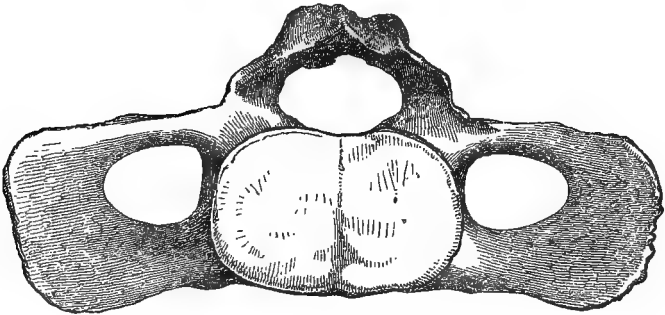
Extreme width 21 inches; height  $12\frac{1}{2}$  inches.



Cervical and part of dorsal vertebræ and the baleen in the British Museum. Length 50 feet.

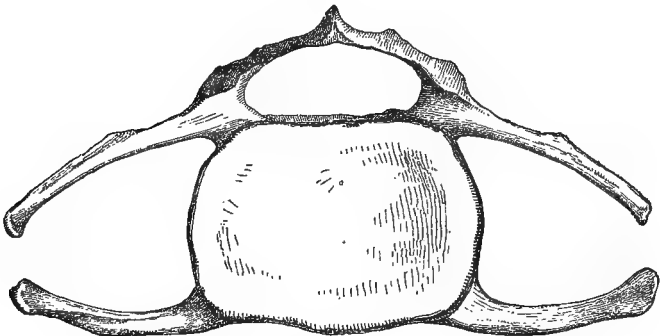
The upper lateral processes of the third, fourth, and fifth cervical vertebræ are very slender and bent down, with two slight angular ridges on the outer edge; the lower processes are much thicker and bent up at the end, with a broad flat lower edge near the base, which forms an angle at the end. The bodies of the cervical vertebræ are roundish oblong, rather wider below than above, about one-fourth the width wider than they are high. The form of the body and the slenderness and form of the lateral processes of the cervical vertebræ seem to separate this species from *P. antiquorum*, as well as the separate form of the lateral processes. In the Plymouth specimen of the latter in the Museum, the bodies of the cervical vertebræ are oblong, transverse, being one-third the width broader than high.

Fig. 34.

Second cervical vertebra of *Physalus Duguidii*.

Extreme length, measured by a cord,  $25\frac{1}{2}$  inches; height 12 inches. Articulating surface: height 7 inches; width 11 inches.

Fig. 35.

Fifth cervical vertebra of *Physalus Duguidii*.

The short baleen forms the front part of the series, in which the layer in the middle is dark slate-coloured, and the intermediate-sized blades are more or less slate-coloured on the outer and white on the inner side. The breast-bone is lozenge-shaped, with a large central perforation.

Mr. Heddle gives a long account of this species in his paper in the 'Proceedings of the Zoological Society' above referred to.

\*\*\* *The upper and lower lateral processes of the third, fourth, and fifth cervical vertebræ short, strong, separate, directed laterally; the lateral process of the second cervical short, truncated. Ribs 16 . 16.*

### 3. *Physalus Sibbaldii*.

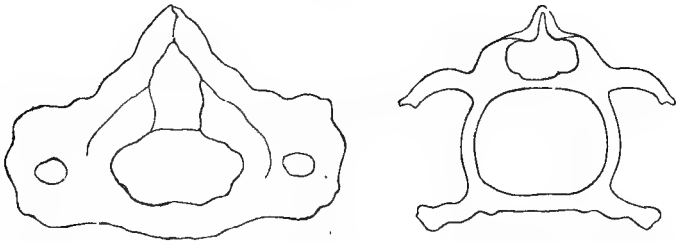
*Physalus* (*Rorqualus*) *Sibbaldii*, *Gray*, *P. Z. S.* 1847, 92; *Cat. Cetac.* 42; *P. Z. S.* 1864, 222. fig. 15 a; *Ann. & Mag. N. H.* 1864, xiv. 332.

Inhab. North Sea, ascending rivers; in the Humber, Yorkshire.

Skeleton in Museum of the Hull Royal Institution and Literary and Philosophical Society. Length 50 feet.

The skeleton in the Hull Philosophical Society's Museum is 47 feet long, and evidently of a young animal; the arm or paddle is rather more than 6 feet long. The baleen is all black. The lower jaw strong, with a conical, large, well-developed ramus. Vertebræ 64: cervical 7, dorsal 16, lumbar and caudal 41. Breast-bone wanting. The cervical vertebræ are all separate; the second cervical vertebra has a broad lateral expansion, and is oblong, obliquely truncated from the wide upper to the narrow lower edge, and with a small oblong subcentral perforation near the base; the third, fourth, fifth, sixth, and seventh cervical vertebræ have a straight, rather elongate lateral process, which projects straight out from the body of the vertebra, and the upper and lower ones are of nearly equal length. The ribs 16 . 16, all simple. The end of the first rib, near the vertebra, has a single head; and the head of the first and second rib is compressed laterally, and with a slender internal process. The articulating surfaces of the cervical vertebræ are oblong, transverse, much broader than high.

Fig. 36.



Second and fifth cervical vertebræ of *Physalus Sibbaldii*. (From a sketch by Mr. Harrison, of Hull.)

“The form of the head is much like that of Ravin’s figure of the skull of *P. antiquorum*. It is 10 feet 10 inches long, 4 feet 8 inches wide at the orbits, and 2 feet 9 inches wide at the base of the beak. The lower jaw is 9 feet 8 inches long without allowing for the curves.”—*R. Harrison*.

*Finner Whales that have been only imperfectly noticed.*

1. *Physalus? australis*. *The Southern Finner*.

*Balæna Quoyii*, *Fischer*, *Syn.* 526.

*Balæna rostrata australis*, *Desmoulins*, *Dict. Class. H. N.* ii. 166.

*Balænoptera australis*, *Gray*, *Zool. E. & T.* 51.

*Balænoptera australis*, Southern Rorqual or Finback, *Nunn. Narrat. Favourite*, 183, fig.

*Physalus? australis*, *Gray*, *Cat. Cetac. B. M.* 1850, 44.

Inhab. Falkland Islands (*Quoy*).

*Desmoulins* (*Dict. Class. H. N.* ii. 164), under the name of *Balæna rostrata australis*, describes a whale seen by *M. Quoy* on the shores of the Falkland Islands, which he says was exactly like *B. Physalus*. It was 55 feet long, and the pectoral fin 6 feet 3 inches—that is, about one-eighth of the entire length, the same as in *Balænoptera Physalus*; but he says the dorsal fin was over the male organ—a character which, as far as I know, is peculiar to the Humpback Whale (*Megaptera*)—thus presenting a combination of characters which, if correct, will not only prove it to be a distinct species, but one forming a section by itself.

*Lesson* (*Tab. Règne Anim.* i. 202) gives the name of *Balænoptera australis* to the “Fin-back of the whalers of the South Sea.” It is most probably intended for this species, as Falkland Islands is given for the habitat; but it may be *Megaptera Poeskop*, or perhaps a confusion of the two.

“The Fin-backed Whale of Desolation, near Kerguelen’s Land, is about 30 feet long. The whalebone short. The dorsal fin is arched backwards, nearly over the pectoral, or, some fishermen say, a little behind the middle of the back. The upper surface is black, lighter beneath. The spout is single, much higher than that of the Right Whale (*Balæna*) in the same latitude.”—*Nunn’s Narrative*. The figures, after the drawings of the whalers, represent the body only as rather more than three times the length of the head.

“From the description I have received of the Fin-fish (*Balænoptera Rorqual*), which often appears in the bays of both the western and eastern coasts of Africa, I feel disposed to regard it as the *Rorqual*. It may, however, prove to be a different species when those who can note its characters shall have an opportunity of examining a dead specimen. It is here rarely attacked by the fishers, being considered dangerous, and of little value from its yielding but a small proportion of oil. About twelve years ago one was killed in Table Bay which measured 95 feet.”—*A. Smith, African Quart. Journ.* 130.

## 2. *Physalus Brasiliensis*.

*Balænoptera Brasiliensis*, Gray, *Zool. E. & T.* 51; *Cat. Ost. Spec. App.* 142.

*Physalus Brasiliensis*, Gray, *Cat. Cetac. B. M.* 1850, 43.

I have also received from Mr. Smith specimens of what is called in trade *Bahia Finner*. This baleen is black; the fibres on the edge of the larger flakes are purplish brown, and of the smaller or terminal ones paler brown. They are 35 inches long by  $11\frac{1}{2}$  inches wide; and the smaller, 10 inches long and 4 inches wide at the base. This is so different in appearance from the other baleen of this genus that I propose to call it *Balænoptera Brasiliensis*.

a. Three plates of baleen, "Bahia Finner." Bahia.

## 3. *Physalus? fasciatus*. *The Peruvian Finner*.

"Lower jaw scarcely longer than the upper; head and back ash-brown; belly whitish; tips of fins and a streak from the eye to the middle of the body white. Length 38 feet."—*Tschudi*.

*Balænoptera*, n. s., *Tschudi, Mamm. Consp. Peruana*, 13.

*Balænoptera* Tschudi, *Reich. Cetac.* 33; *Wieg. Arch.* 1844, 255.

*Physalus fasciatus*, Gray, *Cat. Cetac. B. M.* 1850, 42.

Inhab. coast of Peru.

## 4. *Physalus Indicus*.

"Lower jaw remarkably slender."

*Balænoptera Indica*, Great Rorqual of the Indian Ocean, *Blyth, Journ.*

*A. S.* xxi. 358, xxii. 414; *Rep. Asiatic Society Calcutta*, xxviii. 5;

*Friend of India*, 1842, Sept. 15.

*Balænoptera*, sp., *Heuglin, in Sitzungsber. d. Math.-naturw. Acad. d.*

*Wissensch. zu Wien*, 1851, vii. 449.

*Physalus*, sp., *Flower, P. Z. S.* 1864, 408, note.

Inhab. Red Sea. Mr. Blyth records the following:—

1. Chittagong coast, 15th August 1842, 90 feet long and 42 feet in diameter.

2. Arakan coast, 84 feet long. Lower jaw remarkably slender, the coronoid process well developed. Length 21 feet. Radius  $38\frac{3}{4}$  inches long.

3. A large jaw-bone of a Whale (*Asiat. Res.* xv. Append. p. xxxiv).

4. Vertebra and cranium of a Whale (*Asiat. Res.* xvii. 624, and *Glean. of Science*, ii. 71).

5. A skull and lower jaw, 10 feet long, from Arakan. In the Museum of the Calcutta Medical College.

Whales seem to have been not unfrequently stranded on the coast of Mekran. Thus Nearchus, the commander of Alexander's fleet from the Indus to the Persian Gulf, B.C. 327, described the *Ichthyophagi* of that woodless region as using the bones of whales for building-purposes (see Vincent's Voyage of Nearchus, p. 267–269, quoted by Blyth).

"Whales are very rarely seen" in Ceylon; "a dead one is occa-

sionally stranded. The skeleton of one cast ashore some twenty years ago at Mount Lavinia is still in the museum at Colombo.”—*Kelaart, Prod. Faunæ Zeylonicæ*, 1852.

“Whales are frequently captured within sight of Colombo.”—*Tennent’s Ceylon*.

“Whales are very common on the coast of Alipi, South Malabar. American ships, and occasionally Swedish ones, call at Cochin for stores during their cruises for them, but no English whalers ever come here that I have heard of. One [whale], said to be 100 feet long, was stranded on the coast. I saw some of the vertebræ and ribs about three years ago. Last year another, 90 feet long, got among the reefs in Quilon, and was murdered by some hundreds of natives with guns, spears, axes, &c., and was cut up and eaten, salted and dried as well as fresh. The Roman Catholic fishermen of the coast pronounced it ‘first chop beef.’

“The Maldives and Seychelles are said to be the headquarters of the whalers who seek for these whales. I am sorry I never noticed the jaw-bones sufficiently, for I saw them on the beach.”—*Rev. H. Baker, of Alipi, S. Malabar, quoted by Blyth*.

### 5. *Physalus*? *Iwasi*. *The Japan Finner*.

Black; side white-spotted; belly white.

*Balænoptera arctica*, *Schlegel, Faun. Japon.* 26.

*Physalus*? *Iwasi*, *Gray, Cat. Cetac. B. M.* 1850, 42.

*Balæna sulcata antarctica*, *Schlegel, Abh.* 43; *Faun. Japon. Mamm.* t. 30.

Inhab. Japan.

A species of this genus is known in Japan under the name of *Iwasi Kuzira*. It is very rare. One was cast ashore in 1760 at Kii, which was about 25 feet long; black, belly whitish, sides white-spotted. They distinguish it from the other whales by the head being smaller, narrower, and more pointed, and the pectoral shorter. It was driven ashore by the *Sakanata* (*Grampus*). No remains of this species were brought home by M. Siebold. Temminck (*Fauna Japonica*) regards it as identical with the Northern species. It is very desirable that the bones of the Japan and Northern specimens should be accurately compared. It may be observed that several animals, the Mole and the Badger for example, were formerly said to be like the European species, but recent research has shown that they are distinct, and they are now so considered in the ‘*Fauna Japonica*.’

The following species are described by Lacépède from Chinese drawings (see *Mém. Mus.* iv. 473):—*Balænoptera punctulata*, *B. nigra*, *B. cærulescens*, and *B. maculata*.

“Razorbacks occur in the Strait of Formosa. Some Americans fitted out lorchas for their capture, and erected boiling-houses at Swatow, but they said they yielded too little oil to compensate for the trouble and risk incurred in their capture, as they are dangerous creatures to meddle with. They have very large flat heads and smooth backs. Seldom a year passes but one is stranded some-

where in the vicinage of Swatow."—*Swinhoe, Proc. Asiatic Soc. Bengal*, 1863.

### 6. *Physalus antarcticus*.

*Balænoptera antarctica*, Gray, *Zool. E. & T.* 51.

*Physalus antarcticus*, Gray, *Cat. Cetac. B. M.* 1850, 43.

There has been imported from New Zealand a quantity of finner-fins, or baleen, which are all yellowish white; this doubtless indicates a different species.

The Finner Whales also inhabit the Columbian shores. Lewis and Clarke mention the skeleton of a *Rorqual* found near the Columbia River, 105 feet long.—*Travels*, 422.

Chamisso, in his accounts of the wooden models of whales which were made by the Aleutians, of the species found in their seas, which he deposited in the Berlin Museum, and described and figured in the *N. Acta Nat. Cur.* xii. 212, figures three kinds of this genus: viz. *Abugulich*, t. 16. f. 2; *Mangidach*, t. 16. f. 3; and *Agamachtschich*, t. 18. f. 4, the *B. Agamachschik*, Pallas, *Zool. Rosso-Asiat.* i. t. a.

If reliance is to be placed on the wooden models made by the Aleutians, which have been described and figured by Chamisso—and many of them are not bad representations of known genera—there is a genus found at Kamtschatka which has not yet been described. It is called *Balæna Tschiekagluk* by Pallas (*Zool. Rosso-Asiat.* i. 289; *Nov. Act. Nat. Cur.* xii. 259. t. 19. f. 6). It has no dorsal fin, and a smooth belly and chest; the upper and lower part of the under portion of the body are slightly keeled; the head rounded, like *Balænoptera*, with the blower on the hinder part of the crown. The lower side of the tail and the pectoral are white.

### 6. CUVIERIUS.

The rostrum of the skull very broad, continued as far as the middle with very little diminution of width, and then rounded; outer margin much more convex in the front half. Maxillary bones broad as in *Megaptera*. The atlas with short, thick, rounded lateral processes growing straight out of the upper half of the sides of the body. The axis with two short broad lateral processes which do not completely unite, having a regular oval basal aperture. The cervical vertebræ with oblong rounded bodies, with upper and lower lateral processes which are not united into a ring. The neural canal transversely oblong, flattened above. Vertebræ 64. Ribs 15. 15; head of first undivided; the second and third each with a well-developed capitular process, which is longest and most slender in the third. Sternum irregularly oval, notched in front. The scapula with a distinct acromion and coracoid. The humerus moderate. The radius and ulna much longer than the humerus. Phalanges long.

This genus is intermediate between *Physalus* and *Sibbaldius*; it has the broad rostrum of the latter and the vertebræ and ribs of the former, and a peculiar sternum.

1. *Cuvierius latirostris*.

*Physalus latirostris*, Flower, *Proc. Zool. Soc.* 1864, 410-414.

Inhab. North Sea. Skeleton of young specimen in the museum of the late Professor Lidth de Jeude, at Utrecht.

"In the collection of the late Professor Lidth de Jeude, at Utrecht, is a fine skeleton of a Fin-Whale. It was obtained on the coast of Holland. It was from a young animal. The epiphyses were detached from both ends of the bodies of all the vertebræ between the axis and the last two or three of the tail; also from both ends of the humerus and bones of the forearm. The exoccipital, parietal, and squamosal bones were non-united; and moreover the processes of the vertebræ were imperfectly ossified, as shown by the condition of their ends, and their shortness compared with the large size of the bodies of the bones. It was more advanced, however, than the specimen examined at the Hague.

"The length of the cranium is 9' 10"; of the vertebral column, the bones being placed close together, without the epiphyses, 31' 2"; to this must be added at least 5 feet for the thickness of the epiphyses and the intervertebral spaces; so that the whole animal could not have been much short of 50 feet in length. The number of vertebræ is C. 7, D. 15, remainder (of which 15 or 16 are lumbar) 42=64. The column is quite complete, and ends, not in an elongated bone composed of two or three centrums ankylosed, but in a small, flat, circular, disk-like bone half an inch in diameter. The penultimate vertebra is simple, short, rounded at the edges, and about an inch in diameter. The one before this is much larger in every direction, increasing rapidly at its anterior end.

"The cranium presents many of the characters before attributed to the genus *Physalus*, but with some peculiarities that I have not met with in any other specimen. The most remarkable of these is the great width of the rostrum, which, instead of gradually and steadily contracting from the base to the apex, as in *P. antiquorum* and the members of the genera *Sibbaldius* and *Balenoptera*, continues as far as the middle with very little diminution of width, so that the outer border is much more strongly convex in the anterior half. This is occasioned by the width of the maxillary bone, which more resembles that of *Megaptera longimana*. The great difference of the proportional breadth of the beak to the length of the cranium in this specimen, as compared with other Fin-Whales, is seen in the Table at p. 112, and in the Table of dimensions below. I may mention also that the breadth of the palatine surface of the maxillary, measured in a straight line, at the middle of the beak, is 16", whereas in the cranium of a Common Fin-Whale (*P. antiquorum*) in the Museum of the Royal College of Surgeons, of almost the same length (viz. 9' 3"), it is but 11½". The nasal bones are very broad and short, raised to a ridge in the middle line, and hollowed on each side on the upper surface and anterior border, though to a less extent than in the common species. The orbital plate of the frontal resembles in its general form that of *Physalus antiquorum*, but is rather less

narrowed externally. The lower jaw is massive, has a high, pointed coronoid process, and a considerable but not excessive curve.

“Dimensions (in inches) of Skulls of different examples of *Physalus antiquorum* and of the specimen at Utrecht.

	Utrecht.	Antwerp Zoological Gardens.	Alexandra Park.	Louvain.	Young: Leyden.	Young: R. Coll. Surgeons.
Length of skull in a straight line .....	118	184	186	179	126	111
Breadth of condyles .....	15	12	14	12	14½	11½
Breadth of exoccipitals.....	36	56	55	54	39	38
Breadth of squamosals (greatest breadth of skull).....	60	96	86	78	60	56
Length of supraoccipital .....	27	41	37½	38	26	26
Length of articular process of squamosal ...	28	36	34	35	25	24
Orbital process of frontal, length .....	19½	32	30	29	...	19
Orbital process of frontal, breadth at base (from curved border of maxillary to hinder edge of orbital process of frontal) }	22	34	32	35	25	21
Orbital process of frontal, breadth at upper surface of outer end .....	13	18	17	18	12½	12½
Nasals, length .....	6½	8½	7	8½	8½	7
Nasals, breadth of the two, at posterior end	5½	6	4½	3	4	3
Nasals, breadth of the two, at anterior end	6	9½	7½	9	6½	6
Length of beak (from curved border of maxillary to tip of beak) .....	73	133	132	119	79	75
Length of maxillary .....	86	145	142½	137	86	87
Projection of maxillary beyond premaxillary	5	9	10½	8	9	...
Breadth of maxillaries at hinder end.....	15	17	17	15	14	13
Breadth of maxillaries across orbital pro- cesses (following curve) .....	64	89	88	84	60	57
Breadth of beak at base (all the measure- ments across the beak include the curve of the upper surface) .....	...	56	54	55	38	39
Breadth of beak at one-quarter of its length from base .....	...	45	45	42	...	30
Breadth of maxillary at the same point.....	13½	13½	14½	13½	...	10
Breadth of premaxillary at same point .....	3	6	5	6	...	3½
Breadth of beak at middle .....	32	33	36	32	26	22½
Breadth of maxillary at middle .....	11	9½	10	10	7½	7½
Breadth of premaxillary at middle .....	4	5½	6	5	4	3
Breadth of beak at three-quarters of its length from base .....	22	18½	23	21	...	13
Breadth of maxillary at same point .....	5½	5	5	4½	...	3
Breadth of premaxillary at same point .....	4½	3½	5	4½	...	2½
Length of lower jaw in a straight line .....	112	180	177	...	...	112
Height at coronoid process .....	18	21	23	...	...	15
Height at middle .....	...	...	13	...	...	7½
Amount of curve (greatest distance of the inner surface of the jaw from a straight line drawn between the extremities) ... }	11	...	24	...	...	15

Flower, P. Z. S. 1864, 411.

“In all the characters by which the atlas of *Physalus* differs from that of *Sibbaldius*, the present specimen agrees with the former.



The transverse processes are short, thick, and rounded, growing straight out of the upper half of the sides of the body of the bone, but, as said before, incomplete at their ends. It measures  $14\frac{1}{2}$ " in height, and 23" in extreme width; 16" across the articular surface for the skull, each facet being  $12\frac{1}{4}$ " in height and 6" in width; at their lower end these do not meet by a space of 2". The neural canal is 10" in height,  $5\frac{1}{4}$ " wide at the upper end, contracts rather above its middle to  $3\frac{1}{4}$ ", then expands somewhat again. The body of the axis measures 16" across and  $7\frac{1}{2}$ " in depth; with the processes, it is  $24\frac{1}{2}$ " wide and  $16\frac{1}{2}$ " high; the neural canal is  $6\frac{1}{4}$ " wide by  $5\frac{1}{2}$ " high. The upper and lower transverse processes do not completely unite, although they approach on one side within half an inch, on the other not quite so much; their extremities, however, are not ossified. The opening between them is regularly oval,  $4\frac{1}{4}$ " long and  $3\frac{1}{4}$ " wide.

"The bodies of the remaining cervical vertebræ are rounded oblongs, their arches are low, and their spines little developed; the neural canals transversely elongated, and flattened above; from the third to the sixth, each has an upper and lower transverse process, the upper ones rising somewhat from the body of the vertebræ, before taking their outward and downward course, very thin, especially at their concave margin, gradually and very slightly decreasing in length. The lower processes somewhat shorter, and considerably broader, though thin; with a tuberosity on their under edge near the base; decreasing regularly in length, that of the sixth vertebra being notably shorter than the others. In the seventh vertebra the upper process is wider than in the others, and the lower one is reduced to a mere tubercle.

*"Dimensions of the Cervical Vertebræ (in inches).*

	Extreme height.	Extreme width.	Height of body.	Width of body.	Height of neural canal.	Width of neural canal.
Third .....	14	23	8	13	$4\frac{3}{4}$	$6\frac{1}{2}$
Fourth .....	14	22	$8\frac{1}{4}$	$12\frac{1}{2}$	4	$6\frac{1}{2}$
Fifth .....	$14\frac{1}{2}$	22	$8\frac{3}{4}$	12	4	..
Sixth .....	15	$21\frac{1}{2}$	$8\frac{3}{4}$	$11\frac{1}{2}$	$3\frac{1}{2}$	..
Seventh .....	$15\frac{1}{2}$	22	$8\frac{3}{4}$	$11\frac{3}{4}$	$3\frac{1}{2}$	$7\frac{1}{4}$

"There are 15 pairs of ribs. The first has an undivided head. The tuberosity is prominent but narrow, and a thin crest extends from it for some distance along the convex border of the rib. The greatest length in a straight line is 34"; the breadth at the middle 3", at the lower end 6". The second and third ribs have both well-developed capitular processes extending towards the bodies of the vertebræ, longer and more slender in the third. In the fourth this process is nearly obsolete, and absent in all the succeeding ones. There are rough surfaces on the infero-lateral portions of the hinder edges of the bodies of the first and second dorsal vertebræ, to which those processes of the ribs were connected, probably by the intervention of a strong ligament. The length of the second rib is 49"; of the third 59".

"A bone which, from its general appearance, texture, and surface, I presume must be the sternum, especially as there was no other which could have represented this portion of the skeleton, presents most anomalous characters. It is very flat on both surfaces, a little more than 1" in thickness, of an irregularly oval form, being larger on one side than the other, and slightly produced at what I suppose would be the posterior border, and notched in the anterior. It is only  $5\frac{3}{4}$ " in its greatest diameter (transverse), and 4" in the other direction. Certainly the condition of the edges gave evidence of a bone incompletely ossified; but its very small size, especially in the antero-posterior direction, for a *Physalus* of the dimensions of the one under examination, is very remarkable.

"The body of the hyoid I was unable to find; but the stylo-hyals are slightly curved, compressed, with a thick convex border, and a thinner concave border, rather larger at one end than the other; 14" in length,  $4\frac{1}{4}$ " in greatest width, and 2" in thickness; presenting, in fact, the usual form seen in the genus *Physalus*. The scapula and arm-bones had also the ordinary form; the former is 21" in height, and  $35\frac{1}{2}$ " in breadth; the acromion  $7\frac{1}{2}$ " long, and  $3\frac{1}{2}$ " in breadth; the coracoid  $2\frac{1}{2}$ " long; the glenoid fossa  $10\frac{1}{2}$ " by 7". The humerus is 17" long,  $7\frac{1}{2}$ " in longest diameter, and 20" in circumference at the middle. The radius is 27" long, 6" in breadth at the upper end,  $4\frac{3}{4}$ " at the middle and  $7\frac{1}{2}$ " below, and 3" thick at the middle. The ulna is 25" long, 7" across at the top,  $3\frac{1}{2}$ " at the middle (and 2" in thickness), and  $5\frac{1}{2}$ " at the lower end. The circumference of the two bones together at their middle is  $20\frac{3}{4}$ ". The metacarpal bones are long for the size of the animal, being respectively, beginning at the radial side, 6", 8",  $6\frac{1}{2}$ ", and  $4\frac{1}{4}$ "; whereas the same bones in the adult Common Fin-Whale in the Antwerp Zoological Gardens are  $4\frac{1}{2}$ ", 6", 6", and  $4\frac{1}{2}$ "; and in the specimen in the Alexandra Park  $4\frac{3}{4}$ ", 6", 5",  $3\frac{3}{4}$ ". The phalanges are long, and rather different in number from those in the specimens of the Common Fin-Whale which I have examined, being 4, 5, 5, and 3 in the several digits, commencing on the radial side with No. II. In the Antwerp *Physalus* they are 2, 7, 6, and 3. But, as in both cases they have been artificially articulated, much importance cannot be attached to these numbers.

"This skeleton differs in some respects from any other that I have seen, nor can I identify it with any published description sufficiently detailed for exact comparison. That it belongs to the genus *Physalus* as above defined there is little question. The only difficulty is in the form of the sternum. It must be remembered that the individual was young, and the bone, being slow of development, is subject to considerable variation in form during growth, and also, when fully grown, to great individual diversities of form. It scarcely seems advisable, therefore, on account of this one specimen to modify the generic diagnosis as regards this bone, though such a course might be necessary if a very small oval, transversely elongated sternum were found characteristic of the adult animals belonging to the species. I think that there can be no question that this character, together

with the additional two caudal vertebræ, the wide maxillaries, the more elongated metacarpals, and the slight differences in the form of the cervical vertebræ and the ribs, are sufficient to establish a well-marked species; and, unless it can be identified with any that has been previously described, I would suggest the name of *latirostris* as an appropriate designation."—*Flower, P. Z. S.* 1864, 411-414.

B. *Vertebræ* 55. *The first rib double-headed.*

7. SIBBALDIUS.

The pectoral fins moderate. The second cervical vertebra with a broad elongated lateral process, perforated at the base. The first and second ribs double-headed. Lower jaw compressed, high, flat on the sides, with a conical coronoid process. Vertebræ 55 or 56. Ribs 13. 13 or 14. 14.

*Balænoptera*, sp., *Gray*.

*Pterobalæna*, sp., *Eschricht, Van Beneden*.

*Sibbaldus*, *Gray, Proc. Zool. Soc.* 1864, 223; *Ann. & Mag. N. H.* 1864, xiv. 352.

*Sibbaldus*, *Flower, Proc. Zool. Soc.* 1864, 392.

Pectoral fin one-eighth of the entire length; and the dorsal fin, "opposite the opening of the vent," nearly three-fourths of the entire length from the nose. Skull very broad. Maxillary bones very broad, gradually tapering, with nearly straight outer edges. The intermaxillaries moderate, linear. The frontal bones broad, band-like, with a wide sinuous edge over the orbits. Nasal bones small. The lower jaw slightly arched, compressed, with a conical ramus near the condyle. The lateral process of the second cervical vertebra expanded, with a basal perforation (*Rudolphi, Berl. Trans.* 1822, t. 1. f. 2). Tympanic bone oblong, ventricose (see *Dubar, t. 4. f. 1*; *Rudolphi, t. 3. f. 6*). The lateral processes of the second to the sixth cervical vertebræ separate, elongate. The arm-bones strong, the forearm-bones nearly double the length of the humerus. The scapula broad, with a large, well-developed coracoid process in front. The hand with four rather short fingers; the second and third equal and longest; the inner or fourth rather shorter than the first. Phalanges 4.5.5.3. Vertebræ 54. Ribs 13 or 14. The first rib slender, with a process on the side near the condyle, as if the rib was divided into two somewhat similar lobes above (*Rudolphi, t. 5. f. 6*). According to *Dubar*, the first rib is articulated to the first and second dorsal vertebræ.

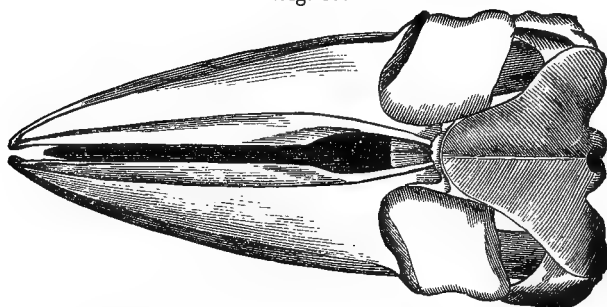
The under jaw less curved; but the great character is that the front rib is split into two separate parts near the condyle, or double-headed as *Dubar* calls it. The tympanic bones are short, oblong, swollen (figured *in situ* in the skull, *Rudolphi, l. c. t. 3. f. 6*).

"Total number of vertebræ 56-58. Ribs 14 pairs. Orbital process of frontal bone nearly as broad at outer end as at the base. Nasal bones elongate, narrow, flat, or very slightly hollowed on the sides of the upper surface, obliquely truncated at the anterior end

(fig. 13, *e*, p. 111). Lacrymal bones thickened and rounded at the outer end. Lower jaw with a comparatively slight curve, and a low, obtusely triangular coronoid process. Neural arches of the cervical vertebræ high, and their spines well developed. Transverse process of atlas arising from upper two-thirds of side of the body, short, and deep from above downwards (fig. 41, p. 181; fig. 42, p. 182). On the hinder border of the under surface a median pointed triangular process, directed backwards and articulating with the axis. Upper and lower transverse processes of the second to the sixth vertebræ inclusive well developed, broad, and flat (united at their ends in the adult, except the sixth?). Lower process of the sixth short, broad, and much twisted on itself. Head of the first rib bifurcated into an anterior and posterior division, articulating with the extremities of the transverse processes of the seventh cervical and first dorsal vertebræ respectively. Second, third, and fourth ribs with short capitular processes. Sternum very small, short, and broad, somewhat lozenge-shaped (fig. 12, *b*, p. 110). Stylohyals very broad and flat (fig. 48, p. 184).

“Type species, *S. laticeps*, Gray.”—*Flower, P. Z. S.* 1864, 392, 393.

Fig. 37.



*Sibbaldius laticeps* (from Rudolphi). *Cuv. t.* 26. f. 6.

Professor Schlegel seems to think that the bifurcation of the first rib is a mark of youth, for he observes, “It appears that in old specimens of the *Balænoptera Physalus* this bifurcation is grown to one solid mass. . . . This singular character has often induced me to believe that the first rib, as it is called, is only the horns of the os hyoides.”—*Letter, 24th August.* 1864.

I may observe, in reply, that the full-grown specimen described as the “Ostend Whale” had the bifurcation well developed.

\* *Dorsal fin compressed, falcate, two-thirds of the entire length from the nose. Ribs 13. 13. First rib short, dilated at the sternal end. Sternum with an elongate, narrow posterior lobe. Rudolphius.*

### 1. *Sibbaldius laticeps*.

Black, beneath white. Upper jaws wide, in the skull only twice as long as the width of their base in front of the orbits; the lower

jaws slightly curved and scarcely wider than the edge of the upper ones. Pectoral fin one-eighth of the entire length, and rather more than one-third, and the dorsal nearly three-fourths, from the nose.

The length was 31 feet 1 inch, from nose to the eye 2 feet 9 inches, to blower 3 feet 11 inches, to pectoral 3 feet 6½ inches, to the front of the dorsal 19 feet 2 inches, to the vent 21 feet.

*Balæna rostrata*, *Rudolphi*, *Berl. Abhandl.* 1820, t. 1 (not *Hunter*); *Brandt & Ratzeb. Med. Zool.* i. 119. t. 15. f. 3, t. 16. f. 12; *Gray, Cat. Cetac. B. M.*

Rorqual du Nord, *Cuvier, Oss. Foss.* v. 564. t. 26. f. 6 (copied from *Rudolphi*).

*Balænoptera laticeps*, *Gray, Zool. E. & T.* (from *Rudolphi*); *Cat. Cetac. B. M.* 37.

*Balæna borealis* (part.), *Fischer, Syn.* 524 (from *Cuvier*).

*Balæna Physalus* (part.), *Nilsson, Scand. Fauna*, 635.

*Pterobalæna Boops* (part.), *Eschricht, K. Dansk. Vid. Selsk.* 1849, 130, 131.

*Balænoptera borealis* (part.), *Rapp, Cetac.* 51.

Inhab. North Sea. Holstein, 1819 (*Rudolphi*); skeleton in Mus. Berlin, 31 feet long. Zuyder Zee, 1816, skeleton in Mus. Leyden.

Fig. 38.



First rib of *Sibbaldius laticeps*. (From *Rudolphi*.)

The blade-bones with an elongated coracoid process, bent up towards the upper edge of the bone, and only a very rudimentary acromion; the upper edge arched; the ends acute, the hinder one rather produced. The forearm-bones are slender, rather dilated at each end, more than twice the length of the short thick humerus; the ulna with a rounded dilatation on the upper end (olecranon). Fingers 4, moderately long; the two middle longest, subequal, each of seven joints; the first shorter, of four joints; and the fourth shorter still, of three joints.—*Rudolphi*, t. 1. f. 1.

Entire length 31 feet 1 inch. Length from nose to front of eye 5 feet 3 inches, to pectoral fin 9 feet, to dorsal fin 19 feet 2 inches, to vent 21 feet; length of pectoral fin 3 feet 6 inches, breadth of pectoral fin 8 inches.

The os hyoides broader in the middle, the end rather tapering and bent up towards the front, the middle of the hinder edge produced out into broad rounded lobes (see *Rudolphi*, t. 4. f. 1, 2). The tympanic bones are short, oblong, swollen; they are figured *in situ* in the skull (*Rudolphi*, *l. c.* t. 3. f. 6). Dorsal fin two-thirds of the

entire length from the nose. (Length 31 feet, dorsal 19 feet.) Lilljeborg describes the dorsal fin as of the usual size, and the baleen as black.

Cuvier copies the figure of the head of this whale as that of the Northern Rorqual, and points out its distinctions from that which he had received from the Mediterranean. The nasal bones appear much broader than in the small common Finner, *Balænoptera rostrata*.

J. B. Fischer, in his 'Synopsis Mammalium,' gives the name of *Balæna borealis* to the *Rorqual du Nord* of Cuvier, which is established on the *Balæna rostrata* of Rudolphi. He adds the account of the Ostend Whale to his synonyms, and gives the bifid head of the first rib as one of his specific characters; but he mentions the *Balæna Boops* and *B. Musculus* of Linné, and *B. rostrata* of Müller, as probable varieties of this species.

M. Van Beneden, who regarded this as the young of the following, observes that the skeleton in the Berlin Museum, from Holstein, is not quite adult; and also states that there is a skeleton, not quite adult, in the Leyden Museum, from the Zuyder Zee (1816).

"A skeleton in the Leyden Museum, marked '*Balænoptera Phyalus*, Vinvisch, Zuyder Zee.' This is no. 17 of Eschricht's list (*Untersuchungen über die Nordischen Wallthiere*, Leipzig, 1849), according to which it was taken in the Zuyder Zee, near Monnikendam, Aug. 29th, 1811, its length being 32' Rheinland. The skeleton is perfect, with the exception of the hyoid and pelvic bones. The malars, lacrymals, and tympanics are present. The entire length (including the skull, which is 6' 7") is 29' 7"; but the bodies of the vertebræ are placed close together, so that 2 or 3 feet should be added for the intervertebral spaces. The animal was young; the epiphyses of all the vertebræ, including that of the hinder surface of the axis, are separate from the bodies, as well as those of both ends of the humerus, radius, and ulna. The vertebral formula is C. 7, D. 13 or 14, L. 16 or 15, C. 19=55; but the last caudal is elongated, and really consists of two bodies ankylosed, with even a minute rudimentary third. The cervical vertebræ exhibit all the characters peculiar to the genus; but their lateral processes are, as the surface of the bone shows, incomplete at the ends. The atlas has a deep, compressed-from-before-backwards, short transverse process, and a backward-directed, median triangular projection on the under surface of its body for articulation with the axis. The five following vertebræ have each an upper and lower transverse process, but not united together at their ends in any of them—not quite, even in the second. The processes are of tolerably equal length throughout, except the lower one of the sixth vertebra, which is shorter and broad, and twisted on itself so that its flat surface is horizontal at the end. The upper processes are slenderer than the lower, and become more so posteriorly. The spaces between the upper and lower processes, in vertical height, are in the second 2''·2, in the third 4''·2, in the fourth 4''·2, in the fifth 4''·1, in the sixth 4''·7. The spines are comparatively well developed, especially that of the axis.

"There are thirteen pairs of ribs present; but it is probable that

the posterior pair are wanting. The first has a *bifid* articular head, the cleft extending to the depth of 5 inches. It articulates by this with the transverse processes of the seventh cervical and first dorsal. Its extreme length in a straight line is 21"; its breadth at the middle  $2\frac{3}{4}$ ", at the lower end  $4\frac{1}{4}$ ". The second, third, and fourth have short capitular processes, not reaching halfway to the bodies of the vertebræ. These processes are absent in all the others. The longest rib (the fifth) is 41" in a straight line, the twelfth is 31", and the thirteenth 30". There are ten chevron bones present. The sternum is remarkably small for the size of the animal, a transversely elongated lozenge in shape, 4" in antero-posterior and 8" in transverse diameter.

"The scapula is, as usual in the family, much elongated transversely, and has a long acromion process. Its length is 14", its breadth 25". The humerus is 10" long; the radius  $18\frac{1}{2}$ ", and proportionately slender. The hand, artificially articulated, is 18" long; the second digit has, besides the metacarpal, three bones, the third three bones, the fourth six bones, the fifth three bones. These numbers are probably not correct, as they do not correspond with a natural skeleton of the hand of the same species at Brussels.

"The upper surface of the orbital plate of the frontal is almost of a rhomboid form. The malars are very thin; the outer end of the lacrymals forms a thick, projecting, rounded knob. The nasal bones are almost straight across their anterior ends, slightly longer at the middle, and sloping away at the sides; their upper surface tolerably flat, but raised to a low ridge in the middle towards the anterior end, and slightly hollowed on each side of this. The dimensions of the cranium are given in the Table at p. 180, compared with those of other specimens of the genus. The inferior maxillaries have low, obtusely triangular coronoid processes. They are articulated too close to the head, and their upper edge rotated too much inwards. This position greatly diminishes their curve as seen from above, and causes their extremity to bend downwards. I was much interested in observing this, as it explains away a great peculiarity in the figure of the whale in the Berlin Museum by Rudolphi (Abhandlungen Acad. Berlin, 1822), in which the same mode of articulating has caused some misconception as to the character and relation of these bones, the more important to be rectified, as this is the only figure extant of the skull of any member of this genus.

"There can be little doubt that this skeleton is identical with the above-mentioned specimen described by Rudolphi; at least, a careful perusal of his description and figure (for I have not seen the skeleton) leaves this impression on my mind. In habitat, age, size, number of vertebræ and ribs, and all other important osteological characters they agree. There are certainly slight differences in the proportions of the parts of the cranium, but not greater than are found among different individuals of undoubtedly the same species; and it is possible that even these may arise from inaccuracies on the part of the artist. Some of the evidence also is wanting to make the comparison complete; for instance, the sternum from the Berlin

specimen, and the hyoids from the one at Leyden. In assigning only five vertebræ to the cervical region, Rudolphi is obviously in error, being probably misled by the mode in which the skeleton was articulated. He states that the transverse processes of the cervical vertebræ have all (that is, the first five) very large holes. If this is strictly correct (that is, if the holes are completely surrounded by bone), it indicates a more advanced state of ossification than in the Leyden specimen—a circumstance, of which the peculiarity is somewhat diminished by the fact that the skeleton of a whale of the same species, and of almost exactly the same size, in the Brussels Museum is in a condition intermediate between the two, the processes of the second and third vertebræ being completely united, but not those of the fourth and fifth. In calling his specimen *Balæna rostrata*, Rudolphi was acting upon the idea, then prevalent, of the specific unity of many of the northern Fin-Whales now known to be distinct. Dr. Gray seems to have been the first to point out that it differed from all whales which had been previously described with anything like definite accuracy, and gave it the name of ‘Rudolphi’s Finner Whale,’ *Balænoptera laticeps* (*Zoology of the Erebus and Terror*, 1846); this name therefore has the right of priority for the species.”—*Flower, P. Z. S.* 1864, 397–399.

In the Brussels Museum “there is a very interesting skeleton, almost the exact counterpart in size to that in the Leyden Museum. It was obtained by Eschricht from the North Cape. The condition of the epiphyses shows that it is young, they being all non-united both in the vertebral column and long bones; but the ossification of the transverse processes of the cervical vertebræ has proceeded further than in that at Leyden. The skeleton is well articulated, and gives now a total length of 31' 8"; but about 6" must be added for the end of the tail, which is wanting. The dimensions of the skull are given in the Table at p. 180. The nasals are narrow, cut off nearly straight at their anterior ends, slightly hollowed on each side above. The lacrymals are thickened at their outer edge. The orbital processes of the frontals broad externally. Lower jaw light, little curved, and with a short triangular coronoid process.

“There are 7 cervical, 14 dorsal, and 32 lumbo-caudal vertebræ present; about 5 of the latter are absent, which would make a total of 58. The atlas has the usual characteristics of the genus. The transverse process of the axis forms a complete ring, the aperture of which has a length of  $2\frac{1}{2}$ " and height of 2". The whole process is  $5\frac{1}{2}$ " long, but is incomplete at the end; it is  $5\frac{1}{2}$ " in height at the middle, and the opening is situated much nearer the upper than the lower margin of the process. In the third vertebra also the upper and lower processes are united; in the fourth, fifth, and sixth they are separate. The lower one of the sixth is shortest, broad, and twisted on itself. In the seventh the inferior process is represented by a small tubercle.

“There are 13 ribs present on the right side, and 14 on the left. The fourteenth is very much thinner than the others, twisted backwards at its lower end, with a very slender head, articulated to the



transverse process of the vertebra. The first pair of ribs have double heads; but the anterior head on both sides is very incompletely developed, and on the right side completely detached from the remainder of the bone; it has a pointed end below, merely applied to the main part of the rib; so that if it had been lost in maceration, this rib might have been supposed to be simple. On the left side it is ankylosed, but very slender. It would be interesting to ascertain, by the examination of younger specimens, whether this anterior head has always a separate centre of ossification, as it is not improbable that this singular double-headed bone is in reality formed by the coalescence of two originally distinct ribs. The second, third, and fourth ribs have small capitular processes. The stylo-hyals are very flat, but not so broad proportionately as in the Java Whale, being 11" long and  $3\frac{1}{2}$ " in greatest width. The bones of the fore limbs present the same general characters and proportions as in the Leyden specimen from the Zuyder Zee. The sternum is absent.

"This specimen has been previously mentioned in this paper as an example of *Sibbaldius laticeps*, Gray, presenting some interesting individual deviations from that at Leyden, referable to the development of the two skeletons not having proceeded *pari passu* in all parts of the system."—*Flower, P. Z. S.* 1864, 417.

\*\* *Dorsal fin very small, far behind, and placed on a thick prominence. Ribs 14. 14; first short, sternal end very broad and deeply notched. Sternum with a broad short hinder lobe. Os hyoides transverse; sides slender; hinder edge cut out in the middle.*

## 2. *Sibbaldius borealis.* *The Flat-back.*

*Sibbaldus borealis*, *Gray, P. Z. S.* 1864, 223; *Ann. & Mag. N. H.* 1864, xiv. 352.

*Baleine d'Ostende*, *Van Breda, en letter boeck*, 1827, 341; *Dubar, Ostéographie, Bruxelles*, 8vo, 1828, t. 1-10; *Bernaert, "Notice sur la Baleine échouée près d'Ostende," Paris*, 1829.

*Baleinoptère d'Ostende*, *Van der Linden*, 1828, *Bruxelles*, 8vo.

The Ostend Whale, *Guide to the Exhibition at Charing Cross, with drawings by Scharff.*

Great Northern Rorqual, "R. borealis, Lesson," *Jardine, Nat. Lib.* 125. t. 5 (from Scharff).

*Balæna borealis* (part.), *Fischer, Syn.* 524 (from Dubar).

*Balænoptera Rorqual*, *Dewhurst, Loudon Mag. N. H.* 1832, v. 214.

*Balænoptera gigas*, *Eschr. & Reinh. Nat. Bidrag, af Groenland*, 1857; *Lilljeborg, l. c.* 56, 57; *Malmgren, Arch. Naturg.* 1864, 97.

*Pterobalæna Boops* (part.), *Eschr. K. Dansk. Vidensk.* 1849, 134.

*Pterobalæna gigas*, *Van Beneden, Mém. Acad. Roy. Sci. Brux.* 1861, xxxii. 37, 463 (not characterized).

*Female* :—

*Balænoptera Boops*, *Yarrell, Proc. Zool. Soc.* 1840, 11.

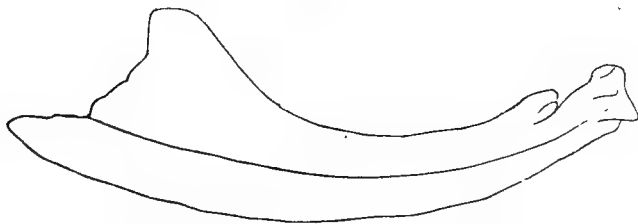
*Balænoptera tenuirostris*, *Sweeting, Mag. Nat. Hist.* 1840, iv. 342.

Inhab. North Sea.

"A whale was observed floating dead in the North Sea between Belgium and England," and towed into the harbour of Ostend on the 4th of November 1827. The skeleton was exhibited at Charing Cross, and is now, I believe, in the United States.

This specimen was 102 feet long, the lower jaw  $21\frac{1}{2}$  feet long, and the fins  $13\frac{1}{2}$  feet long. Vertebrae 54. Ribs 14. 14. The atlas (*Dubar*, t. 6. f. 1): the second cervical vertebra with large lateral processes, pierced with a large hole; the third, fourth, and fifth with two lateral processes on each side, which are not formed into a complete ring as in the second; the fifth offers a rudiment of a spinal apophysis. The first rib double-headed, articulated to the first and second dorsal vertebrae. Bones of the ears (*Dubar*, t. 5. f. 1); os hyoides (t. 5. f. 2); breast-bone (t. 6. f. 4) not pierced, short and broad, with a broad hinder portion. The vertebral column 37. *Dubar's* figures represent the second, third, and fourth cervical vertebrae as with a ring, and the fifth, sixth, and seventh with deflexed upper and straight lower separate lateral processes. Ribs, first (t. 8. f. 1) with two heads, very broad at lower end; second (f. 2) with rather elongate internal process; fourteenth (f. 3) quite simple. Pelvic bones (t. 9. f. 1, 2). Shoulder-blade short and very broad on the external edge, with a large lobe for the ridge (t. 10). Pectoral fin and bones (t. 11). Fingers four; the second and third nearly of equal length, and longest; the fourth or outer shorter, longer than the first or inner.

Fig. 39.

First rib of *Sibbaldius borealis*. (From *Dubar*.)

The upper jaw narrower and shorter than the lower, so as to be embraced by the lower; a tuft of horny round filaments or long hairs, united at their roots by a common membrane and divided at the end into small points, at the tip of the snout. Eyes rather high and very near the angle of the mouth. Ear-hole near the eye, but a little further back. Hinder part of the back keeled. Dorsal fin rather less than three-fourths of the entire length from the end of the nose, exactly opposite the vent. Skin polished, black above, white beneath. Length (entire) 25 metres, of mouth 4.8, to pectoral 6.9, to navel 13.7, to front of vagina 18.1, to front of vent 18.1. Length of pectoral fin 3.1, width of pectoral 0.65. The atlas transverse. The lateral processes thick, elongated, rather above the middle of the side (*Dubar*, t. 6. f. 1). The os hyoides broad in the middle and gradually tapering at each end, and with a deep notch in the middle of the hinder edge (*Dubar*) (*Scharff's* figure). Tympanic bone oblong, very imperfectly figured as the *os du rocher* (t. 5. f. 1). The

sternum : upper part broad, three-lobed, with a linear elongate hinder lobe (*Dubar*, t. ). (In Scharff's figure it is represented as shield-like, with four nearly square rounded lobes.) The first rib is trigonal, rather short, curved, and very broad, and with a rather deep notch at the sternal end (as broad as one-third the length of the outer edge). (*Dubar*, t. 8. f. 1 (8 feet long).) The second rib slender, subcylindrical, with a rather long subcylindrical process on the inside, just below the condyle (*Dubar*, t. 8. f. 2). The last rib slender, subcylindrical (*Dubar*, t. 8. f. 3). The blade-bone with a large coracoid process and acromion, the former broad, flat, rather bent up at the end (*Dubar*, t. 10). The humerus very short and thick, not longer than broad. The radius and ulna nearly twice as long as the humerus, the ulna with a long flat olecranon process. The fingers 4, slender, tapering; the second and third longest and nearly equally long, of 7 joints; the fourth shorter, of 5; the first shortest, of 4 joints, nearly half the length of the second (*Dubar*, t. 11).

Lilljeborg describes the "dorsal fin as very small, situated far behind and placed on a thick prominence" (*l. c.* p. 57), and, according to *Dubar's* measurement, it was three-fourths the length from the nose.

"From the calculations made by M. le Baron Cuvier and the Professor of the Jardin du Roi, this enormous cetaceous animal must have lived nine or ten centuries."—*H. Mather's account of the Ostend Whale*, 1831, 8vo.

Mr. Yarrell (*Proc. Zool. Soc.* 1840, p. 11) notices a female of this genus under the name of "*Balæoptera Boops*." It was stranded at Charmouth, Dorsetshire, on Feb. 5, 1840. It had no warts about the lips; back black; underside white; pupil oval, without any eyelashes. Length 41 feet. Pectoral fin  $5\frac{1}{2}$  feet long, base  $10\frac{3}{4}$  feet from tip of nose, and  $1\frac{1}{2}$  foot wide. Dorsal small, conical, 11 feet in advance of the tail. Skeleton 40 feet long, head 10 feet. Vertebrae 60, viz. 7 cervical, 15 dorsal, 16 lumbar, 15 caudal, and with 7 caudal bones. Ribs 14/14; the first double-headed, and attached to the first two vertebrae; each of the other ribs is attached to a single vertebra, and has a single head. The dorsal vertebrae exceed the ribs by one. "The subcutaneous layers of fat varied in thickness from 3 to 5 inches." "In other details the skeleton agreed with Dewhurst's description of the 'Ostend Whale.'"

"Head, back, tail, and outside of the pectoral fins black; inside of the pectoral fins, throat, breast, and belly beautiful white; inside of the under jaw black; tongue, palate, and the spaces intervening between the reefs on the belly pink. The under jaw the widest, and projecting 9 inches beyond the upper one; end of both jaws rounded. The muzzle longer and more attenuated than in *Balæna*. The spiracles longitudinal, like slits or fissures, nearly meeting in front, and gradually diverging behind to a distance of about 3 inches. Baleen bluish black and yellowish white. Female 42 feet long, weighing 25 tons. Blubber varied in thickness from 3 to 5 inches; yielded three hogsheads of oil."—*Sweeting, Mag. Nat. Hist.* 1840, p. 342.

The accounts in the '*Mag. of Nat. Hist.*' and in the '*Proc. Zool.*'

Soc.' 1840, p. 11, are evidently from the same animal, but there are some discrepancies between them. Mr. Sweeting says, breadth 21 feet; Mr. Yarrell says, girth 21 feet. Mr. Sweeting, total weight 25 tons; Mr. Yarrell, probable weight between 20 and 25 tons. Mr. Sweeting, length of skeleton 41, and head 11 feet; Mr. Yarrell, 40, and head 10 feet. Mr. Sweeting says, "For the discrepancy as to the number of vertebræ, &c., I am of opinion that this species has not been described before, and I have proposed for it the name *Balænoptera tenuirostris*" (Mag. Nat. Hist. 24th March, 1840, 342).

The skeleton here described was sold, about sixteen years ago (1859), for five pounds, to Mr. Freane, and it was stated to have been sent to London as a present to the British Museum, but it has never been received, and I cannot find any further account of it; probably it was sold for manure. *B. tenuirostris* is the earliest name given specially to this species, but it cannot be used for a whale with a broad nose or beak. This is most likely the same as the "Ostend Whale," or a nearly allied species. The dorsal fin is described as small, conical, and three-fourths the length from the nose.

\*\*\* *Dorsal fin unknown. First rib elongate, dilated at sternal end.*

### 3. *Sibbaldius Schlegelii*.

*Balænoptera Physalus*, from Java, *Schlegel, Mus. Leyden*.

*Balænoptera Schlegelii*, *Flower, MS.*

"*Megaptera* (from Java)," *Van Beneden, Gray, P. Z. S. 1864, 208.*

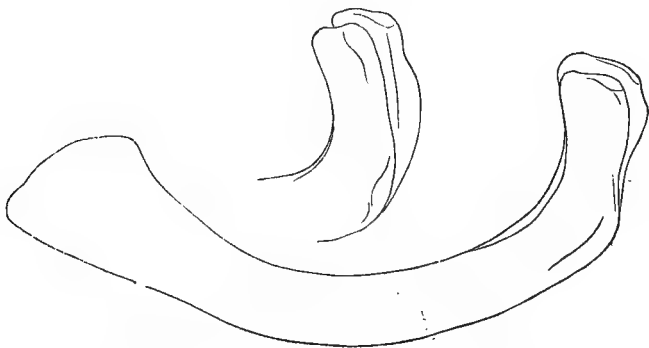
*Balænoptera longimana*, *Schlegel, Mus. Leyden.*

*Sibbaldius Schlegelii*, *Gray, Ann. & Mag. N. H. 1864, xiv. 352.*

*Sibbaldius Schlegelii*, *Flower, P. Z. S. 1864, 408, 419.*

Inhab. Java. Skeleton, *Mus. Leyden* (young); skull, *Mus. Leyden*.

Fig. 40.



First rib of *Sibbaldius Schlegelii*?, in *Mus. Roy. Coll. Surgeons*.

There is the first rib of a whale of this genus in the Museum of the Royal College of Surgeons, which, if it is not this, would seem to indicate a fourth species. The origin of the specimen is unknown.

“The Leyden Museum during the present year (1864) has received the skeleton of a Fin-Whale taken on the north-west coast of the island of Java. The hands, from the carpus downwards, the pelvic bones, and some of the terminal caudal vertebræ are wanting, also the lacrymals and malars from the skull; in other respects the skeleton is complete. Not being yet articulated, the separate bones could be examined with great facility. Both epiphyses are anchylosed to the bodies of the first three cervical vertebræ; the anterior epiphyses only are united on the fourth and fifth. From this, as far as the ninth caudal, inclusive, they are detached; on the tenth caudal the hinder, and on the succeeding ones both epiphyses are firmly united. On the humerus the upper epiphysis is partly, and the lower one completely, united to the shaft, all traces of the original separation of the latter having disappeared. The upper epiphyses of the radius and ulna are in the same condition; but those at the lower end are separate. The transverse processes of the cervical vertebræ show, from the condition of their terminal surfaces, that they are not quite complete. The upper edge of the scapula appears completely ossified in the middle, but must have been cartilaginous towards the two extremities. These conditions taken together show that the animal was in the adolescent stage, and had probably attained very nearly its full size.

“The skull is 9' 8" long in a straight line; the vertebræ, placed close together and without their epiphyses, measured 30"; so that, allowing for the epiphyses, intervertebral spaces, and the end of the tail, the animal could not have been less than 45 feet long.

“The number of vertebræ present is 54; and 3, or probably 4 of the caudal are wanting, raising the total number to 57 or 58. Of these, 7 are cervical, 14 dorsal, and about 13 or 14 lumbar; but, the articular surfaces for the anterior chevron bones not being well marked, I could not be certain where the tail should be considered to begin. There are fourteen pairs of ribs.

“The skull presents the general characters of the genus *Sibbaldius*. The only important difference that I could find between it and the specimen from the coast of Holland is in the form of the orbital process of the frontal bone, which is narrower at its outer end, approaching more to the form characteristic of *Physalus*, although by no means so narrow as in this. The nasals (fig. 13, *e*, p. 111) are long and narrow, nearly flat on their upper surface, and slightly shelving downwards from the middle line. Their anterior border is rather less produced near the middle line than at the sides—the reverse in this respect to the Zuyder Zee specimen. The tympanic bones are 4"·6 long, 3"·5 in greatest breadth, and 2"·5 thick. Their form is seen in the annexed woodcut (fig. 47). The lower jaw has a very slight curve and a low coronoid process, the highest part of which is 20" from the hinder end of the bone. It is triangular in form, rounded at the apex, with a base about 4" in breadth, and rising about 2½" in height. The principal dimensions of the skull in inches are given in the following Table, compared with those of the skulls of the two other specimens of the genus mentioned in this notice.

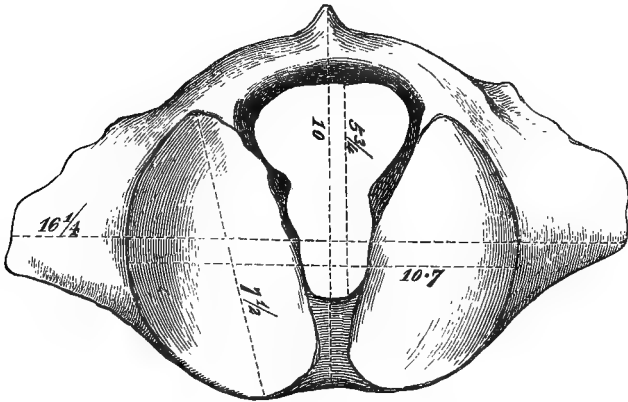
	Java: Leyden Museum.	Zuyder Zee: Leyden Museum.	North Cape: Brussels Museum.
Length of skull in a straight line . . . . .	116	79	80
Breadth of condyles . . . . .	10 $\frac{3}{4}$	10	9
Breadth of exoccipitals . . . . .	41	26	27
Breadth of squamosals (greatest breadth of skull) . . . . .	57	40	38
Length of supraoccipital . . . . .	29 $\frac{1}{2}$	21 $\frac{1}{2}$	21
Length of articular process of squamosal . . . . .	22	15	16
Orbital process of frontal, length . . . . .	22	13	13
Orbital process of frontal, breadth at base . . . . .	24 $\frac{1}{2}$	16	15
Orbital process of frontal, breadth at outer end . . . . .	15	12	11
Nasals, length . . . . .	10 $\frac{3}{4}$	6 $\frac{1}{2}$	6 $\frac{1}{4}$
Nasals, breadth of the two, at posterior end . . . . .	2	2 $\frac{1}{2}$	3
Nasals, breadth of the two, at anterior end . . . . .	6	4	4
Length of beak, from middle of curved border of maxillary to the tip of premaxillary . . . . .	82	53	50
Length of maxillary . . . . .	90	57	55
Projection of premaxillary beyond maxillary . . . . .	6	5	3
Greatest width of nasal aperture . . . . .	10	6 $\frac{1}{2}$	..
Breadth of maxillaries at posterior end . . . . .	11	9	8
Breadth of maxillaries across orbital processes (following the curve) . . . . .	63	43	43
Breadth of beak at base (following the curve) . . . . .	42	30	30
Breadth of beak at middle (following the curve) . . . . .	22 $\frac{1}{4}$	16	15
Breadth of maxillary at same point . . . . .	6	4	4
Breadth of premaxillary at same point . . . . .	4	3	2 $\frac{3}{4}$
Length of lower jaw in a straight line . . . . .	117	78 $\frac{1}{2}$	76
Height at coronoid process . . . . .	14	9	9
Height at middle . . . . .	9 $\frac{1}{2}$	7 $\frac{1}{4}$	..
Amount of curve (greatest distance of the inner surface of the jaw from a straight line drawn between the extremities) . . . . .	8 $\frac{1}{2}$	6	6

"The atlas presents the characteristic features of this bone in other members of the genus in a very marked degree. The transverse process is particularly deep from above downwards, and much twisted. The spinal canal is contracted in the middle; the articular surfaces for the axis are not confluent at their lower margins, but between them is a distinct, oval, transversely elongated facet, and another smaller round one is situated on the upper surface of a pointed triangular projection from the hinder border of the inferior surface of the bone, which runs under the body of the axis. There are thus four distinct articular surfaces in connexion with the second vertebra. The extreme width of the bone is 16 $\frac{1}{4}$ " ; the length of the inferior surface of the body 4"·4, including the triangular process, which is 1"·5. The other dimensions are shown in the sketches (figs. 41 & 42).

"The axis (fig. 43) has the usual form of this bone in the Fin-Whales. The odontoid process is represented by a slight rounded elevation, with a depression in the centre; and besides the two large lateral articular surfaces for the atlas, there are two small median facets, one on the lower part of the anterior and one on the inferior surface, corresponding to those above described in the first vertebra.

The neural arch is high and massive, and the spine well developed. The lateral processes are large wing-like plates, directed somewhat backwards, with a regularly oval perforation rather above the middle of their base. The dimensions are given in the figure, which is drawn to scale, regardless of perspective.

Fig. 41.



Atlas; anterior surface.

“The third, fourth, and fifth vertebræ much resemble each other; they have rounded oblong bodies, high triangular neural canals, spines gradually increasing in length, and well-developed upper and lower transverse processes completely united together at the ends, leaving large oval spaces between them. In the sixth the transverse processes do not meet by the space of 3 inches; and I doubt if they ever would meet in the process of growth, on account of the different planes of their ends. The upper one is long, with its flat surface almost vertical; the lower one, short and broad, with a stout conical tuberosity projecting forwards and downwards from its base, turns so completely on itself that its broad terminal end is directed horizontally; it is, moreover, very nearly complete. The peculiar form of this process is highly characteristic of all the specimens I have examined of the genus *Sibbaldius*, though it is best marked in the one under consideration, being the most mature. It should be mentioned that, when the series is placed together, a gradual approach to its form is seen in the lower processes of the antecedent vertebræ. The seventh cervical vertebra has no trace of an inferior transverse process. The thicknesses of the under surface of the bodies of the last five cervical vertebræ, and of the first two dorsal (without the epiphyses), are respectively 1.5, 1.3, 1.4, 1.5, 2, 2.25, and 2.5 inches. The width of the first dorsal vertebra across the transverse processes is exactly the same as that of the last cervical, 23''; the second is 3'' less. The transverse processes of the posterior dorsal and of the lumbar vertebræ are very broad in the antero-posterior direction,

and the spines are high. In the second lumbar vertebra, which is the largest, the extreme width is 40'' and the height 29''.

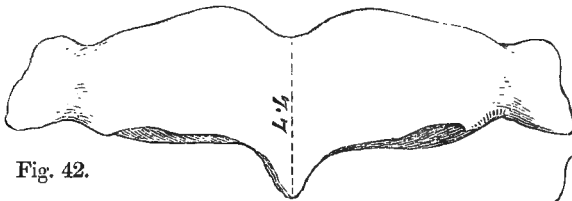


Fig. 42.

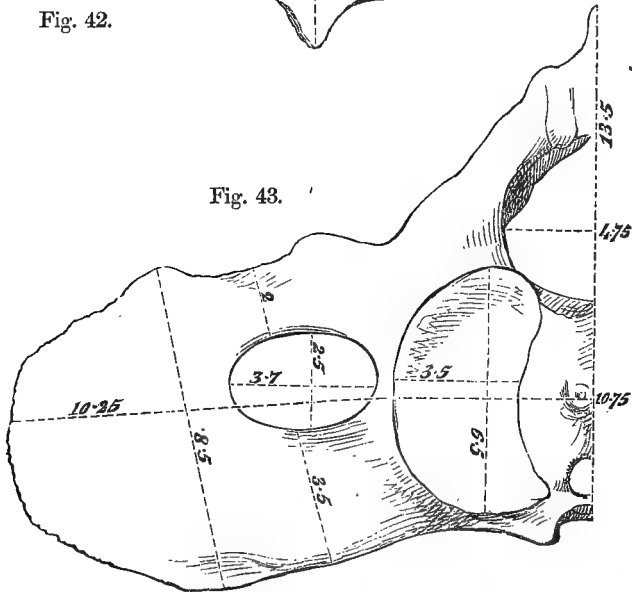


Fig. 43.

Fig. 42. Atlas; under surface.

Fig. 43. Axis; anterior surface.

“The ribs generally are slender, the first much shorter, broader, and flatter than any of the others. The vertebral end of this is split to the depth of about 6'' into two flat broad plates, of which the anterior is slightly the longer; this brings their articular surfaces, when the rib is placed in its natural position (*i. e.* somewhat sloping backwards), exactly on a level, and proves that they must have articulated with the equal transverse processes of the seventh cervical and first dorsal vertebræ, and not with those of the latter and the second dorsal vertebra, which is  $1\frac{1}{2}$  inch shorter. This rib is  $32\frac{1}{2}$ '' in length in a straight line,  $4\frac{1}{2}$ '' wide at the middle, and 8'' at the lower end; in thickness at the middle it is  $1''\cdot2$ . Its general form closely resembles the figure given by Dr. Gray (P. Z. S. 1864, p. 224) from a specimen in the Museum of the Royal College of Surgeons, but it is rather broader in proportion to the length. The second, third, and fourth ribs have large articular heads and only



Fig. 44.

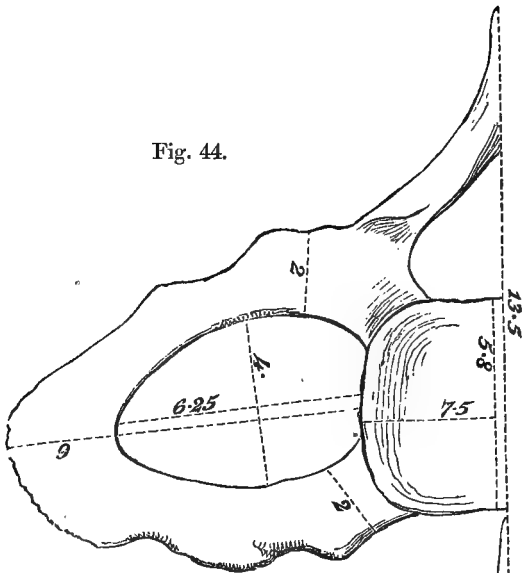


Fig. 45.

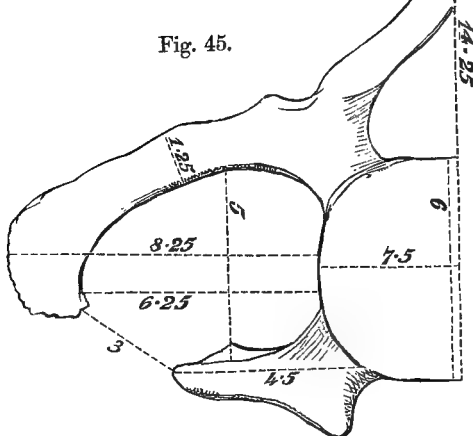


Fig. 46.



Fig. 44. Fifth cervical vertebra; anterior surface.  
 Fig. 45. Sixth cervical vertebra; anterior surface.  
 Fig. 46. The same; inferior surface.

slightly produced capitular processes. The second rib is 45" in length, the third 60", the fourth 61", the fifth  $62\frac{1}{2}$ ", the sixth  $61\frac{1}{2}$ ", the seventh  $61\frac{1}{4}$ ", the ninth 57", the twelfth 51", the thirteenth 49", and the fourteenth 48". They gradually decrease in breadth from the first. The last is considerably twisted on itself; it has a small, flat articular head, but there is no corresponding surface on the fourteenth dorsal vertebra, which is only slightly thicker at the extremity than the succeeding ones. On the thirteenth vertebra there is a distinct articular surface.

"The sternum (fig. 12, *b*, p. 110) is small, in the form of an irregular transversely elongated lozenge, the posterior angle being narrower and more produced, and the anterior more rounded, than in the Zuyder Zee specimen; so that it approaches more the form seen in the genus *Physalus*. Its length is  $8\frac{3}{4}$ ", and its breadth  $12\frac{3}{4}$ ".

"The scapula is low and broad, with a long acromion and well-developed coracoid process. Its breadth is 40", its height  $22\frac{3}{4}$ "; the acromion 10" long, and 3" in depth; the coracoid 4"; the glenoid fossa  $8\frac{1}{2}$ " by  $5\frac{1}{2}$ ". The humerus is 15" long, by 6" in diameter in the middle of its shaft and  $7\frac{1}{2}$ " at the lower end. The radius is  $24\frac{1}{2}$ " long in a straight line, 4"·6 broad above, 3"·7 at the middle, and 5"·3 at the lower end. The ulna, which is 25" long, including the olecranon projection, is 7"·5 broad above, 2"·7 at the middle, and 4"·5 at the lower end. The thickness of the radius at the middle is 2"·2; that of the ulna 1"·8.

Fig. 47.

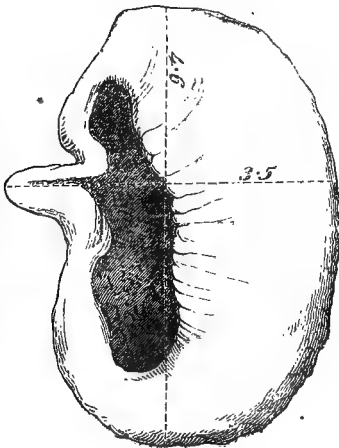


Fig. 47. Tympanic bone; half nat. size.

Fig. 48.

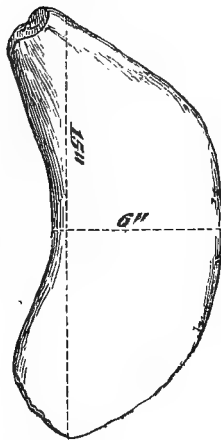


Fig. 48. One of the stylo-hyals.

"The hyoid bone, formed of the completely united basi- and thyrohyals, is flatter and deeper from before backwards, and the lateral

processes are smaller and more tapering, than in *Physalus*; but otherwise its general form is not dissimilar. Its extreme width in a straight line is 25"; its antero-posterior length  $10\frac{1}{2}$ ". The stylo-hyals (fig. 48) present a remarkable modification in form. Instead of the usual subcylindrical shape seen in *Physalus* and *Balenoptera*, they are very broad and flat, and much curved, having a convex rounded border and a concave thin edge, their flat surface having somewhat the form of a crescent with truncated ends, 15" long by 6" broad. Their greatest thickness at the convex border is about  $1\frac{1}{2}$ ". The ends are not alike, one being narrower and thicker, the other broader and flatter. The two bones are precisely similar.

"In the present case I have carefully compared the skeletons (that from Java and those from the European coast) together. I have even had the advantage of placing many of the bones of the two in the Leyden Museum side by side; and I confess that, allowing for difference of age, it is difficult to fix upon any characters in which they decidedly differ. The stylo-hyoids in the first, it may be said, are broader than in the Berlin or Brussels specimens, the sternum larger and of more definite cross-like form than in the Leyden skeleton, the transverse processes of the vertebræ are more developed and united at their ends than in either of these; but such characters are of no value for specific distinction. One, however, does appear to me of some importance, and that is the form of the orbital plate of the frontal, so decidedly narrower at the outer end in the Javan cranium than in the three specimens from Europe; but it is possible that even here age may cause the difference. Eschricht has laid great stress upon the little dependence that can be placed upon the proportions of the bones of the head in making out the specific characters of Whales. It is rather curious that the tympanic bones, though agreeing in general form, are actually smaller in the Java than in the Zuyder Zee skeleton, being less in length by 0".3, and in breadth by nearly the same amount.

"Moreover, although a comparison of osteological details of the immature bones of the other specimens with those of the adult Ostend example was not likely to throw much light upon the subject, here the case is different; as far as can be made out from the descriptions and drawings given by Dubar of the Ostend skeleton, there are notable differences, as in the form of the atlas, of the first rib, of the stylo-hyoid, in the statement that the second and three following ribs have heads reaching the bodies of the vertebræ, and in the statement that the transverse processes of the third, fourth, and fifth cervical vertebræ do not unite to form a complete hole as in the second, which last, however, would be of greater importance if the figure did not throw some doubt upon its accuracy.

"A skull of a very young whale, in the Leyden Museum, is of great interest as having been brought from Java by the late Dr. Reinhardt. It is labelled '*Balenoptera longimana*,' and has in consequence been quoted in some of our most esteemed catalogues as evidence of the extensive geographical range of that species (Van Beneden, 'Faune Littorale de Belgique,' p. 38, and after him, Gray,

Proc. Zool. Soc. 1864, p. 208). The cranium is now in an extremely imperfect condition, the maxillaries, premaxillaries, and nasals being absent. There is, however, enough to show that it is not a *Megaptera*, but belongs to the subfamily *Balænopterinae*, and probably, on account of the great width of the external part of the orbital process of the frontal bone, to the genus *Sibbaldius*. The lower jaw is 52" long, which would indicate an animal of about 18 feet, perhaps a young individual of the species last described."—*Flower, P. Z. S. 1864, 408.*

- III. "Dorsal fin high, erect, compressed, falcate, about two-thirds of the entire length from the nose. Pectoral moderate, with 4 short fingers, of 4 or 6 joints. Vertebrae 50. Cervical vertebrae sometimes ankylosed. Neural canal broad, trigonal, broader than high. Ribs 11. II. Balænopterina, or Beaked Whales.

### 8. BALÆNOPTERA.

Balænoptera, Sect. 1 (Balænoptera), *Gray, Zool. Ereb. & Terr.* 50.  
 Balænoptera, *Gray, P. Z. S. 1847, 89; Cat. Cetac. B. M. 1850, 31;*  
*P. Z. S. 1864, 226; Ann. & Mag. N. H. 1864, xiv. 352; Flower,*  
*P. Z. S. 1864, 393.*

Balænoptera (pars), *Lacépède, Cétac.*

Pterobalæna (pars), *Eschricht, Nord. Wallthiere, 1849, fol.*

Balæna (pars), *Linn.; Müller, Zool. Dan.; Illiger, Prodr. 242.*

Rorqualus, sp., *Dekay; F. Cuvier, Cétac. 321.*

Balæna minimus, *Knox, Cat. Whale, 14.*

Head elongate, flattened, throat and chest with deep longitudinal folds and very dilatile. The dorsal fins compressed, falcate, two-thirds the length of the body from the nose and behind the line above the orifices of generation. The pectoral fins moderate, one-eighth the length of the body, one-third the length of the body from the head, with 4 short fingers of few joints. The humerus short, thick. The radius nearly twice as long as the humerus. Lower jaw-bone moderate, with a distinct high conical coronoid process. Vertebrae 50; last very small. The first pair of ribs undivided near the condyle.

The lateral process of the second cervical vertebra elongate, pierced at the base; of the third, fourth, and fifth cervical elongate, slender, separate; the lower with an angular bend below. The front ribs simple, thick, with only a slight swelling on the inner edge near the condyle. Tympanic bones obovate, short, ventricose.

The lateral process of the second cervical vertebra expanded, broad, with a large ovate perforation in the middle of its base, the upper and lower margins being broad and of nearly equal width, the upper being, if anything, rather the broader of the two, very unlike the lateral process of the same bone in *Physalus*. The neural arch high, acute, with a rather high subcircular canal for the spinal marrow. The body of the atlas vertebra oblong, transverse, with a subcylindrical lateral process produced from the middle of the side.

"Total number of vertebrae 48–50. Ribs 11 pairs. Orbital process of frontal almost as broad at the outer end as the base. Nasal bones rather narrow and elongate, truncated at their anterior ends,

convex on the upper surface in both directions (fig. 13, *f*, p. 111). Rami of lower jaw much curved, and with a high pointed coronoid process. Cervical vertebræ usually separate; but this family character not unfrequently departed from by the union of the second and third, or the third and fourth, by their arches. Neural arches high; spines moderately developed. Transverse process of atlas arising from the middle of the body, elongated, tapering, directed outwards and slightly upwards. Upper and lower transverse processes of axis and succeeding vertebræ, to the sixth inclusive, well developed. Those of the axis broad, flat, and in the adult united at their extremity; those of the other vertebræ slender, and never united at their extremity, except occasionally in the sixth and more rarely in the fifth vertebra. Head of the first rib simple; capitular processes scarcely developed upon any of the ribs. Sternum longer than broad, having the form of an elongated cross (fig. 12, *c*, p. 110).”—*Flower, P. Z. S.* 1864, 394.

The lateral processes of the cervical vertebræ are generally free and tapering at the tip; but some of them are sometimes united, forming a ring. Eschricht described those of the fifth and sixth vertebræ as sometimes united. In the specimen in the Royal College of Surgeons the lateral processes of the sixth cervical vertebra are united on one side and free on the other.

In all these cases the form of the processes is not altered; the end is only elongated and united. The cervical vertebræ are sometimes quite free, as is the case with Hunter's specimen in the Museum of the Royal College of Surgeons. The second and third vertebræ are often united by more or less of the surface of the neural arches; and this seems to be the normal state. In the specimens from Cromer, lately acquired by the Royal College of Surgeons, the third and fourth cervical vertebræ are united by the neural arches, and the second and third free.

The elongated processes on the end of the front ribs have two muscles attached to them, one arising from each of the two neighbouring vertebræ. Eschricht, in his essay above cited, figured a fœtus and a new-born specimen, which was 34 inches long, and gave the anatomy of it, with details of its skeleton (see Eschr. K. D. Vid. Selsk. 1846, fig. p. 309). They have a single series of bristles parallel with the lips (see K. Dansk. Vid. Selsk. xi. t. 1 & 2).

Tympanic bones oblong, swollen, rounded above and below and at each end. They are figured *in situ* in the skull by Eschricht in the 'Danish Transactions,' vol. xii. t. 11. f. 2 *g* in the fœtus, t. 9. f. 2 & 4 *g*, & t. 10. f. 2 *g*, in the more adult state.

In the 'Royal Danish Transactions' for 1846, Eschricht gives a detailed comparison of the bones of the head of a fœtal specimen (one 6½ feet) and one 34 feet long (see t. 9–11), and the details of the skeleton of a fœtus 9 inches long (t. 14). The form of the cervical and other vertebræ of the skeleton seems to be nearly identical with that of those of the adult animal. The lateral processes of the second cervical process, for example, are united into a broad expanded blade, with a perforation near the body of the vertebra, which is so characteristic of the genus.

Eschricht figured the cranium of a *B. rostrata* from a fœtus 9 inches long, an older fœtus  $6\frac{1}{2}$  feet long, and an older specimen 31 feet long (t. 9, t. 10, t. 11, & t. 14), which show how much more rapidly the rostrum elongates in comparison with the size of the brain-case, the very unequal manner in which the bones enlarge as compared with each other, and how they anchylose, especially the very large size of the tympanic bones in the smallest fœtus compared with these bones in the older specimen, and how they enlarge laterally and become more transverse and less oblique as the animal increases in size. In the fetal state the forearm-bones are slender and nearly twice as long as the humerus; the longest fingers are almost as long as the forearm-bones; the second and third and the first and fourth fingers are nearly equal in length; the first finger has three, the second and third six or seven, and the fourth four phalanges.—*Eschricht, Wallthiere*, t. 7. f. d, D:

### 1. *Balænoptera rostrata*. *The Pike Whale*.

Black, beneath reddish white. Pectoral fin white near the base above.

*Balæna rostrata*, Müller, *Prodr.*; *O. Fabr. Faun. Grænl.* 40; *Hunter, Phil. Trans.* lxxvii. t. 20–23, cop. *E. M.* t. 4; *Turton, B. Fauna*, 16; *Nilsson, Scand. Fauna*, 632.

*Rorqualus rostratus*, *DeKay, Zool. New York Mus.* 730. t. 30. f. 1.

*Balæna musculus* (pars), *Flem. B. A.* 30; *Jenyns, Man.* 47.

*Balæna Boops* (pars), *Flem. B. A.* 31.

*Balænoptera acuto-rostrata*, *Lacép. Cétac.*; *Scoresby, Arct. Reg.* i. 485. t. 13. f. 2.

*Balænoptera acuto-rostrata*, *Lesson, N. T. R. A.* 202.

*Balænoptera microcephala*, *Brandt, MSS.*

*Balæna minimus borealis*, *Knox, Cat. Whale*, 14.

*Rorqualus minor*, *Knox, Jardine, Nat. Lib.* 142. t. 7; *Gaimard, Voy. Islande, Mamm.* t. 13 (skull), t. 14 (skull).

*Balæna borealis rostrata*, *Fischer, Syn.* s. 25.

*Balæna Boops*, *Albers, Icon. Anat.* 1822, t. 1; *Camper, Cétac.* 74. t. 11, 12; *Cat. Coll. Surg.* 171. n. 1194, *Hunter's spec.?*; *Giesecke, Edinb. Encyclop.*

*Balænoptera Boops*, Fin-backed Whale, *Newman, Zoologist*, i. 33, fig.; *Fleming, B. A.* 31; *Bell, Brit. Quad.* 520. fig. p. 521, from *Hunter*.

*Rorqualus Boops*, *F. Cuv. Cétac.* 321. t. 20.

*Balænoptera Physalus*, *Gray, Zool. E. & T.* 18.

Vaagehval, *Eschricht, K. D. Vidensk. Selsk.* xi. t. 1, 2, and p. 286–299 (fœtus and anat.).

*Balænoptera rostrata*, *Gray, Zool. Ereb. & Terror*, 50. t. 2 (skull), t. 1. f. 3 (baleen); *Proc. Zool. Soc.* 1847, 90; *Cat. Cétac. B. M.* 1850, 32; *Proc. Zool. Soc.* 1864, 227; *Flower, Proc. Zool. Soc.* 1864 (anat.).

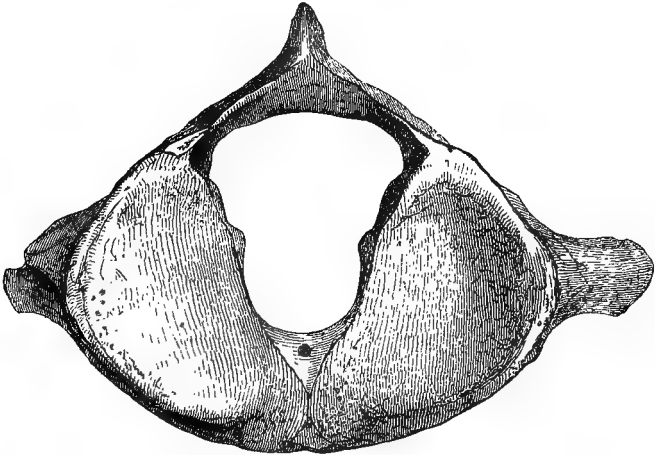
*Pterobalæna minor*, *Eschricht, Nord. Wallthiere*, 59, 1849; *Van Beneden, Mém. Acad. Roy. Bruxelles*, xxxii. 36; *Couch, Rep. Nat. Hist. Soc. Penzance*, 1851; *Lilljeborg, l. c.*; *Malmgren, Arch. Naturg.* 1864.

*Pterobalæna minor et prostrata*, *Van Beneden, l. c.* 463.

Inhab. North Sea. Ascending the mouths of rivers. New York Bay (*DeKay*). Valognes, France (*Geoffroy*). Greenland. Norway.

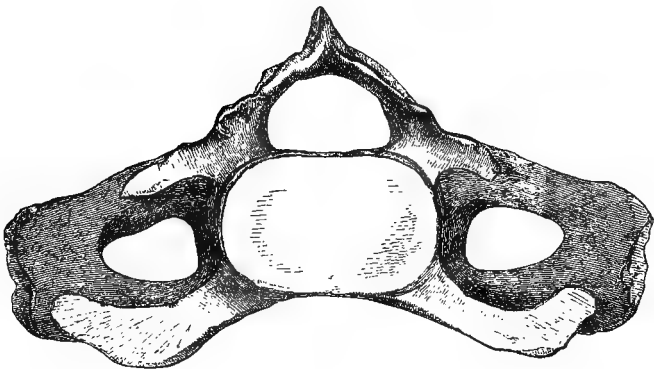
- a. Stuffed specimen: young. Thames at Deptford.  
 b. Stuffed specimen: very young. Greenland.  
 c. \*Plates of baleen from a. Thames at Deptford. Figured in  
 'Zool. Erebus and Terror,' t. 1. f. 3.  
 d. Skeleton. South Greenland. From Mr. Brandt's Collection.

Fig. 49.



Atlas vertebra of *Balænoptera rostrata*.  
 Extreme width 9 inches; height  $9\frac{1}{2}$  inches.

Fig. 50.

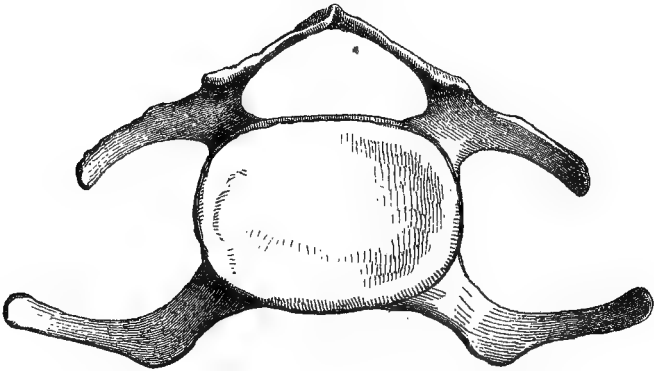


Second and third cervical vertebræ of *Balænoptera rostrata*, united by the  
 crural arch.  
 Extreme width 12 inches; height 6 inches. Articular surface:  
 width 4 inches.

The skull figured in 'Zool. Erebus and Terror,' t. 2, is  $46\frac{1}{2}$  inches long, 28 at the beak, 23 inches wide at the orbit,  $15\frac{1}{2}$  at the notch, and  $10\frac{1}{2}$  in the middle of the nose. The nose of the skull is elongate-triangular, with straight, regularly converging sides, not quite twice as long as the width at the notch. The first cervical vertebra is rather broader than long. The central hole is half as high again as broad. The second and third cervical vertebræ are united together by the upper edge. The second cervical vertebra has a broad, much-expanded, lateral process, with an oblong central hole near the body of the vertebra, reaching rather more than half its length. The third, fourth, fifth, and sixth cervical vertebræ have two (or upper and lower) lateral processes. The upper process of the third is the shortest and least developed, and they increase in length to the sixth. The lower process of the third is the thickest. The fourth and fifth are rather small; and in the sixth the basal part of the process is shorter and the upper part much elongated and thinner. The seventh has only the upper process, which resembles that of the first dorsal in form, but is smaller.

This species, which is the smallest of the family, scarcely if ever exceeds 25 or 30 feet in length.

Fig. 51.

Fifth cervical vertebra of *Balænoptera rostrata*.

The skeleton of the "young *Balæna Boops*" (No. 1194, Mus. Coll. Surg.), which formed part of the Hunterian collection, and is probably the skeleton of the *B. rostrata* described by John Hunter (as the head is about 4 feet long, which agrees with the measurements of his figure of the animal), belongs to this species. The cervical vertebræ are all free. The skeleton and baleen are described by Professor Owen in Cat. Osteol. Coll. Mus. Coll. Surg. ii. 441.

Mr. Knox examined a *young Rorqual*, 9 feet 11 inches long, 3 feet from snout to ear, and 4 feet 8 inches in girth at the end of the folds, which was cast ashore near Queensferry, Firth of Forth, in 1834. He considers it quite distinct from the Great Rorqual (*B.*



*Boops*), because it has only 11 dorsal, 36 lumbar, sacral, and caudal vertebræ; but he considers it the same as *B. rostrata* of O. Fabricius, Hunter, and Scoresby (Edinb. N. Phil. Journ. 1834, 199). Mr. Knox's specimen is figured by Jardine under the name of the *Lesser Rorqual* (Nat. Lib. vi. t. 7). Schlegel (Fauna Japon. 24, and Abhandl. 44) erroneously refers to this figure as a representation of *Balænoptera arctica (antarctica)*; for though the pectoral in the figure is larger in proportion than it should be for a *Balænoptera*, it is not of the shape of the fins of *Megaptera*; and the artist has made the fin of both the animal and skeleton of the larger Rorquals too large in proportion for the other parts of the body, and perhaps the length of the body is foreshortened.

Fig. 52.

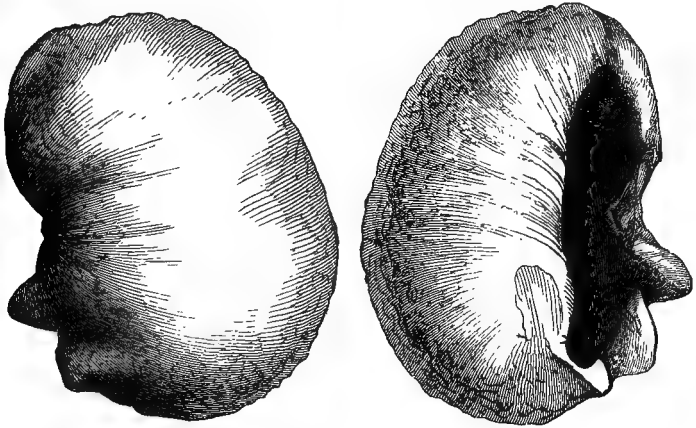
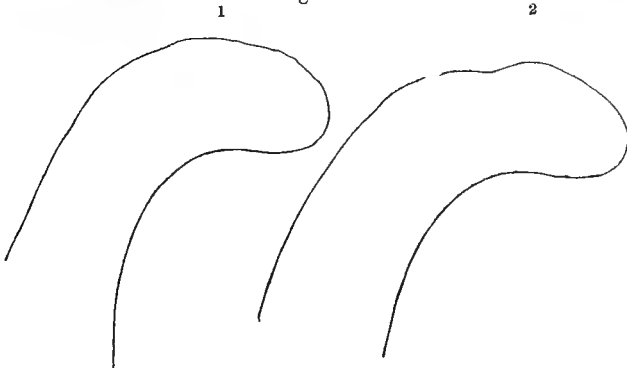
Tympanic bones of *Balænoptera rostrata*.

Fig. 53.

Top of first and second ribs of *Balænoptera rostrata*.

“ In the Leyden Museum there are two skeletons; the first a very beautiful and perfect specimen from the same locality as the last-mentioned skeleton. The baleen is *in situ* on both sides of the mouth, never having been removed. The animal was in the adolescent stage. The epiphyses of the upper end of the radius and ulna are united, but that of the head of the humerus is still separable. The entire length is 23' 2", of which the head occupies 5' 2". The vertebral formula is C. 7, D. 11, L. 12, C. 17=47; but one or more bones are wanting from the end of the tail. The cervical vertebræ are all free. The upper and lower transverse processes of the sixth are united on the right side, but separate on the left. The other skeleton of the same species is rather larger, but not so complete. The cervical vertebræ are all free, and none of the transverse processes (excepting those of the second) are united at their ends.”—*Flower, P. Z. S.* 1864, 418.

“ In the Louvain Museum there are two skeletons, but neither of them yet articulated. The first is young and not very perfect; it formed part of the old anatomical collection of the University. The second and third cervical vertebræ are anchylosed by their arches; all the rest are free; the transverse processes are not fully developed. The second is a fine perfect skeleton of an adolescent individual obtained more recently from the Norway coast. The cervical vertebræ are all free from each other; the upper and lower transverse processes fully developed; those of the axis and the sixth vertebra united together on both sides; the others all separate. A small tubercle represents the inferior transverse process on both sides of the body of the seventh vertebra.”—*Flower, P. Z. S.* 1864, 409.

“ Skeleton of a young individual, in the Louvain Museum, marked *B. minima*, and said to belong to a small variety only found among the Right Whales of Greenland. The total length is 17' 3"; but several vertebræ are wanting from the end of the tail. The skull is 4' long. There are 7 cervical, 11 dorsal, and 12 lumbar vertebræ, and 11 pairs of ribs. The cervical vertebræ are all free, and the upper and lower transverse processes are not united at their ends in any of them; but in the axis the union is almost complete. There is in the same Museum a skull, 3' 8" long, of a younger specimen of this species.”—*Flower, P. Z. S.* 1864, 418.

The skeleton figured by Albers (*Icon. Anat. Comp.* t. 1) was taken at Bremen on the 8th of May, 1669, and is preserved in the Town Hall of that city. The skull was figured by Camper, *Cétac.* It is 29 feet long. The scapula is much broader than high, with a large broad coracoid process. The sternum is slender and cross-shaped, and is suspended in the place of the pubic bones.

Professor Eschricht observes that “ the Greenland *Tikagulik*, or *Balæna rostrata* of O. Fabricius, may be distinct from the Norwegian *Vaagehval* or *B. minor*” (4th Mem. 157). Our Greenland skull does not appear to differ from that of the English skeleton.

Specimens have been taken in the Thames at Deptford (*Hunter*), skeleton in Mus. Coll. Surg.; Liverpool, April 1829 (*Mag. N. Hist.* ii. 391, 1829); Largo, Scotland, 15th May, 1832, 14 feet long (*Mag.*

N. Hist.); Frith of Forth, near Queensferry, 1834 (*Knox*); coast of Norfolk, 23rd Nov. 1839, 24 feet long (*Mag. N. Hist.* iii. 157); Cromer (*Gurney*), skeleton in Mus. Coll. Surg.; Thames opposite Deptford Creek, Oct. 23, 1842 (*Illustrated London News*, i. 388; *Zoologist*, 1842), skeleton in British Museum; Jutland, 1837, skeleton in Mus. Louvain; skeleton in Mus. Bremen, head figured by P. Camper; Bergens, skeleton in Mus. Paris, Charante. Polperro; caught in a mackerel drift-net, May 1850. The blubber 2 inches thick.—*Couch*. In the specimen described by Dr. Jacob the remains of herrings only were detected.—*Dublin Phil. Journ.* 1825, 343. This species is well described by John Hunter (*Phil. Trans.* 1787, 373. t. 20) from a specimen caught on the Doggerbank. It was 17 feet long.

Fleming refers this animal to the *Balæna tripinnaque rostrum acutum* of Sibbald, on which *Balæna Boops* is established, which was 46 feet long (*Brit. Anim.* 31). Fleming also refers an animal described and figured by Mr. Scoresby (*Arctic Regions*, i. 485, t. 13. f. 2), from notes by Mr. James Watson, from the Orkneys, to *Balæna musculus* (*Brit. Anim.* 31). He quotes Sir Charles Giesecke's statement "that *B. Boops* is a small kind of whale, its length being from 20 to 25 feet;" and asks, "are we to rely on the size in determining the species, and consider *B. rostrata* as a distinct species, limited to 25 feet in length, and represented by the *rostrata* of Fabricius and Hunter and the *Boops* of Giesecke? Future observers may determine the point." (*Fleming, Brit. Anim.* 32.) The examination of specimens has determined it in the affirmative.

Dr. Knox, in his account of the dissection of a young Rorqual, or Short Whalebone Whale, gives the following as the specific differences in the skeleton of the greater Rorqual and the smaller, or *rostrata* of Fabricius:—

*Great Rorqual.* Vertebrae 63: cervical 7, dorsal 13, lumbar, sacral, and caudal 43.

*Smaller Rorqual.* Vertebrae 48: cervical 7, dorsal 11, lumbar 13, sacral and caudal 17.

The position of the fins in the genus is very different from that found in the genus *Physalus*. I first pointed this out in my paper on British Whales (*Ann. & Mag. N. H.* 1846, xvii. 85), when, misled by the general belief that there was only one species of Finner Whale, I stated that the body appeared to elongate between the fins as it arrives at maturity. In the small ones (females?), from 14 to 25 feet long (these are *B. rostrata*), the pectoral fins are about one-third, and the dorsal two-thirds of the length from the end of the nose; but in the larger specimens, male and female (these are *Physali*), the middle of the body appears to lengthen twice as fast as the other parts, for in these the pectoral is about one-fourth, and the dorsal three-fourths the entire length from the end of the nose. Thus, one is obliged to feel one's way in the study of these animals so difficult to observe:

Professor Barkow describes the skeleton of a small Whalebone Whale in the Museum of Breslau (*Das Leben der Walle*: Breslau,

1862, folio, with five woodcuts). It is 25 feet long, with 48 vertebræ, and appears to agree in most particulars with *Balænoptera rostrata*, or Beaked Whale of Hunter. The fore-limb or hand has five short fingers, like the short truncated fin of the Right Whale or *Balæna*, the first having three, the second four, the third five, the fourth four, and the fifth a single phalange. The middle finger is longest, the second and fourth nearly equal, a little shorter, the first shorter still, and the fifth rudimentary and very slender (see f. 5 at p. 22). He proposes to call it *Pterobalæna nana pentadactyla*, giving the name of *P. nana tetradactyla* to the *Balæna rostrata* of Hunter, *P. gigantea longimana* to the *Megaptera longimana*, and *P. gigantea microchira* or *brevimana* to the *B. Physalus* of Scoresby.

I think this determination requires reconsideration, for I am doubtful if this specimen is not made—that is to say, a skeleton of *Balænoptera rostrata* with the arm and fingers of a young true *Balæna* or Right Whale appended to it.

Mr. Flower (Proc. Zool. Soc. 1864, 394) observes, “Barkow (Das Leben der Walle, &c.: Breslau, 1862) has described another species under the name of *Pterobalæna pentadactyla*; but much uncertainty hangs over the origin and composition of the single skeleton in the Museum at Breslau, on which it is founded. If genuine, it would necessitate a considerable modification of both the family and generic characters.”

## Section II. DENTICETE.

*Teeth well developed in one or both jaws, rarely deciduous. Palate lined with a hard membrane, without any baleen. Gullet large. Head large or moderate, more or less compressed. Tympanic bones at first separate, nearly similar in size; they unite early into a single bone, which is sunk in and suspended in a cavity in the base of the skull.*

Cetacea dentata, *Brisson, R. A.* 225.

Delphinidæ, “*J. Gray*,” *Tandhwalar, Lilljeborg, Ofversigt*, 1862, p. 3.

Denticete, *Gray, Ann. & Mag. N. H.* xiv. 1864; *P. Z. S.* 1864.

Delphinoidea, *Flower, P. Z. S.* 1864, 389.

Zahnwalle, *Eschricht, Nord. Wallthiere*, 7.

“Teeth always developed after birth, and generally numerous, sometimes few and early deciduous. No baleen. Sternum elongated, composed of several pieces placed one behind the other, to which are attached the ossified cartilages of several pairs of ribs. The anterior ribs with capitular processes developed, and articulating with the bodies of the vertebræ, as in other Mammalia. The posterior ribs without head, and only articulating with the transverse processes. Rami of mandible straight, the two coming in contact in front by a surface of variable length, but always constituting a true symphysis. Upper surface of the skull generally, if not always, unsymmetrical. Upper end of the maxilla expanded, and produced over the orbital process of the frontal bone. Nasal bones rudimentary and unsymmetrical. Lacrymal bone confluent with the jugal.”—*Flower, P. Z. S.* 1864, 389.

- A. *Nostrils longitudinal, parallel or diverging, covered with a valve, one often larger and more developed. Pectoral broad, truncate. Fingers 5. Physeteroidea.*

### Family 3. CATODONTIDÆ.

Head large, subcylindrical, blunt. Lower jaw narrow. Teeth large, in the lower jaw only, fitting into pits in the gums of the upper one. Nostrils separate, one often abortive. The hinder edge of the maxillary elevated, forming a concavity on the forehead of the skull. Pectoral broad, truncated. Fingers 5. Eye and limb of left side smaller; left nostril very large. The lower jaw is early joined in front into a subcylindrical mass; the branches converge and nearly straight.

*Delphinia Catodonia* (pars), *Rafin. Anal. Nat.* 60, 1815.

*Cete Carnivora* (pars), *Lesson, N. Règ. Anim.* 201.

*Physetereæ*, *Lesson, N. Règ. Anim.* 201.

*Zahnwalle* (pars), *Oken, Lehrb. Naturg.* 672, 1815.

*Physeteridæ* seu *Hypodontia*, *J. Brookes, Cat. Mus.* 38, 1828.

*Catodon*, *Artedi, Gen. Piscium*, 78, *Ichth.*

Les Cachalots, *Duvernoy, Ann. Sci. Nat.* 1851, 23.

*Catodontidæ*, *Gray, Cat. Cetac. B. M.* 1850, 44; *P. Z. S.* 1864, 231;

*MacLeay, New Sperm Whale*, 1851, 63.

*Physeteriens*, *Geoff. Leçons, Mamm.* 1835, 66.

Der Cachalots (Physeter), *Schlegel, Abhandl.* 24.

*Physeteridæ*, *Owen, Cat. Osteol. Mus. Coll. Surg.* ii. 442.

“Upper surface of massive skull concave for the reception of spermaceti. Nostrils enormously disproportionate in size, the left one the largest. The nasal bones as well as those of the face generally unsymmetrical and distorted. Blowhole externally single (in all?). Branches of the toothed lower jaw united in front by a bony symphysis, which is always considerably narrower than the toothless upper jaw. Teeth of the under jaw conical, hollow, like those of a crocodile, and fitting into cavities formed in the gum of the upper jaw.”—*MacLeay, l. c.* p. 63.

“The Cachalots or ‘Sperm Whales,’ *Catodontidæ* of Dr. Gray, I humbly consider to constitute a subfamily rather of *Delphinidæ*, especially since the discovery of that very remarkable small species, the *Euphysetes Gravi* of Mr. W. S. Wall.”—*Blyth.* Mr. W. S. MacLeay discusses this question in his ‘History and Description of a new Sperm Whale,’ set up by Mr. W. S. Wall.

#### SYNOPSIS OF THE GENERA.

- I. *Head compressed, truncated in front. Blowers in front of upper part of head. Skull elongate. Dorsal hump rounded.*

#### 1. CATODON.

- II. *Head depressed. Blower on back of the forehead. Dorsal fin compressed, falcate.*
2. **PHYSETER.** Head large, rounded in front. Skull elongate.
3. **KOGIA.** Head moderate, with a truncate snout in front. Skull short, broad.
- I. *Head compressed, truncated in front, with the nostril in the upper edge of the truncation. Skull elongate. Dorsal hump rounded.*

1. **CATODON.** *Spermaceti Whales.*

Head rather compressed in front and truncated, with the blowers close together on the front of the upper edge, separated from the head by an indentation. Nose of skull elongate, broad, depressed. Lower jaw shorter than the upper one, very narrow, cylindrical in front, and the rami united by a symphysis for nearly half its length. Back with a roundish tubercle in front, over the eyes, called the "bunch," and a rounded ridge of fat behind, highest in front over the genital organs, called the "hump," and continued in a ridge to the tail. No true dorsal fin. Pectoral broad, truncated. Teeth conical, often worn down. Males larger than the females.

The atlas is distinct; the other cervical vertebræ are soldered together.

*Catodon*, *Artedi, Syst.*; *Lacép. Cét.*; *Rafin. Anal. Nat.* 60, 1815; *Oken, Lehrb. Nat.* 678; *Gray, Zool. E. & T.*; *Cat. Cetac. B. M.* 45; *P. Z. S.* 1863; 1864, 231.

*Physeter* (*Catodontes*), *Fischer, Syn. Mamm.* 517.

*Physeter*, sp., *Linn.*; *Illiger, Prod.* 143, 1811; *Lesson, N. Règ. Anim.* 201.

*Physeter*, *Wagler, N. S. Amph.* 33; *J. Brookes, Cat. Mus.* 38; *Rousseau, Mag. Zool.* 1856, 257.

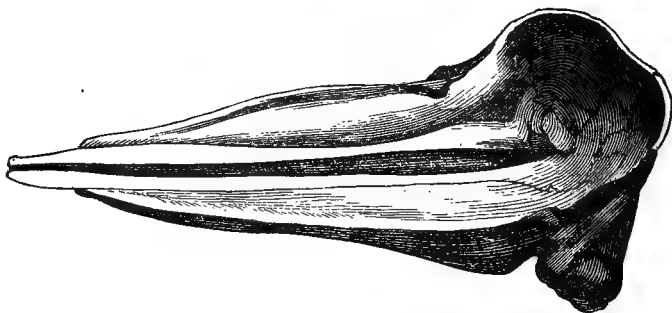
*Physalus*, *Lacép. Cét.* 219. t. 9, from *Anderson, Cachalot*, t. 4.

*Balænoptera* (*Physalus*), *Fischer, Syn. Mamm.* 519.

? *Notaphrum*, *Rafin. Anal. Nat.* 60, 1815 (no char. nor type).

*Cetus* (pars), *Oken, Lehrb. Naturg.* 674.

Fig. 54.



*Catodon macrocephalus.* *Cuvier, Oss. Foss. t. 24. f. 4.*

Clusius erroneously describes the blowers as placed on the head near the back, and Artedi and Linnæus adopt this error in their character of *Physeter macrocephalus*. Anderson (Iceland, ii. 186. t. 4) gives a figure of a whale with a truncated head, much resembling the old figures of the Sperm Whale, with the blower on the hinder part of the head, like a *Physeter*. Bonnaterre established on this figure his *Physeter cylindrus*; and Lacépède forms a genus for it, which he calls *Physalus*. The Dutch engraving of the animal described by Clusius shows this to have been a mistake.

The bunch and hump referred to by Beale and the other whalers appear first to have been described by T. Hasæus of Bremen, in 1723, in a dissertation on the 'Leviathan of Job and the Whale of Jonas;' on "a specimen 70 feet long, with a very large head, the lower jaw 16 feet long, with 52 pointed teeth, with a boss on the back, and another near the tail, which resembles a fin." Cuvier, after quoting this very accurate description, observes, "Mais d'après l'observation fait sur divers dauphins, cette disposition que personne n'a revue pourroit avoir été accidentelle, et alors cet animal n'auroit différé en rien du Cachalot vulgaire" (Oss. Foss. v. 331). Indeed he wrongly accuses Bonnaterre of having added a tubercle in his copy of Anderson's figure, which is not in the original (Oss. Foss. 333). Anderson, in the description of this animal, says that it has a prominence 4 feet long and a foot and a half high near its tail, as in his figure. But the fact was that Cuvier erroneously combined the Sperm Whale and the Black-fish (*Physeter*) together; and he could not otherwise reconcile how some authors, as Hasæus, Anderson, and Pennant, described the Sperm Whale with a hump, while Sibbald describes the *Physeter*, which Cuvier erroneously considered the same animal, with a dorsal fin, overlooking at the same time the great difference in the form of the head, and in the position of the blower of these two very dissimilar genera (Oss. Foss. 338).

"When the young Cachalot has attained the length of 34 feet, its teeth are perfectly formed, though not visible until it exceeds 28 feet."—*Bennett, P. Z. S.* 1836.

"The teeth in the lower jaw (in young specimens 16 feet long) had not yet come through. Captain Benjamin Chase states that he has more than once seen teeth of a considerable size in the upper jaw of the adult females, though always covered by the gum. The males, he says, being much larger, are cut up differently, and in such a way as not to expose the teeth."—*Jackson, Boston Mag. N. H.* v. 140.

"The upper jaw is not altogether toothless, as usually described. It has on either side a short row of teeth, which for the most part are placed more interior than the depressions which receive the teeth of the lower jaw, though they sometimes also occupy the bottom of these cavities. Their entire length is 3 inches; they are curved backwards and elevated about half an inch above the soft parts, in which they are deeply imbedded, having only a slight attachment to the maxillary bone. In two instances I have found their number to be eight on each side. They exist in both sexes of the Sperm Whale; and although visible externally only in the adult, they may

be seen in the young animal upon removing the soft parts from the interior of the jaw."—*Bennett, Whaling Voyage*, ii. 163; *Proc. Zool. Soc.* 1836.

"The number of the teeth varies greatly in different individuals, and does not appear to be influenced by either age, sex, or size. Amongst many Cachalots I find their variations in number to be as follows:—21 on one side of the jaw, 20 on the opposite; 23–21, 22–22, 24–25, 22–23, 24–26, 23–24, 22–24, 19–20. Length of male 60 to 76 feet; of female, 30 to 35 feet. Fœtus, 14 feet long and 6 feet in girth."—*Bennett, l. c.* 154.

M. de Blainville described what he considered as two varieties, observed in the lower jaws:—the first, from Capè Horn, has long, slender, cylindrical, rather acute teeth, and the symphysis to the twentieth tooth (figured Cuv. Oss. Foss. v. t. 24. f. 8); the second with 25 or 27 blunt and vertical teeth on each side, the symphysis to the eighteenth tooth.—*Ann. Anat. et Phys.* ii. 335, 336.

The ear-bones are figured by Camper (*Anat. des Cétac.* t. 23 & 25) and Cuvier from these figures (Oss. Foss. v. 376); they most resemble those of the *Delphinidæ*, but are less elongate and less bilobed posteriorly. The tympanic bone is small, scroll-like, oblong, ankylosed to a somewhat similar-shaped tegmen tympani and pars mastoidea (see Owen, *Hist. Brit. Foss. Mamm.* p. 526. t. 33. figs. 220 & 225; the figures are of the natural size; not half the natural size, as marked). They are from specimens sent by Mr. G. Bennett to the Royal College of Surgeons.

The atlas is distinct; the rest of the cervical vertebræ are ankylosed into one piece (Cuv. Oss. Foss. v. 346, t. 24. f. 12, 13). Ribs 14/14. Vertebræ 60 (see Cuv. Oss. Foss. *l. c.* t. 24. f. 15–18). Blade-bone higher than wide, with a large coracoid (*l. c.* t. 24. f. 11). Humerus and cubitus ankylosed, short and thick (t. 24. f. 14). Os hyoides very wide (Cuv. t. 25. f. 15?).

There is the skull of a fœtus of this animal in the Museum of the Royal College of Surgeons: the bones are of a very soft structure. The following are its measurements:—

Length, entire . . . . .	32 inches.
Length of nose . . . . .	20 "
Length of lower jaw . . . . .	28 "
Length of symphysis . . . . .	9.6 "
Width at notch of nose . . . . .	12.6 "
Width of condyles apart . . . . .	16.6 "

This fœtal skull is most fully and accurately described as showing the cranial organization of the present genus of Cetaceous animals by Professor Owen (*Cat. Osteol. Series*, ii. 442).

The length of the symphysis in the skull of the fœtal Cachalot is three-fourths that of the rest of the ramus. In the adult male, the disproportionate growth of this part of the jaw leads to an excess of the length of the symphyseal part beyond the rest of the ramus.



This skull is also described and figured by Huxley in his 'Elem. Comp. Anat.' 1864, fig. 118, on page 275.

In the fetal skull the right præmaxilla is much larger than the left, extending far back upon the right frontal, while the left does not reach the left frontal; the left nostril, on the other hand, is much more spacious than the right (see Huxley, Elem. Comp. Anat. 276. f. 110 a).

"These huge but timid animals on the approach of a ship or boat dive into the depths of the ocean or skim along its surface with the utmost precipitation, and when harpooned they are paralyzed with affright, in which state they will often remain a short period on the surface of the sea, lying as if they were fainting. When they recover they show extreme activity in avoiding their foes, and but rarely turn upon their adversaries; for although men and boats are frequently destroyed in these rencontres, they are more the effect of accident during violent contortions and struggles to escape than any wilful attack. They emit no sound, except a trifling hissing at the time of the expiration of the spout. They only eject a thick and dense vapour, and never water, from the spoutholes."—*Beale*, 3, 5, & 16.

"The male and female differ greatly in size and form. The adult female is only about one-fifth the size of the adult male; but this is not altogether to be understood as regards length, but of their general bulk, for the females are longer in proportion to their circumference than the males, and they are altogether more slender, which gives them the appearance of lightness and comparative weakness."—*Beale*, 15.

"The herds or schools of the Sperm Whale are of two kinds: 1st, of females, which are accompanied by their young and one or two adult males; and, 2ndly, of the young and half-grown males; but the large and full-grown males always go singly in search of food."—*Beale*, 20.

"There is little external appearance, beyond the size of the individual or the development of its teeth, to distinguish the male from the female. Whalers are inclined to believe that the convex or 'hatchet-shaped' snout is characteristic of the male Cachalots, but I do not think that there is sufficient ground for this conclusion."—*Bennett*, 167.

Captain Chase states, "They couple in a horizontal position and not upon the side; nor does the female remain supine, but being close to the surface of the water they occasionally turn, so as alternately to bring the top of the head above the water, evidently for the purpose of breathing. The Right Whale (*Balaena*) breeds at particular seasons, but the Sperm Whale (*Catodon*) at any season of the year. He has never seen more than a single young one at a time about the old female. Has seen a bucketful of thick rich milk discharged from the mammary gland of a female when cut up, but has never witnessed the young in the act of suckling."—*Jackson, Boston Journ. N. H.* v. 141. He figures the stomach as having three cavities (*l. c. t.* 14).

“Owing to the great projection of the snout beyond the lower jaw, it may be requisite for this whale to turn on its side or back to seize its more bulky prey. When the animal attacks a boat with its mouth it invariably assumes a reversed posture, carrying the lower jaw above the object it is attempting to bite.”—*Bennett, l. c.* 176; see also *Beale, Hist. Sperm Whale*, 159, and fig. at 154.

“The ordinary food is the cuttle-fish or squid (*Sepia*), many kinds of which are rejected from the stomach of the whale when the latter is attacked by the boats. It is probable they occasionally indulge in other food. In 1835 a School Whale rejected from her stomach a bony fish more than a foot long. Some whalers assert that they have seen Cachalots throw up rock-cod, and even sharks.”—*Bennett, l. c.* 176; see *Beale*, 18.

Couch says a young one, 20 feet long, caught at Ropehann, on the coast of Cornwall, had 300 mackerel in its stomach.

“The habitat of the Sperm Whale is more peculiarly the central and fathomless water of the ocean, or the vicinity of the most abrupt coast. The geographical range of the species (genus?) must be regarded as very extensive, since no part of the aqueous globe, excepting the Polar seas, would appear to be altogether inimical to their habits or free from their visits. It is, however, in the warmer seas, within or upon the verge of the tropics, that the Cachalot is sought with the greatest success, as in those corresponding to the inter-tropical coasts of Africa, America, Asia, and New Holland, or surrounding the Indian and Polynesian islands, but more especially and uniformly in the ‘line of currents’ which extend from the equator to almost the seventh degree of north and south latitude, both in the western and eastern hemispheres.”—*Bennett, l. c.* 182, with map, showing where they occurred during his voyage. They were observed in the Antarctic Seas as high as lat.  $71^{\circ} 50'$ .—*Ross, Antarctic Voyage*, i. 169, 197.

Mr. Beale says, “From having particularly noticed their external form, and also their manner and habits in various parts of the world very distant from each other, yet I was never led to suppose for an instant from their observance that more than one species” (the Sperm Whale) “exists. The large full-grown male appears the same in every part, from New Guinea to Japan, from Japan to the coast of Peru, from Peru to our own island; while their females coincide in every particular, having their young ones among them in the same order, and appearing similar to all others which I had seen in every respect, merely differing a little in colour or fatness according to the climate in which they were captured, as we had an opportunity of observing as they were lying dead by the side of the ship.”—*Beale*, 12, 13.

But this is merely speaking the language of whalers, and by *species* he means, as he does in the other parts of his book, *genus*. I have no doubt, from analogy of other whales, that when we shall have had the opportunity of accurately comparing the bones and the various proportions of the parts of the Northern and Southern kinds, we shall find them distinct. Mr. W. S. MacLeay, in his essay on

the Southern Whale, has shown that this is the case. Wishing to call attention to this subject for future examination, I may observe that Beale (N. H. Sperm Whale, 22. f. 1, 14) describes the Southern Sperm Whale as grey. Female one-fifth the size and bulk of the males, more slender and large in proportion. Young black, skin thicker. Varies sometimes in being black and grey mottled.

Quoy gives an engraving of a drawing of a Sperm Whale, which was given him by an English captain, which is probably the Southern Whale. He calls it *Physeter polycyphus* (and Desmoulins renames it *P. australis*), because its back appears to be broken into a series of humps by cross ridges. In this particular it agrees with the Scrag Whale of Dudley (on which Bonnaterre established his *Balaena gibbosa*); but it cannot be that animal, as Dudley says it is a Whalebone Whale. Quoy's figure differs from Beale's in being much longer; but, as Beale observes, when speaking of the figures of the Northern kind, this is the common fault of all the drawings of the Sperm Whales.

Dr. Jackson observes—"The dorsal fin or hump forms a very obtuse angle, and is ill-defined, being (in a space 16 feet long) about 10 inches in length and 2 or 3 inches high;" there being, he further remarks, "also between it and the caudal two or three quite small finlets" (Boston Journ. N. H. v. 137). These latter are, perhaps, what are represented as humps in Quoy's figure of *C. polycyphus*.

The figure of the Sperm Whale in Duhamel, Pêches, iv. t. 15. f. 3, is good for the form and blower, and has the "taquet" marked; but a fin has been added below, between the vent and tail, in the position of the anal fins of fishes (!), in t. 9. f. 1. This author has figured and described *Orca gladiator* for the Sperm Whale (!).

Bonnaterre's figure (E. M. t. 7. f. 2) of the *Grand Cachalot* taken at Andiene, 1784, and copied by Lacépède, t. 10. f. 1, is not so bad for form, but has a fin instead of a hump on the back.

The figure of the Spermaceti Whale from the coast of Kent, 1794, in the Gent. Mag. t. 1, is very inaccurate, especially respecting the tail.

It is to be remarked that all the older writers only describe this animal as occurring in the Northern seas, and Robertson and Fabricius described it as black when young, becoming whitish below.

All the figures, except Anderson's, are, by the unanimous experience of the whalers, far too long for the thickness; and Anderson's scarcely represents the "bunch" sufficiently prominent, and erroneously represents the blower on the wrong part of the head.

Sperm Whales are infested with small lice (*Larunda Ceti*) and species of barnacles (as *Otione Cuvieri*), which usually adhere in clusters to the integument around the jaws. (See Bennett, l. c. 169; Beale, Hist. Sperm Whale.)

Beale (Hist. Sperm Whale, 8vo, 1839) and Bennett (Narrat. Whaling Voyage, 1840, 8vo, ii. 153) give a long account of the habits, the mode of catching, &c. of the South-Sea Sperm Whale.

Colnet, in his 'Voyage,' p. 80. f. 9 (copied by Brandt and Ratzeburg, t. 14. f. 3), gives a very good figure of a Sperm Whale, 15 feet

long, from measurements; with details of the manner of flenching or peeling it. His figure agrees with Beale's in proportions. It was caught in the North Pacific, near Point Angles, on the coast of Mexico. This figure escaped Cuvier's researches.

Purchas says the Sperm Whale is found at Bermuda, where it is called *Trumpo*, a name which Lacépède applied to the Northern animal. An anonymous writer in the 'Philosophical Transactions,' i. 132, and Dudley, describe them as found on the east coast of North America.

The Japanese distinguish three varieties of this animal, according to their size. They live in herds on the Japanese coast.—*Faun. Japon.*

A whale's tooth is highly prized in Fiji, being used in augury by the priests, and was formerly a sort of currency.—*Bensusan, Journ. Roy. Geogr. Soc.* 1862, 48.

"The crown jewels of Viti were kept in a wooden box, in charge of the widow of the late Governor of Namose: first, there was a necklace of whale's teeth, the first that ever came to the mountain; secondly, a large whale's tooth, highly polished, and carefully wrapped up in cocoa-nut fibre (whale's teeth are in Fiji what diamonds are with us); thirdly, a cannibal's foot, in the shape of a club, and bearing the name of *Strike twice*, i. e. first the man and then his flesh."—*Seemann, Journ. Roy. Geogr. Soc.* 1862, 62.

### 1. *Catodon macrocephalus*. *The Northern Sperm Whale*.

Black, becoming whitish below.

Trumpo, *Phil. Trans.* i. 132.

*Catodon Trumpo*, *Gerard, Dict. Sci. Nat.* vi. 57; *Lacép. Cét.* 212. t. 10. f. 2.

*Balæna macrocephala* quæ binas tantum pinnas laterales habet, *Sibbald, Phal.* 12.

*Balæna major* in inferiore tantum maxilla dentata macrocephala bipinnis, *Raii Pisc.* 15.

*Cetus bipinnis supra niger*, etc., *Brisson, Cete*, 357.

*Catodon fistula* in cervice, *Artesi, Syn.*

*Catodon macrocephalus*, *Lacép. Cét.* t. 10. f. 1; *Gray, Cat. Cetac. B. M.* 1850, 49; *Proc. Zool. Soc.* 1863; 1864, 231.

Sperm Whale, *Anderson, Cambridge Phil. Trans.* ii. 250. t. 12 (view of animal), t. 13 (cranium and lower jaw), t. 14 (side view of head); *Jackson, Boston Journ. N. H.* v. 137. t. 14 (stomach).

Spermaceti Whale, *Dudley, Phil. Trans.* xxxii. 258; *Gent. Mag.* 1794, 33. t. 1.

Blunt-head Cachalot, *Robertson, Phil. Trans.* lx. t.

Physeter *Catodon*, *O. Fabr. Faun. Grœnl.* 44, and *Robertson*, not *Linn.*; *T. Thompson, Mag. N. Hist.* 1829, ii. 471. f. 114 (bad).

Physeter Trumpo, *Bonnat. Cétac.* t. 8. f. 1, from *Robertson*, copied *Reichenb. Cetac.* t. 4. f. 12 (anat. t. 10); *Fischer, Syn. Mamm.* 518.

Physeter macrocephalus, *Linn. S. N.* i. 107; *O. Fabr. Faun. Grœnl.* 41; *Shaw, Zool.* ii. 497. t. 228; *Reichenb. Cetac.* 4. t. 4. f. 11; *Schreb. Säugeth.* t. 337 a ♀, t. 337 β ♀; *Gosse, Jamaica*, 349; *Turton, Fauna*, 16; *Jenyns, Man.* 44; *Bell, Brit. Quad.* 506. f. 511.

*Cetus macrocephalus*, *Oken, Lehrb. Nat.* 675.

*Physeter gibbosus*, Schreb. *Säugeth.* t. 338; Johnston, *Pisc.* 215. t. 41. f. 1, 2, *Supp.* t. 42, copied Brandt & Ratz. *Med. Zool.* t. 12. f. 20; Willughb. *Ichth.* t. A 1. f. 3.

Inhab. Atlantic Ocean. North Sea. Teignmouth (*Gesner*, 1532). Whitstable Bay, 1794. Scotland (*Sibbald*, *Robertson*). Greenland (*O. Fabr.* &c.). New England, nine months of the year (*Dudley*, *Phil. Trans.* i. 132).

a. Skull. North Sea.

Length, entire .....	179 inches.
Length of beak .....	127 "
Width at notch .....	67 "
Width at middle of beak .....	52 "

The beak is not quite twice the length of the breadth at the notch, and more than two-thirds the length of the entire head.

This specimen is figured, *Cuv. Oss. Foss.* v. 6. 24. f. 1-5.

b. Lower jaw. Indian Seas. Presented by Colonel Cobb.

c. Lower jaw of young.

d. Lower jaw bent and distorted in front.

	b.	c.	d.
	in.	in.	in.
Entire length .....	157	92	51
Length of teeth-groove ..	..	..	29
Length of symphysis ....	85	44	21½
Teeth on each side .....	23	21	19
Width at condyle .....	..	..	31

The lower jaw appears to increase in length in front, for in the older specimens the symphysis is more, and in the younger ones less, than half the entire length of the jaw.

e, f. Teeth, various.

g. Section of a tooth.

The Spermaceti Whale frequently comes ashore in Orkney; one was caught at Hoy, 50 feet long ("Lowe," *Flem. B. A.* 29).

A male, 52 feet long, with a dorsal fin, was found at Limekilns, in the Forth, in Feb. 1689, and described by Sibbald (*Phal.* 33. t. 1).

After a hard gale of wind northerly, no less than twelve male whales, which undoubtedly came out of the Northern Ocean, were towed and driven on shore, all dead and in a high state of putrefaction, excepting one; six were found upon the coast of Kent, two on the coast of Holland. One at the Hope Point, in the River Thames, was the only one seen alive; he ran aground and smothered himself in the mud, and was afterwards made a show of in the Greenland Docks. (*Letter from Walderwick, on the coast of Suffolk*, 7th March 1788, in Sir Joseph Banks's copy of *Phil. Trans.* in B. M. library.)

Whitstable, Kent, Feb. 16, 1829. A male, 62 feet long and 16 feet high. "It was purchased by Messrs. Enderby and Sturge, who erected coppers on the beach and collected the oil. They presented the skeleton, which had been prepared by Mr. J. Gould, to the

Museum of the Zoological Society. The government having put in a claim to the 'royal fish,' the whole proceeds of it were under arrest, and the bones are now whitening on the shore."—*P. Hunter and H. Woods, Mag. Nat. Hist.* May 1829, ii. 197.

The skeleton of an adult male, 56 feet long, at Burton Constable (Turnstall in Holderness, Yorkshire, 1825), was articulated by Mr. Wallis (see Beale, 73). This specimen was cast on the coast of Holderness, and claimed by Mr. Constable as Lord of Holderness, and sent to Burton Constable (Thomas Thompson, *Mag. Nat. Hist.* 1829, ii. 477). The skeleton is 49 feet 7 inches long; cranium 18 feet  $\frac{1}{2}$  inch; lower jaw 16 feet 10 inches. Teeth 24.24. Ribs 10.10, nearly circular; the first with one, the second, third, fourth, fifth, sixth, seventh, and eighth with two articulating surfaces, each articulated to two vertebræ. Cervical vertebræ 2—that is, atlas and another united; dorsal vertebræ 10; lumbar and caudal 32: = 44. Pelvis two flat bones; sternum of three bones; clavicles none; blade-bone flat, without any spine, but with two projecting coracoid processes near the articulation; bones of pectoral fins 4 feet 4 inches long; carpus of seven loose square bones; the phalanges five, the three middle ones each of four and the two outer each of three bones. The os hyoides  $2\frac{1}{4}$  feet long.—*Beale*.

This is the skeleton from the coast of Yorkshire described by Dr. Anderson in Cambridge Phil. Soc. Trans. 1825, ii. t. 12, 13, 14, but it is said to be 58 $\frac{1}{2}$  feet long, teeth 24.24.

"In July 1835 a whale came alongside of his boat, and sometimes at no greater distance than a fathom. It was between 30 and 40 feet long, but he could not well distinguish the hinder part of his body. The body very thick and solid, with a fin on the tail of an extraordinary shape, appearing like a hump, not high, and almost two fathoms long, with the upper portion in a waved form as of separate humps, and tapering behind into the general shape, where the body became more slender."—*Couch, Whale on the Coast of Cornwall*, 32.

This is probably the whale Mr. Couch in his former list referred to *Physeter polycystus*.

Ireland, north and north-west coast (*Molyneaux*, Phil. Trans. 1795, xix. 508); Youghal (*Smith*); Dublin, 1766 (*Rutty*).

Sandy Side Bay, Thirso, August 1863, skeleton presented to the British Museum; supposed to have been brought by the Gulf-stream; was decayed when discovered.

Duhamel (*Pêches*, iv. t. 15. f. 63) figures a male Cachalot, 48 feet long, taken near Bayonne. He erroneously represents it as having a long high fin between the vent and the tail, like the anal fin of fish.

"A true Cachalot was taken in 1856 by the fishermen of St. Nazaire, in the Mediterranean, and a considerable portion of its lower jaw is preserved in the collection of the Marist Fathers, at La Seyne, near Toulon."—*Gervais, Comptes Rendus*, 28th Nov. 1864, 876; *Ann. & Mag. N. H.* 1865, 75.

Skeleton mounted in the Court of the Cabinet of Comparative Anatomy at Paris (Blainville, *Ann. Fr. et Etrang. d'Anat. et de Phys.* ii. 326), which is said to have been purchased in London.

See *Dauphin de Berlin*, Duham. Pêches, ii. 1041. t. 10. f. 5, and *Delph. Bertini*, Desm. Mamm. 516, 768; Fischer, Syn. 509. Is it a young *Physeter*?—Fischer.

M. H. de Blainville, in his 'Système du Règne Animal,' extracted in the 'Annales Fr. et Etr. d'Anatomie et de Physiologie,' ii. p. 235, states that the jaws with teeth in the Paris Museum seem to show two or three distinct forms. The first, a head, stranded at Audierne, on the coast of Brittany, in 1784, has the lower line of the lower jaw in the form of a boat. Teeth 25 on each side; 18 to the symphysis. In two other jaws of this variety, one has 26 and the other 27 teeth.

The second form has the lower jaw much less curved, nearly straight, the symphysis reaching to the twentieth tooth. Teeth all long, straight. It was obtained at Cape Horn by M. Daubré, and is figured in Cuv. Oss. Foss. v. 340. t. 24. f. 8. There is a second jaw of this variety figured in Cuv. Oss. Foss. v. t. 24. f. 9 (?).

The third form is a jaw intermediate between the two former. The symphysis ends between the twentieth and twenty-first teeth. The teeth are 25 on each side.

Camper (Cétac. t. 17, 20–22, from the church of Scherclinge, t. 18, 19, 27, Mus. Paris) figured the skull of this whale. He represents the nose of the skull as nearly twice and a half as long as the width at the notch.

"Sperm Whales were frequently hunted off the shores of the Antilles. Moreau de St.-Meri, in his 'History and Description of the old French Colony of St. Domingo,' relates that in his time (1785, in the months of March, April, and May) as many as twenty-five vessels from the North American States could be seen off the coast of Sale Trou, near Jacmel, fishing for the *Cachalot Whale*, and, he adds, for *Souffleurs* (*Balænoptera*), and that this fishery was pursued with equal spirit and success within the gulf to the west of the colony, that is, within the Bight in which I saw the *Cachalot* beach. The whalefishers resorted to Turk Island to boil their oil."—*Gosse, Nat. in Jamaica*, 353.

Dr. J. B. S. Jackson gives the dissection of a very young Sperm Whale taken near Boston, U. S., on 29th March 1842, which was 16 feet long; the hump, which was 9 feet from the tip of the nose, formed a very obtuse angle, and was ill defined, there being also between it and the caudal two or three quite small finlets. The outer surface was everywhere quite black, remarkably smooth, and elastic like india rubber.—*Boston Journ. Nat. Hist.* 1845, v. 138. t. 16. f. 1 (the stomach).

The blowholes are situated on the top of the head, at the very extremity, and rather towards the left side; they are of the form of an italic *f*, as observed by Anderson, Beale, and Jackson. F. Cuvier says they are semicircular (p. 288), and they are longitudinal, and not transverse as stated by Hunter.

Roof of the mouth smooth, high-coloured, hollowed as if to receive the lower jaw, which is quite narrow in front.—*Jackson, l. c.* 140; *Wyman, l. c.* t. 14 (stomach).

Dr. Jackson gives a comparison of the measurements and teeth of nine lower jaws of the Sperm Whale, taken on the coast of North America, which he had examined.—*Boston Journ. N. H.* 1845, v. 152.

1. Length  $16\frac{1}{2}$  feet. Teeth 25 . 24, moveable, rather irregular.
2. Length  $15\frac{1}{2}$  feet. Teeth 25 . 27, opposite in front, behind irregular, hinder smallest and worn. Width at condyles  $5\frac{3}{4}$ .
3. Length  $8\frac{1}{2}$  feet. Teeth 20 . 20, regularly opposite, and very little worn, the front largest, middle most slender, hinder smallest. Width at condyles  $3\frac{3}{4}$ .
4. Length  $7\frac{5}{8}$  feet. Teeth 26 . 23.
5. Length  $5\frac{2}{3}$  feet. Teeth 23 . 22, but connected in animal 18 feet long. Width at condyles  $2\frac{3}{4}$ .
6. Length  $5\frac{1}{4}$  feet. Teeth 25 . 24, all pointed, and some hardly cut the jaw. Cranium  $6\frac{1}{2}$  feet long; the petrose portion instead of being free, as usual in the Cetaceans, is as closely connected with the base of the skull as any other bone. Width at condyles  $5\frac{1}{2}$ .
7. Length  $15\frac{1}{2}$  feet. Teeth 26 . 25. Width at condyles  $5\frac{1}{2}$ .
8. Length  $7\frac{1}{3}$  feet. Teeth 24 . 24. Width at condyles  $3\frac{2}{3}$ .
9. Length  $8\frac{1}{8}$  feet. Teeth 23 . 23. Width at condyles  $4\frac{1}{8}$ .

A very young Spermaceti Whale, taken near New Bedford, Massachusetts, 29th March 1842, weighed 3053 lbs. Entire length 16 feet, to rudimentary dorsal 9 feet, to anterior fin 4 feet, to vent  $10\frac{1}{8}$  feet, to eye  $3\frac{1}{8}$  feet, to angle of mouth  $2\frac{5}{8}$  feet. Circumference 9 feet. Teeth of lower jaw not yet cut.

The young is quite black, remarkably smooth and elastic, like india rubber; from a line with the anterior extremity of the head to the top of the tail 16 feet, to the rudimentary dorsal fin 9 feet, to the anterior fin about 4 feet, to the vent 10 feet 2 inches, to the eyes 3 feet 2 inches, to the external orifice of ears (which was about the size of a goose-quill) 3 feet 8 inches, to the angle of the mouth 2 feet 10 inches; vertical diameter of the head, just in front of the opening of the mouth, 2 feet 10 inches, of the largest part of the body 3 feet; anterior fin 18 inches long and 9 inches wide. The dorsal fin or hump forms a very obtuse angle, and is ill-defined, being about 10 inches in length and 2 or 3 inches in height; *there being also between it and the caudal two or three quite small finlets.* Span of tail 1 foot 7 inches, and 4 inches wide midway. Lower jaw to angle of mouth 1 foot 8 inches; right eye  $1\frac{1}{2}$  inch long. Circumference of the body 9 feet.—*Jackson, Boston Journ. N. H.* v. 139.

## 2. *Catodon australis.* *The Australian Sperm Whale.*

Vertebræ 49. Cervical atlas free, rest very thin and ankylosed together.

*Catodon australis*, *W. S. MacLeay, New Sperm Whale, set up by W. S. Wall*, Svo, t. 1 (skeleton), 1851.

Sperm Whale, *Beale*.

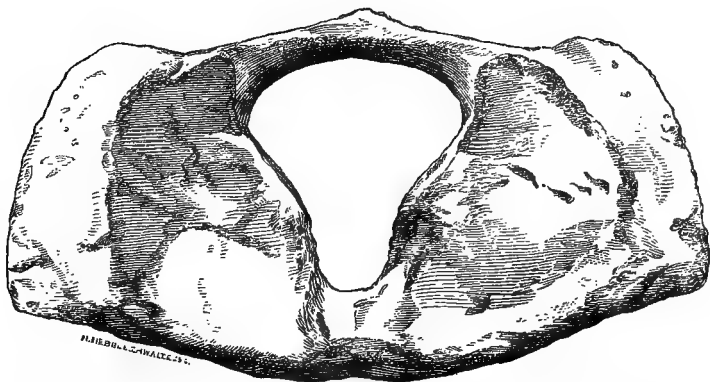
Inhab. South Seas.

“The head is very thick and blunt in front, and is about one-third of the whole length of the animal; at its junction with the body is



a large protuberance on the back, called the '*hunch of the neck*'; immediately behind this, or the shoulders, is the thickest part of the body, which from this point gradually tapers off to the tail; but it does not become much smaller for about another third of the whole length, when the '*small*' or tail commences; and at this point on the back is a large prominence of a pyramidal form, called the *hump*, from which a series of small processes run halfway down the *small* or tail, constituting what is called the *ridge*; the body then contracts so much as to become not thicker than a man's body, and terminates in the *flukes* or tail. The two *flukes* constitute a large triangular fin. The chest and belly are narrower than the broadest part of the back, and taper off evenly and beautifully towards the tail, giving a *clear run*. The depth of the head and body is in all parts, except the tail, greater than the width; the head, viewed in front, presents a broad, somewhat flattened surface, rounded and contracted above, considerably expanded on the sides, and gradually contracted below, so as in some degree to attain a resemblance to the cutwater of a ship. At the angle formed by the anterior and superior surface on the left side is placed the *single* blowhole or nostril, which in the dead animal is a slit or fissure in the form of an S, extending horizontally. In the right side of the nose and upper surface of the head is a large, almost triangular-shaped cavity, called the *case*, which is lined with a beautiful glistening membrane, and covered by a thick layer of muscular fibres and small tendons running in various directions, finally united by common integuments. This cavity is for the purpose of secreting and containing an oily fluid, which is, after death, converted into a granulated substance of a yellowish colour—the *spermaceti*.

Fig. 55.



Atlas of *Catodon australis*, MacLeay. From the Museum at Sydney.

“Beneath the *case* and nostril, and projecting beyond the lower jaw, is a thick mass of elastic substance—the *junk*, which is formed

of a dense cellular tissue, strengthened by numerous strong tendinous fibres, and permeated with very fine oil and spermaceti.

“The mouth extends nearly the whole length of the head; both jaws, but especially the lower, are in front contracted to a very narrow point; and when the mouth is closed, the lower jaw is received within a sort of cartilaginous lip or projection of the upper one—but principally in front; for further back at the sides and towards the angles of the mouth both jaws are furnished with well-developed lips. In the lower jaw are forty-two large conical teeth; in the upper are no teeth, but depressions corresponding to and for the reception of the ends of the teeth in the lower jaw. Sometimes a few rudimentary teeth may be found in the upper jaw, never projecting beyond the gum, and upon which those in the lower jaw strike when the mouth is closed. The tongue is small, white; the throat capacious, very unlike the contracted gullet of the Right Whale. Mouth lined with a pearly-white membrane, continuous at the lip, which is bordered with the black external skin. Eyes small, with eyelids, the lower one most moveable, placed a little behind and above the angle of the gape, at the widest part of the head. Ears very small, without any external appendage, a short distance behind the eyes. The swimming-paws or fins are placed behind, not far from the angle of the mouth; they are not much used as organs of progression, but as giving direction and balancing the body in sinking suddenly, and occasionally in supporting their young.

“The full-grown male of the largest size is about as follows:—entire length 84 feet; depth of head 8 or 9 feet; breadth 5 or 6 feet; depth of body seldom exceeds 12 or 14 feet, so that the circumference rarely exceeds 36 feet; the fins about 6 feet long, and 3 feet broad; the tail or flukes 12 or 14 feet wide.”—*Beale*.

Vertebræ 49. Cervical 7, the first free, the other six much compressed, and ankylosed together; dorsal 10, having the vertical spinous processes inclined backward, and increasing in length from the first to the last. The ribs 10.10: the first, ninth, and tenth pairs have only one articulating surface to their proper vertebræ; the second, third, and fourth have two articulating surfaces; and the fifth, sixth, seventh, and eighth have three. The ribs on the left side larger in dimension than the corresponding ones on the left. Sternum triangular, composed of three pairs of bones, the upper pair larger, oblong, elongate, the second and third pairs smaller, narrower behind (*MacLeay*, t. 1. f. 2).

Humerus very short and thick, nearly half the length of the scapula; it expands very much at its carpal end. The radius and the ulna both constricted in the middle, and of much the same form, except that the globular olecranon process of the latter gives a peculiar character to this last by its being very prominent as it turns towards the thumb. The bones of the carpus not articulated together, but imbedded in a mass of cartilage. Carpal bones 6; five rounded, irregular, placed in a transverse row, one opposite each finger; the sixth thin, laminar, transverse. Metacarpal bones much compressed, and scarcely to be distinguished from the phalangeal.

Pelvis composed of three pieces, a middle and two slender ones, which are articulated one on each side of the former (Wall, t. 1. f. 4), the middle bone being composed of two arched pieces.

It is clear from Wall's description of the skeleton of the Sperm Whale which lives on the coast of New Holland that it is quite distinct from the Northern one described by Beale and Cuvier.

Mr. Wall says "there were no vestiges of any alveoles in the skull of a very young Sperm discovered on the beach near Botany (Bay);" he suspects "that Mr. Bennett must have mistaken some kind of Dolphin for a young Cachalot." Very unlikely, when we consider that Dr. Bennett was a surgeon on board a whaler.

John Hunter states that there is only a single tube or canal from the commencement for both nostrils. In some Dolphins there is said to be a dividing membrane.

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*Species wanting further examination.*

*The Pacific Sperm Whale.*

Sperm Whale, *Colnet, Voyage*, 80. f. 9; *Beale, N. H. Sperm Whale*, 22. f. 1-14.

*Physeter macrocephalus*, *Brandt & Ratzeburg, Med. Zool.* t. 14. f. 3, from *Colnet*.

Spermaceti Whale, *Nunn, Narrat. Favourite*, 40, 58 (fig. not good), 175; *Fauna Japonica?*

Catodon *Colneti*, *Gray, Cat. Cetac. B. M.* 1850, 52.

Inhab. North Pacific. Japan. South Seas (*Nunn*). "Equatorial oceans" (*Lesson*).

*The South African Sperm Whale.*

Catodon *macrocephalus*, *A. Smith, African Zool.* 127.

Inhab. Mozambique Channel and South-east coast of Africa (*A. Smith*).

*The Indian Sperm Whale.*

Catodon *macrocephalus*, *Blyth, Cat. Mus. A. S.* 93.

Inhab. Ocean; occasionally hunted at the entrance of the Bay of Bengal, within sight of Ceylon.

Whales visit the Straits of Namoia regularly every May. They are mostly cows, and are usually accompanied by their calves, some 20 or 30 feet long. Some of the adults attain the length of 70 feet. At night they make a loud puffing noise resembling the sound produced by the piston of a steam-engine. At daytime they are seen putting their long heads out of the water and opening their immense jaws.

Lacépède describes a whale, figured in some Chinese drawings, under the name of *Physeter sulcatus*, in *Mém. Mus.* iv. 474.

*The South-Sea Sperm Whale.*

*Physeter polycyphus*, Quoy & Gaim. Zool. Uran. Mamm. t. 12, cop. Reichenb. Cetac. 5. t. 5. f. 13.

*Physeter australis asiaticus*, Desmoulins, Dict. Class. H. N. ii. 618; Fischer, Syn. 518, from Quoy.

*Catodon polycyphus*, Lesson, Mamm. 422.

Cachalot, or Sperm Whale, Bennett, Whaling Voyage, ii. 153, fig.

Inhab. Molucca.

Only described and figured from a drawing by an English sea captain.

The humps on the hinder part of the back, from which MM. Quoy and Gaimard name the Molucca Sperm Whale, do not appear, by the account of Dr. Jackson and Mr. Couch, to be a peculiarity of that animal.

Under the name *Physeter polycyphus*, the *Humped Blower*, Mr. Couch, in his 'Cornish Fauna,' observes:—"A specimen like the figure of the above in Gaimard, ran itself on shore in pursuit of small fish several years since; another was seen and minutely described to me by an intelligent fisherman; but it would appear that the number of humps on the back is variable. It is probably the *Balæna monstrosa*, Ruysch, Theat. Anim. i. t. 41."—Couch, *Cornish Fauna*, 9. It is curious that the same form should be observed in the Northern and Southern oceans.

"The Spermaceti Whale is not uncommon in the latitudes of New Zealand, and often falls a prey to the whale ships which cruise in the open sea; but it does not approach the shallow coast or inlets, as its habits are different from those of the Black Whale. One driven on shore at Te-awa-iti gave about 2 tuns of oil."—Dieffenbach, *New Zealand*, i. 42.

II. Head depressed, broad, rounded in front. Blower on the back of the forehead. Dorsal fin compressed, falcate.

## 2. PHYSETER.

"Head rounded, very large, in the adult about one-fourth the entire length of animal, oblong, rather compressed; eyes small, on the sides behind the blower, convex above; upper jaw longest; the blowers on the middle of the top of the head, separate, covered with one flap; pectoral fin moderate, triangular?; dorsal fin high, falcate; teeth conical, compressed; the male organ under the front edge of the dorsal, and the vent nearly under its hinder edge."—Sibbald.

*Physeter*, sp., Linn.; *Artedi*; Illiger, *Prodr.* 143, 1811; Gray, *Zool. E. & T.*; *Cat. Cetac. B. M.* 53; *P. Z. S.* 1863; 1864, 234.

*Physeter*, Rafin. *Anal. Nat.* 1815, 60.

Tursio, Fleming, *Phil. Zool.* 211, 1822 (P. microps).

Cetus (Ruckenfinne), Oken, *Lehrb. Nat.* 676.

? Orthodon, Rafin. *Anal. Nat.* 60, 1815 (no char. nor type).

Physeteres, Lacép.; *F. Cur. D. S. N.* lix. 318.

We only know this genus by the description and figure of Sibbald.

According to Sibbald they produce spermaceti. Cuvier, in his 'History and Examination of the Synonyma of the Cachalots or Sperm Whales' (Oss. Foss. v. 328-338), regards the description of this animal given by Sibbald as merely a redescription of the Sperm Whale, and finds great fault with Artedi, Bonnaterre, and others for having considered them as separate; and he regards the second, blunt-toothed specimen as either a *Delphinus globiceps* or a *D. Tursio* which had lost its upper teeth; this error is important, as it vitiates many of his subsequent observations. To have come to these conclusions he must have overlooked Sibbald's figure and ample details of the first, and the figure of the teeth of the second, or they would have at once shown him his error. That he did so is certain; for when he comes to Schreber's reduced copy of Sibbald's figures of *Balcena microcephala* (p. 337), he says Schreber does not indicate its origin; but on this copy of Sibbald's figure, which he before regarded as a Sperm Whale, he observes, that "from the form of its lower jaw it most resembles a large dolphin which had lost its upper teeth."

Thus, while Cuvier was reducing the numerous species of Sperm Whales that had been made by Bonnaterre, Lacépède, and other compiling French authors, to a single species, he has inadvertently confounded with it the very distinct genus of Black-fish, or *Physeter* of Artedi, which has a very differently formed head, the top of the head being flattened, with the blowers on the hinder part of its crown, and with a distinct dorsal fin, particulars all well described by Sibbald, a most accurate observer and conscientious recorder, and not badly represented by Bayer.

Mr. Bell observes,—“After careful examination of the various accounts which have from time to time been given of whales belonging to this family, called *Spermaceti Whales*, I have found it necessary to adopt an opinion in some measure at variance with those of most previous writers, with regard to the genera and species to which all those accounts and details are to be referred. The conclusion to which I have been led, is, first, that the *High-finned Cachalot* is specifically but not generically distinct from the common one, and that therefore the genus *Catodon* is to be abolished, and the name *Physeter* retained for both species; and, secondly, that all the other species which have been distinguished by various naturalists have been founded upon trifling variations or upon vague and insufficient data.”—*Brit. Quad.* 507. Thus, though Mr. Bell differs from Cuvier in regarding them as distinct species, yet he overlooked Sibbald's figures, for he says there is no figure of the High-finned Cachalot in existence, and keeps it in the genus *Physeter*, which he characterizes as having the “head enormously large, truncated in front,” which is quite unlike the depressed rounded head of the High-finned Cachalot; and he also adopts the mistaken description of the dorsal fin.

Eschricht seems to believe that Sibbald described a Killer, or *Orca gladiator*, under the above name, but I have never heard of an *Orca* 52 feet long.

Some parts of Sibbald's description, and his reference to Johnston's figure, might lead to this error; but his figures, which exactly agree

in proportion with his description, though not referred to in the text, at once set this at rest, the drawing being  $\frac{1}{72}$  of the natural size, that is to say, 6 feet to an inch; and he observes that his animal is longer and more slender than Willughby's figure of the Sperm Whale.

Sibbald describes the comparatively small triangular dorsal to be erect like a "mizen mast," which Artedi and Linnæus translate *pinna altissima*, and cause Shaw to call it the High-finned Cachalot. Dr. Fleming by mistake calls this species the Spermaceti Whale (Brit. An. 38); and he refers to *P. macrocephalus* (Linn.) as the true Sperm Whale figured by Robertson. Sibbald, in speaking of another specimen, says, "*spinam dorso longam*," as correctly quoted by Artedi and Linnæus, but used by them in opposition to the *altissima* of their other species.

J. Bayer (Act. Nat. Cur. 1733, 111. l. t. 1) gives a rather fanciful but very recognizable figure of a male specimen of this genus, which was thrown ashore at Nice, on the 10th of Nov. 1736, where it is called *Mular*. He compared it with Clusius's description of the *Sperm Whale* which was stranded on the coast of Holland, and observes that it has a dorsal fin, very small pectorals, and other characters not noticed by Clusius; and he says it agrees in all points with the whale noticed by Ray (Syn. Pisc. 14), which is extracted from Sibbald as above quoted.

F. Cuvier, overlooking the reference to Clusius and Ray, and the characters, speaks thus of Bayer's figure, "Elle est en effet d'un Cachalot; mais elle le rend de la manière la moins fidèle."—*Cétac.* 267.

Duhamel (Pêches, iv. t. 9. f. 2) figured a whale from the "River Gabon" in Guinea, with teeth in the lower jaw, a dorsal on the hinder part of the back, and the blowers in the crown, as in this genus; but the jaws are equal, and the mouth bent up at the angles to the eyes. He says it is called *Grampus* by the English. This figure is evidently only a copy of the *Baleine franche* (Duhamel, ix. t. 1. f. 2), with teeth in the place of the exserted baleen, and has a dorsal fin added.

There is an etching, by Van den Velde, of a "Pot Walwesck op Noortwijek op Zee, 28 Dec. 1614," which I think represents this species.

Beale (History of Sperm Whale, 11) observes, "Others of the whale tribe have dorsal fins while they possess the cylindrical jaw (like the Sperm Whale), as the *Black-fish*, but yet spout from the forehead or top of the head, and do not produce spermaceti. It is doubtful if this is not derived from Sibbald, for it can scarcely refer to the *Globocephalus macrorhynchus*, which, according to Bennett, Nunn, and others, is called the *Black-fish* by South-Sea whalers.

### 1. *Physeter Tursio*. *The Black-fish*.

Black. Teeth 11 to 22 on each side, conical, compressed. Head nearly one-fourth, pectoral fin one-thirteenth the entire length; the length 50 to 60 feet.

Physeter Tursio, *Artedi, Syn.*; *Linn. S. N. i.* 107; *Gray, Cat. Cetac. B. M.* 1850, 56; *P. Z. S.* 1863; 1864, 234.

Physeter — ? , *Schlegel, Dieren*, 96. t. 19.

Delphinus Orca, *Eschricht*.

1. De Balæna macrocephala quæ tertiam in dorso pinnam sive spinam habet et dentes in maxilla inferiores arcuatos falciformes.—*Sibbald, Phal. t. 1. f. A, B, C*; hence

Balæna major inferiore tantum maxilla dentata dentibus arcuatis falciformibus pinnam s. spinam in dorso habet.—*Raii Pisces*, 15.

Cetus tripinnis dentibus arcuatis falciformibus, *Brisson, R. A.* 229.

Physeter microps, *Artedi, Syn.*; *Linn. S. N. i.* 107; *Schreber, Säugeth. t.* 339; *Anderson, Iceland*, 248, fig. from *Sibbald*; *Turton, B. F.* 17; *Fleming, B. A.* 38; *Jenyns, Man.* 45; *Bell, Brit. Quad.* 512.

Physeter macrocephalus, *Cuvier, Oss. Foss.* v. 331, 334.

Tursio microps, *Fleming, Phil. Zool.* 211.

2. Balæna macrocephala tripinna quæ in mandibula inferiore dentes habet minus inflexos et in planum desinentes.—*Sibbald, Phal. t. 2. f. 1, 2, 4, 5* (teeth); *Raii Pisc.* 16.

Cetus tripinnis dentibus in planum desinentibus, *Brisson, R. A.* 230.

Delphinus globiceps? or D. Grampus? , *Cuv. Oss. Foss.* v. 331, 334.

3. Mular, *Bayer, Act. Nat. Cur.* 111. t. 1, male; hence

Physeter Mular, *Bonnal. Cét.* 17; *J. Brookes, Cat. Mus.* 18, 1828 (a stuffed foetus high-finned !!!).

Physeter Orthodon, *Lacép. Cét.* 236, from *Anderson*, 246.

Delphinus Bayeri, *Risso, Eur. Merid.* iii.; *F. Cuv. Cétac.* 224, from *Bayer*.

Inhab. North Sea. Scotland (*Sibbald*), female 1687, male 1689. Nice (*Bayer*)?

*Sibbald* observes that “the superior part of the body was swelled to a prodigious size. In length it was 52 or 53 feet, its height 12 feet, its girth above 32 feet. Its head was so large that it was (the tail being removed) half the length of the whole body. In form it was oblong-round, somewhat compressed at the upper part; inferior part of rostrum beyond lower jaw  $2\frac{1}{2}$  feet, the superior part nearly 5. Lower jaw 10 feet long. The extreme part of the rostrum was distant 12 feet from the eyes, which were very small for the size of the head, about the size of those of the haddock. A little above the middle of the rostrum is a lobe, which is called the ‘lum,’ with two entrances covered with one operculum, called the ‘flap.’ The size of the cranium may be estimated by the fact that four men were seen inside it at one time, extracting the brain, which contained several cells or alveoli, like those which bees keep their honey in, and in these were round masses of a white substance, which, upon examination, were proved to be sperm. Some of this substance was also found externally on the head, in some parts to the thickness of 2 feet. In the superior jaw were 42 alveoli, hollowed out for receiving the teeth of the lower jaw; they were of a cartilaginous nature. In the inferior mandible there were 42 teeth, 21 on each side, all of the same form, which was like that of a sickle, round and a little compressed, thicker and more arched in the middle, and gradually becoming thinner, terminating superiorly in an acute cone turning inwards; inferiorly it becomes thinner, and terminates in a more slender root, which is narrower in the middle. Of these teeth

those in the middle of the jaw are larger and heavier, those external are smaller. One of the larger, 9 inches long, weighed  $18\frac{1}{2}$  oz., and at the thickest end was of the same length as breadth. The smallest tooth which I got was 7 inches long and 5 in girth. The osseous part of these teeth projected 3 inches beyond the gums, was like polished ivory, smooth and white; the fang of each tooth was provided with a large cavity, which was so constructed that in the larger teeth there was a cavity 3 inches deep. It had two lateral fins each about 4 feet long, and besides these a long fin on the back. Colour of skin black. The throat was observed to be larger than usual in whales. Only one stomach was found."

The male and female seen by Sibbald have been divided into two species, according to the more or less truncated state of the teeth.

Mr. Wall thinks the skeleton at Burton Constable must belong to this genus, but the nostrils were at the end of the snout (see Anderson, 257).

"A male with acute falciform teeth is described by Sibbald as found at Limekilns in the Forth, in February 1689. It was 52 feet long. The upper jaw projected  $2\frac{1}{2}$  feet beyond the lower. Lower jaw 10 feet long, and narrower than the upper towards the extremity. From the snout to the eye 12 feet. In the lower jaw were 42 teeth, 21 on each side, curved and ending in acute points, the largest of which was 9 inches long, and the least 7 inches; these projected 3 inches above the gums, and contained a large cavity at the root. Swimmers 4 feet long, tail 9 feet broad. Sibbald also mentions a female with flat-tipped teeth, which came ashore in Orkney in 1687. The head was 8 or 9 feet high, the blowhole in front. The tusks were very little bent, and nearly solid externally, or with only a lateral slit or a small cavity. Some of the teeth were 4 inches long (figures 1-11). The dorsal fin was erect, like a mizen mast; it yielded good spermaceti."—*Fleming, B. A.* 38.

Mr. Lowe states that this species frequently comes ashore in Orkney. One was caught at Hoy, 50 feet long.—*Lowe, Orkney*, 160; *Fleming, B. A.* 39.

Mr. Barclay, of Zetland, states that "the *Physeter Tursio*, or High-finned Cachalot, is frequently seen on these coasts in summer, and is easily distinguished by the long perpendicular fin on its back" (Bell, Brit. Quad. 513).

Mr. William Thompson, of Belfast, published a sketch of the fin of this whale as said to be seen by Captain Thomas Walker of Kelmore, Wexford (see Ann. & Mag. N. H. 1846, xviii. 310, fig.). "There were either five or seven of them, two much larger than the rest, and apparently 25 feet long. When I first saw it I thought it was a cot (small flat-bottomed boat) at anchor, her tarred sail made up to the mast; more then rose, and they crossed in a long file the bows of my boat. They were not more than 3 or 4 yards from me, and the back fin appeared 10 or 12 feet high, and had either before or behind a round white spot on the back; all the rest of the body was black, like a porpoise. I did not see the head or tail. They went steadily, not rolling like a porpoise."



Mr. Couch thinks he has seen this whale "on the coast of Cornwall. It also occurred in May 1850. The fin was not less than 7 feet high." He further observes, "This species is supposed to be the whale sometimes seen on the Cornish coast sailing rapidly along at a uniform elevation in the water, with its slender but elevated fin above the surface white. The body is lineated below."—*Couch, Corn. Fauna*, 7.

In the Catalogue of the Museum of the Royal College of Surgeons, the truncated whale's-teeth are called "the teeth of the High-finned Cachalot, *P. Tursio*?" p. 171, n. 1189-1194. And the small jaws of the Sperm Whale are called "the Lesser Cachalot (*Physeter Catodon*, Linn.)."

See also *Physeter sulcatus* (Lacép. Mém. Mus. iv. 475), from a Japanese drawing, with the dorsal fin over the pectoral and the jaws grooved.

The Black-fish, or *Balæna microcephalus* of Sibbald, the *Physeter microps*, which I thought formerly might be the *Ardluk* of O. Fabricius, but which Eschricht after much consideration feels assured is the female *Delphinus Orca*, has entirely escaped the research of Eschricht and all other writers on the Whales of the North Seas.

The greatest desideratum of zoology is the power of examining some specimens of the genus *Physeter*, or Black-fish as it is called by the whalers. There is not a bone, nor even a fragment of a bone, nor any part that can be proved to have belonged to a specimen of this gigantic animal to be seen in any museum in Europe. This is the more remarkable as the animal grows to the length of more than 50 feet, and is mentioned under the name of the Black-fish in almost all the Whaling Voyages; and two specimens of it were examined by Sibbald, having occurred on the coast of Scotland. The only account which we have of the animal, on which zoologists can place any reliance, is that furnished by Sibbald in his little tractate on Scotch Whales.

The *Balæna minoribus in inferiore maxilla tantum dentatis* (Sibb. Phal. 24), on which Linnæus established *Physeter Catodon*, and Fleming the *Catodon Sibbaldii*, is evidently a *Beluga*.

### 3. ΚΟΓΙΑ.

Head moderately short, very broad, rounded behind and sub-tetragonal in front, where the base is broad, and the snout truncated, slightly reflexed and marginated at the extremity. The blow-hole single, externally large, situated at the base of the forehead near the middle of the head. Snout turned up at the margin. Pectoral fin broad, truncated, with 5 fingers, first and fifth shortest, second longest, third and fourth gradually shorter. Dorsal fin triangular; front edge rather convex, at an angle of 45°; hinder edge concave, perpendicular. Caudal triangular, terminal edge sinuated. Skull broad, triangular; beak short, broad, flat above; hinder part very broad, semicircular, and surrounded by a bony ridge formed by the maxillaries. This sperm-cavity is longitudinally divided by a

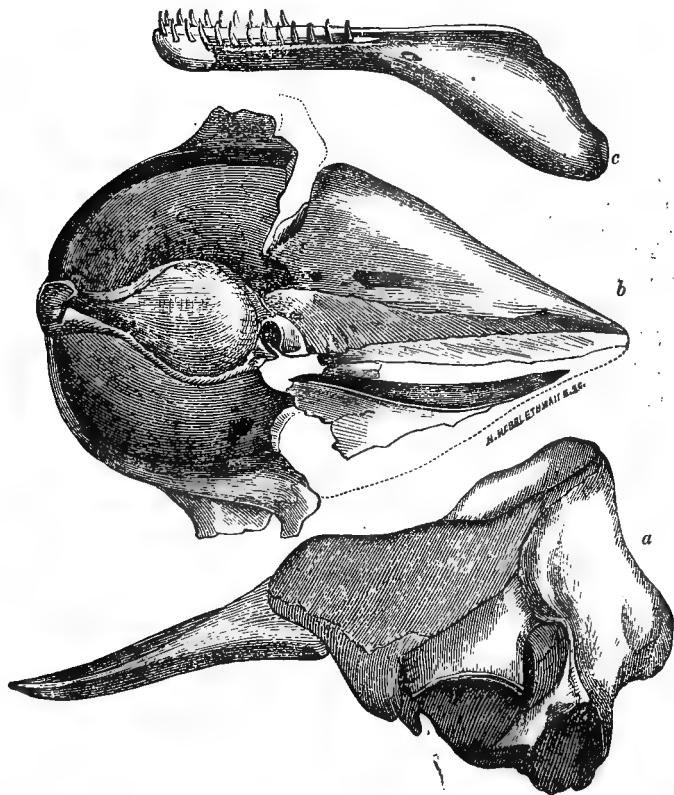
bony ridge near the occiput. The lower jaw wide at the condyles, having the branches in front united by a short narrow symphysis. Teeth: none in the upper jaw; 13.13 in the lower jaw, conical, curved.

*Physeter*, sp., *Blainv. Ann. Anat. et Phys.* ii. 335; *Lesson, N. Règ. Anim.* 201.

*Kogia*, *Gray, Zool. Erebus & Terror*, 22; *Cat. Cetac. B. M.* 18.

*Euphysetes*, *MacLeay (Wall), Hist. New Sperm Whale*, 1851, 50, 53, t. 2.

Fig. 56.



Skull and lower jaw of *Kogia breviceps*. From De Blainville.

“The most important character of the genus *Euphysetes* is the heavy ridge of bone that longitudinally divides the spermaceti-cavity into two unequal parts. There has been nothing like this structure hitherto described among the Cetacea” (Wall, l. c. 47). This character at once separates it from the skull of the foetal *Catodon*, with which some zoologists have been inclined to confound it.

“Instead of the perpendicular and semicircular wall as in *Catodon* being formed by the maxillary and doubled on the occiput, forming the back of a great cavity on the summit of the head, we see a cavity, although it is completely formed at the back by the maxillaries, divided as it were into two unequal parts by a ridge of bone, which is twisted towards the right side of the head.”—*Wall, l. c.* 39.

### 1. *Kogia breviceps*. *The Short-headed Whale*.

Skull broad and high, the frontal crest distinct, and the nasal pit deep, rather like that of the Cachalot. Nose short and pointed, rapidly tapering, only 1 inch longer than the breadth of the occipital bone. The lower jaw is very wide apart at the condyles, bent sharply inwards, and united in front by a moderate symphysis, and very narrow but rounded at the end. Teeth 14 or 15, narrow, slender, conical, acute, and rather arched inwardly.

*Physeter breviceps*, *Blainv. Ann. Anat. et Phys.* 1838, ii. 335. pl. x. (skull); *Lesson, N. Règ. Anim.* 201.

*Kogia breviceps*, *Gray, Zool. Erebus & Terror*, 22.

Inhab. Cape of Good Hope (Mus. Paris).

Described from a single skull in the Paris Museum. Length of the skull 14 inches 6 lines. Lower jaw 13 inches, separation at the condyles 12 inches, symphysis about two-ninths of the length of the lower jaw. Beak the length of the width at the notch.

“Tête osseuse est extrêmement large et fort élevée (figs. 3 & 4), ayant les crêtes frontales très remontées et par conséquent les fosses nasales fort profondes, un peu comme dans les Cachalots, et se terminant très rapidement par des maxillaires très courts et pointus, en sorte que la longueur totale est à peine d’un pouce supérieure à la longueur occipitale. La mâchoire inférieure (figs. 1, 2) a nécessairement une forme analogue, c’est à dire que très larges entre les condyles, les deux branches se rapprochent presque aussitôt, comme dans un soufflet, pour former une symphyse assez longue et une extrémité étroite, mais arrondie à sa termination. Il me paraît à peu près certain qu’il n’y avait pas de dents à la mâchoire supérieure; quant à l’inférieure, elle en avait 14 ou 15 de chaque côté, dont toutes ne sont pas restées; cinq seulement du côté gauche, quatre à droite, étaient encore dans leurs alvéoles: quelques autres y ont été remplacés: elles sont étroites, grêles, coniques, aiguës, un peu arquées en dedans, et longues de 6 ou 8 lignes (fig. 5, de grandeur naturelle).

“Longueur de la mâchoire inférieure 13 pouces, écartement de ses condyles 12 pouces. Longueur du crâne 14 pouces et demi.

“Une autre particularité qu’offre ce crâne consiste dans une inégalité telle des fosses nasales que la droite est presque à l’état rudimentaire, étant vingt fois peut-être plus petite que l’autre.”—*De Blainville*, tom. cit. p. 337.

2. *Kogia Grayii*.

Beak of skull much truncated and blunt, shorter than broad (that is, as 14 to 8) at the occipital bone, and shorter than it is wide (that is, as 7 to 9) at the notch. Teeth  $\frac{0.0}{13.13} = 26$ .

*Euphysetes Grayii*, *W. S. MacLeay, (Wall) Hist. New Sperm Whale, 1851, 8vo, p. 37. t. 2 (skeleton).*

Inhab. Australia.

“Head short and very broad, with a low snout, a convex forehead, at the base of which was a *large single blowhole*, placed at about the middle of the head (aperture circular? or lunate?); the snout turned up with a margin like that of a pig; roof of the mouth with a series of sockets on each side for receiving the teeth of the under jaw; under jaw very thin, narrow, subcylindrical, with hollow conical teeth inserted somewhat horizontally, with the points slightly curved upwards, and worn at the tips; the eyes low down, in front of a very weak pectoral fin. Dorsal fin like that of a Dolphin; the front edge rather convex and inclined backward at an angle of 45°; the hinder edge more perpendicular and concave; it was about 3½ inches high, 6 inches long at the base. The caudal fin triangular, hinder edge sinuated, with a small deep central emargination and acute tips. The length was 9 feet, and the tail 2 feet wide.

“The skeleton (with the cartilages) is about 8½ feet long. The skull is 16½ inches long, and not symmetrical.

“There is the same want of symmetry, the same distortion of the bones, and the same concavity of the upper surface of the head, formed by the enormous development of the base of the maxillaries, and the same convexity of the roof of the mouth, as are found in the genus *Catodon*, and there are some anomalies that render the formation more divergent from that of the Dolphins in the last-named genus. Owing to the great breadth of the vomer, the snout forms from the notches an almost equilateral triangle, with a short, blunt emarginate point instead of the long and sharp one of the genus *Catodon*. The intermaxillaries barely pass beyond the point of the maxillaries, but, as in the Sperm Whale, the right intermaxillary mounts nearly to the occiput, high above the right nostril, which is, as it were, almost carved out of it. Instead of a perpendicular and semicircular wall formed by the maxillaries, and doubled by the occipital, forming the back of the great cavity on the summit of the head, as in *Catodon*, in this genus the cavity, although it is completely formed at the back by the maxillaries, divides as it were into two unequal parts by a ridge of bone, which is twisted towards the left side of the head; this prominent, thick, and sinuated central ridge is formed by the base of the left maxillary and the base of the right intermaxillary, which both meet at the summit of the head. The right intermaxillary does not join the occipital, but is separated from it by a thin edge of the right maxillary, so that the occipital is doubled in front by the base of the maxillaries above. The left intermaxillary is much shorter than the right one, and mounts no higher than the wall of the left nostril, which it partly forms; the

great width of the left nostril distorts these bones. The vomer, with the side of the intermaxillaries, forms a broad hollow canal.

“The nostrils are in the middle of the upper surface of the head, not perhaps so obliquely as in the genus *Catodon*, but they are of a much more unequal size, one being more than ten times the size of the other, throwing the nasal bones quite out of their place. The right nasal bone is a very small triangle, at the base of the ethmoid, which forms, with the right intermaxillary, the wall of the small right nostril, and it forms the lower edge of the dividing ridge, and terminates abruptly and perpendicularly above the base of the vomer. The left nasal bone is more than 2 inches long, and somewhat parallelogram in shape with the left intermaxillary. The left maxillary and the ethmoid together form the wall of the very large left nostril.

“The two massive maxillæ touch each other behind where they are doubled by the occipital, and leave no part of the frontal visible.

“The frontal is a heavy quadrilateral bone with concave sides, one of which forms the top of the orbit. A part of the maxilla comes near to the front angle of the orbit, and its posterior wall is formed by part of the zygomatic apophysis of the temporal; it does not join the postorbital apophysis of the frontal, but leaves it open. The lower part of the orbit has its front side formed of a short, thick, triangular jugal. The fosso-temporalis is pear-shaped.

“The roof of the mouth is convex, showing only two small points of the intermaxillaries, one on each side of the line of the vomer, and formed almost entirely of the under side of the enormous maxillaries. These each have a linear groove running from the front of the snout for the pits for the teeth of the lower jaw. The palatines are small, quadrilateral, the pterygoid very large.

“The lower jaw is slight and fragile, with scarcely any condyles. The broad branch nearly as thin as paper, with the side deflexed inwards. The symphysis is short compared with that in *Catodon*, and boat-shaped and keeled. Teeth 13. 13, projecting horizontally and curved upwards; they have single roots.

“The os hyoides like that of *Catodon*, but the lateral pieces are more rounded, and the anterior apophyses of the middle piece are deficient. The styloidean pieces are subcylindrical, thicker at each extremity.

“The larger portion of the labyrinth of the ear-bones has six points, and the other portion, which is spherical in *Catodon*, is in this genus oval, as in Dolphins. The tympanum resembles the shell of the genus *Conus*, with a wide longitudinal mouth; in other respects the ear resembles that of *Catodon* more than *Delphinus*.

“Vertebrae 52; the seven cervical all confluent and soldered together, so as to be very difficult to distinguish one from the other. The atlas and axis are marked out, and have blunt, conical, transverse apophyses. The lower apophyses are evanescent; the third and fourth are thick, each marked with a short, conical, superior apophysis, distinguished by four lateral holes; the vestiges of the fifth, sixth, and seventh are as thin as paper, and soldered. Dorsal vertebrae 14, lumbar 9, caudal 21, thirteen with chevron bones attached, and eight

terminal. The ribs are flattish and somewhat angular, 14.14: the first rib is broad and flat, and has but one articulating surface to the transverse process of the first dorsal vertebra; the seven following pairs have each two articulating surfaces for each consecutive two of the first seven vertebræ; the next five pairs have only one articulating surface for each rib. The ribs more or less arched. The sternum composed of three pairs of bones, like *Cutodon australis*?; the middle pair united?

"The pectoral fin weak. Scapula thin, flat, smooth, with a thin triangular acromion on the outer crest, and a thick, more solid coracoid apophysis on the inner ridge in the shape of a parallelogram. The humerus compressed, concave behind, with a waved front edge. Ulna distinct, like the radius, both nearly alike, only the ulna is rather the thicker.

"The carpal bones 7, viz. two linear transverse bones, and five of a flat, round, irregular shape; a small hexagonal one, which is placed between one of the transverse bones and the metacarpal of the thumb. The transverse carpal is subtriangular, and placed at the end of the radius. The other thin transverse bone is trapezoidal, and between the base of the ulna and the two outer carpals. The fore-finger has two large flat carpal bones between the corner of the radius and the metacarpal of the fore-finger. The phalanges appear gradually to diminish towards the points of the digits. The thumb has two, the index finger six, the fourth finger four, and the little finger two (or perhaps three) phalanges.

"The pelvis is composed of five bones, the middle ones quadrangular, each longer than broad; the outer ones are broad, subquad-rangular, thickest in the middle of their inner side, where it is articulated to the former."

This work, I am informed by Dr. Krefft of Sydney, was entirely written by that eminent zoologist and entomologist Mr. W. Sharpe MacLeay. It is only to be regretted that he did not publish it under his own name.

"The inhabitants of the island of Selvi, one of the Timor group, are such expert fishermen, that they constantly take the species of whale called *Blackfish*, which are often 20 feet long, and which afford oil inferior only to the Spermaceti, having the same substance in the head as the Sperm Whale. They do not boil the blubber, but expose it to the sun in an inclined situation, with a ditch for the bottom, into which the oil drains."—*Moore, Notes on the Indian Archipelago, quoted by Blyth.*

#### Family 4. PLATANISTIDÆ.

Head small, with a long produced beak; forehead arched. Blower linear, nearly parallel, in a line over the eyes. Pectoral broad, truncated; fingers 5. Dorsal fin none. Back keeled. Skull with the sides of the maxilla elevated, forming a vaulted cavity over the

forehead. Teeth in both jaws at first subcylindrical, becoming compressed.

Platanistidæ, Gray, *Proc. Zool. Soc.* 1863.

Delphinidæ Platanistina, Gray, *Zool. E. & T.* 45, 1846; *Cat. Cetac. B. M.* 61 & 136.

### 1. PLATANISTA.

Head convex; beak compressed, curved up at the end. Teeth at first subcylindrical, at length compressed. Dorsal none. Back keeled in the place of the fin, and obliquely truncate behind. Pectoral fan-shaped, truncated. Blowhole single, longitudinal. Fingers 5, four subequal, outer shortest. Scapula with a large acromion process, and without any ridge.—*Cuv. Oss. Foss.* v. t. 22. figs. 8, 9, 10.

Platanista, *Pliny*; “*Cuvier*, 1829,” vide *Lesson, Tab. Règ. Anim.* 198; *Wagler, N. S. Amph.* 35, 1830; *Gray, Illust. Ind. Zool.*; *Zool. E. & T.* 45; *Proc. Zool. Soc.* 1863.

Platanistina, *Gray, Zool. Ereb. & Terr.* (misprint).

Susu, *Lesson, Œuvr. Buffon*, i. 215, 1828; *Tab. Règ. Anim.* 198.

Delphinorhynchus, sp., *Lesson*.

Delphinus, sp., *Lebeck*.

The eyes extraordinarily small in diameter, only  $1\frac{1}{2}$  line. It may be called a Blind Whale, for the perforations for the optic nerve in the skull are only rudimentary. The ear situated considerably above the eye. The spiracle is a simple longitudinal fissure, measuring 1 inch  $9\frac{1}{2}$  lines, its anterior end exactly in a vertical line above the eye; it is a perfectly straight longitudinal slit, without the faint double curve of an S attributed to it by Lebeck and Roxburgh. Female sexual organs about 2 inches long, showing nothing remarkable in form, nor in the furrows in which the papillæ are situated. The tongue exceedingly short, adnate in its whole circumference, and reaching only as far as the point where the jaw contracts itself into a narrow rostrum. The body enveloped in a thick layer of fat, measuring  $1\frac{1}{2}$  inch in thickness. Colour of the back dark lead-grey; under the belly somewhat lighter, though not much.—*Eschricht, Ann. & Mag. N. H.* 1852, 284.

*Cuvier* (*Oss. Foss.* v. 307) describes the skeleton of this genus, and figures some of the bones.

Professor Owen describes the skull and teeth of an old and young specimen (*Cat. Osteol. Coll. Mus. Coll. Surg.* ii. 449). Professor Reinhardt has described its general anatomy (*Dan. Vet. Selsk.* for 1851); a translation of the paper, by Dr. Wallich, appeared in the *Ann. & Mag. Nat. Hist.* for March and April 1852. It was from a young specimen caught in a fish-net and sent to Denmark in spirits. M. Rousseau gives some observations on the anatomy (*Mag. Zool.* 1856, 204); and I gave some observations on the change in the form of the jaws and teeth during the growth of the animal, in the *Ann. & Mag. Nat. Hist.* 1862.

Professor Owen observes, “In the length of the mandibular symphysis the *Platanista* resembles the *Physeter*; in the broad converging

maxillary crests it resembles the *Hyperoodon*; in the expanse of the temporal fossæ, the strength of the zygomatic arches, the shortness of the malars, and the smallness of the orbits, it is peculiar among the true Cetacea. Contrary to the rule in the *Delphinidæ*, the anterior teeth retain their prehensile structure, while the posterior ones soon have their summits worn down to their broad bases. The implanted base of the tooth is remarkably expanded in the antero-posterior direction, and its outer surface is augmented by longitudinal folds like those of the teeth of Sauroid fishes, but weaker than in them. Sometimes the posterior teeth are implanted by two short fangs, which is a still more exceptional character in the existing carnivorous Cetacea" (p. 449).

The form of the crest of the skull is modified according to the age. In the head of a young specimen in the Anat. Mus. Univ. Edin., Knox Cat. n. 105, the reflexed portion of the maxillary bones is only partially developed; their inner sides are cellular, and radiately ridged with a ragged edge.

In the skull of a half-grown specimen in the Royal College of Surgeons the crest is rather produced in front; the upper part of the front edge is suddenly raised behind, compressed, and forms a sort of ovate crest.

In the skull of an adult the crest is regularly arched, and the upper part of the front edge is obliquely truncated, as represented in Cuvier, tom. cit. xxii, f. 8, and in Ann. & Mag. N. H. 1852, t. 5 & 6.

"From the minuteness of its eyes, the *Susu* is obviously adapted for turbid rather than clear water, and it has never been observed out to sea."—*Blyth*.

Mr. Blyth observes, "I have heretofore been under the impression that the specimen presented [to the Museum of the Asiatic Society] by M. Duvaucel was of the male sex, but I find it otherwise, and certain discrepancies of proportion which I had suspected to indicate sexual diversity may yet prove to be of specific importance. I have never obtained a male of this animal. So far as can be judged from apparently well-stuffed specimens, that of M. Duvaucel is of a more slender form, with a longer rostrum, unlike any that I have seen from the river Hougly. Entire length 6 feet to point of tail-flukes, and 1 foot  $5\frac{1}{2}$  inches from gape to tip of rostrum. Length of Calcutta female 7 feet, with rostrum  $13\frac{1}{2}$  inches from gape. The two skulls presented by Dr. Wallich show a similar disparity."—*Cat. Mus. Asiat. Soc.* 92.

In the young specimens the jaws are rather swollen, and oblong near the front end. The teeth are cylindrical; the hinder ones thick, short, and far apart. Those in the front half of the jaws are very long, subcylindrical, slightly arched, transversely compressed at the base, that is, more or less flattened on the front and hinder sides by the interlocking of the teeth of the opposite jaws.

In the older specimens the jaws are compressed at the end; the teeth are conical, compressed laterally on each side, longitudinal as regards the length of the jaw; the base is broad, rugulose, and more or less worn away at the upper hinder edge; the hinder ones



are rather distant, the front rather longer than the others. In the middle-age specimens, as that figured by Home (Phil. Trans. 1818, t. 19, t. 20), the roots of the teeth are compressed and hollow; but in the more aged animal they are much lengthened, solid, strong, divided into irregular tubercles and sometimes even into large tuberculated lobes.

### 1. *Platanista Gangetica*. *The Susu*.

Blackish-red colour, rather paler beneath.

*Delphinus Gangeticus*, *Lebeck, N. Schrift. Berlin. Natur.* iii. 280. t. 2, 1801; *Home, Phil. Trans.* 1818, 417. t. 20; *Roxburgh, Asiatic Researches*, vii. 170. t. 5, 1811; *Desm. Mamm.* 513; *Fischer, Syn.* 506; *Cuvier, Règ. Anim.* i. 278, 1817; *Oss. Foss.* v. t. 22. f. 8-10; *Schlegel, Abhandl.* 28.

*Delphinorhynchus Gangeticus*, *Lesson, Man.* 406 (from life).

*Platanista Gangetica*, *Gray, Illust. Ind. Zool.* t. ; *Zool. E. & T.* 45; *Cat. Mamm. B. M.*; *Cat. Cetac. B. M.* 1850, 137; *F. Cuv. Cétac.* 252; *Blake, Journ. Asiat. Soc. Beng.* 1860, 449; *Blyth, Rep. Asiat. Soc.* 12; *Asiatic Researches*, xii. Append. xxvi., xv. Append. xxxii.; *Cat. Mus. Asiat. Soc. Beng.* 92; *Reinhardt, Trans. Roy. Acad. Sci. Copenh.* ii. 1851; *Ann. & Mag. N. H.* 1852, 161. t. 45.

*Delphinus Shawensis*, *Blainv. in Desm. Dict. H. Nat.* ix. 153. (from spec. in *Mus. Coll. Surg.*).

*Delphinus rostratus*, *Shaw, Zool.* ii. 514, 1801 (from spec. in *Mus. Coll. Surg.*); *Home, Phil. Trans.* 1820, t. 20.

*Platanista*, *Lesson*.

*Susu*, *Œuvr. Buffon*, i. 215. t. 3. f. 3, 1828.

*Platanista*, *Plin. Hist. Nat.* ix. ch. 15.

Dauphine du Gange, *Cuvier, Oss. Foss.* v. t. 22. f. 8, 10 (from spec. *Shaw*).

Inhab. India. Ganges and Brahmaputra with their tributaries (*Blyth*). Pegu, Irawaddi (*Blake*).

a. Stuffed specimen. India. Ganges.

b. Stuffed specimen: younger. India, Ganges.

c. Skull: end of nose entirely straight: young. India, Ganges.

d. Skull: end of nose recurved. India. Presented by Gibson Rowe, Esq.

"They generally appear in the Hougly when the full-grown females are pregnant. The embryo before birth is 14 or 15 inches long. The stomach was filled with a quantity of small fish and shrimps."—*Ann. & Mag. N. H.* 1852, 288.

"There are three stuffed specimens (an adult male, a young and old female) and two skulls (male and female) in the Museum of the Asiatic Society of Calcutta, and a fine series of skeletons in the Museum of the Calcutta Medical College."—*Blyth*.

"The *Susu* abounds in the river Hougly; it is extremely difficult to procure, at least in the vicinity of Calcutta, and too often when taken the captors saw off the rostrum."—*Blyth*.

"In what I believe to be the skull of an adult male, the symphysis of the lower jaw measures 17 inches, in the adult female only

12 inches ; the rostrum being thus 5 inches longer in the former."—*Blyth*.

"The *Susu* ascends very high up the rivers, if not quite to the foot of the mountains. Hardwicke's drawing was 'made from a living specimen 1000 miles above Calcutta.' Major Tyler has seen them forty miles up the Jumna, and also at Rajghal Mundi in the Dehra Dhoon. In the Indus and Sutlej near Ludiana, but these were doubtless the species (*Platanista Indi*) proper to the Indus and its tributaries.

"The Gangetic *Susu* is common throughout the valley of Assam, in the Brahmaputra and its tributaries. I have been assured that no such animal exists in the Irawadi and other Burmese waters. It is migratory, as it occurs towards the Gangetic outlet only in the cold season, as remarked by Dr. Cantor ; but at what particular season it is observed in the upper provinces I have been unable to ascertain."—*Blyth*.

"There are 28 or 29 teeth in each side of each jaw. They do not alternate in a quite regular manner. The length and form of the teeth vary much, though not by sudden transitions. The anterior are of considerable length, as much as 9 lines, pointed, and so compressed and curved that they have an anterior and posterior surface, the anterior margin convex and the posterior concave ; towards the middle of the jaw they gradually become shorter and cone-shaped, so that the 19th lower and the 21st upper pair only project above the gum like little knobs 1 line high with broad bases : in proportion as they become shorter they recede from each other."—*Reinhardt, Ann. & Mag. N. H.* 1852, 174.

"Anteriorly, the lower teeth are seen to embrace as it were the upper jaw, leaving a deep furrow on the outer side of the opposed gum. Midway in the jaws the apices of the teeth meet the corresponding gum close to the outside of their own teeth."—See *Illustr. Ind. Zool.* t.

Professor Reinhardt says, "the figure in the 'Indian Zoology' is most unsuccessful," yet his translator fairly states that it is from "a living specimen," while Eschricht only saw "a young specimen that had been preserved in spirits!"—*Ann. & Mag. N. H.* 1852, 167 & note.

## 2. *Platanista Indi*. *The Indus Susu*.

*Platanista Indi*, *Blyth, Rep. Asiat. Soc.* 13 ; *Journ. Asiat. Soc. Beng.* xxviii. 493 ; *Cat. Mus. Asiat. Soc. Beng.* 92.

*Platanista Gangetica*, var. minor, *Owen, Cat. Osteol. Mus. Coll. Surg.* 449. no. 2481.

Inhab. Indus, *Dr. David Wallich (Mus. Coll. Surg.)*, *Sir Alexander Burns, Major Tyler*.

"The skull from the Indus, presented by Sir A. Burns, is of a conspicuously new species. The maxillary crests are wanting in this specimen. The skull is larger and much more robust than that of *P. Gangetica*, with the same number of teeth, which are more than twice as short, being much ground down by attrition. Length of the

skull  $20\frac{1}{2}$  inches. Greatest width at zygomata  $9\frac{1}{2}$  inches. Depth of the two jaws with teeth *in situ*, measured in the middle of their height,  $3\frac{1}{2}$  inches (in *P. Gangetica* barely  $1\frac{1}{2}$  inch). Length of symphysis of lower jaw 11 inches. Depth of zygomatic arch  $2\frac{1}{2}$  inches.

"A coloured figure, probably the identical individual that furnished the skull above described, occurs among the Burns' drawings. The rostrum is represented as short in proportion to the length of the animal, and the neck to be more contracted than in the Gangetic species, which may be an error of the draughtsman. Colour also much paler, the lower parts dull albescent, abruptly defined in a line from the gape to the tail-flukes. Evidently a female. The male should have a longer rostrum. Length 7 feet by  $1\frac{1}{4}$  in depth. Dorsal rudimentary as in *P. Gangetica*."—*Blyth*.

See Reinhardt's paper in 'Ann. Nat. Hist.' 1852, pp. 162, 279, & 291, where the Susu of the Indus is referred to as a peculiar species.—*Blyth*.

The skull brought from the Indus by Dr. David Wallich, in the Museum of the Royal College of Surgeons, n. 2481, named *P. Gangetica*, var. *minor*, is of "smaller size, the total length not exceeding 12 inches, and the anterior teeth being much longer and more slender and acute. These differences may depend on the immaturity of the individual, but all the parts of the occiput have coalesced, and none of the sutural unions manifest any mark of immaturity. There are 21 teeth on the left side of the upper jaw, and 19 teeth on the right side, but the alveolar grooves extend further back, indicating the former existence of teeth or germs of teeth which have been lost. There are 26 teeth on each side of the lower jaw, behind which is a short extent of an empty alveolar groove. The teeth are placed close together; the anterior ones in the lower jaw are an inch in length, slender, and sharp-pointed, with the points slightly incurved and projecting outside those of the upper jaw; but the chief parts of the crowns of both the upper and under teeth fit into the interspaces of those of the opposite jaw when the mouth is closed. The teeth progressively diminish in length, without decrease of basal breadth, as they are placed further back."—*Owen, l. c.* pp. 448 & 449.

They have lately received a second skull like the preceding at the College Museum, of a rather larger size.

This skull is very unlike the *Platanista Indi* of Blyth, as he describes the teeth of that animal as short as those of the Gangetic Susu and much ground down. May it be the very young state of it?

- B. *Nostrils united into a single transverse or crescent-shaped blower. Head moderate, more or less beaked. Teeth in both jaws, often deciduous. The pectoral fin lanceolate, tapering.*

### Family 5. INIIDÆ.

The head beaked; beak bristly. Teeth in both jaws, conical, rugulose, crown of the hinder ones with an internal process. Back without any fin, keeled behind. Pectoral fin large, lanceolate. Skull: maxillary bones simple, expanded over the orbits. Jaws compressed. Symphysis of the lower jaw elongate. Fluviate.

Iniadæ, *Gray, Proc. Zool. Soc.* 1863, May.

Delphinidæ Iniana, *Gray, Zool. Erebus & Terror*, 45; *Cat. Cet. B. M.* 1850, 60, 135.

#### 1. INIA.

Head rounded, convex. Nose produced, nearly cylindrical, tapering, hairy. Blowers oblique, nearly above the pectoral fin. Ear-hole distinct. Teeth numerous, rugose, grooved, permanent; the front hooked; the hinder, close at the base, with a large rounded tubercle on the inner side. Dorsal fin none, but the back is keeled, ovate, and subtriangular behind. Body compressed behind. Pectoral fin large. The skull depressed, with the nose twice as long as the brain-cavity, compressed, with a groove along each side. Temporal cavity very large, edged above by a strong crest; the orbital hole very short, roundish. Muzzle of the young hairy.

*Inia, D'Orbigny, Ann. Sci. Nat.; Nouv. Ann. du Mus.* viii. 111, 1834; *Institute*, 1834, 246.

*Delphinus, sp., Desm.*

*Delphinorhynchus, sp., F. Cuvier.*

#### 1. *Inia Geoffroyii.* *The Inia.*

Pale blue, reddish beneath; fins and tail olive. Some reddish, others blacker. Teeth  $\frac{3}{3}$   $\frac{3}{4}$ .

*Delphinus Geoffroyii, Desm. Mamm.* 512.

*Delphinus Geoffroyensis, Blainv.; Desm. N. Dict. H. N.* ix. 151; *Gervais, Castelnau, Voy. Mamm.* 89; *Comptes Rendus*, 1856, 806; *Ann. Nat. Hist.* xvii. 521; *Arch. Naturg.* 1857, 27; *Gray, Ann. & Mag. N. H.* 1856, xviii. 157.

"*Delphinus à bec mince,*" *Cuvier, R. A.* i. 278?

*Delphinorhynchus frontatus, F. Cuv. Cétac.* 121.

*Delphinorhynchus Geoffroyii, Lesson, Man.* 405.

*Delphinus Inia, Schlegel, Abhandl.* 24.

*Delphinus Amazonicus, Martius, R. Schomburgk, Reisen in Brit. Guiana*, iii. 786.

*Inia Boliviensis, D'Orbigny, N. Ann. Mus.* iii. t. 22. f. 3, cop. *F. Cuv. Cétac.* 166. t. 10\*, t. 11; *Gerv. in D'Orb. Voy. Amér. Mérid.* 50. t. 22 (animal and skull); *Gray, Ann. & Mag. N. H.* 1856, xviii. 157; *Gervais, Ann. & Mag. N. H.* 1856, xviii. 52; *Institute*, 1856, 806.

*Buffe der Missionaires, Castelnau, Hist. du Voy. dans l'Amér. du Sud*, iv. 459; *Arch. Naturg.* 1853, 24.

Inhab. Upper Peru or Bolivia, River Moxos. Brazils, Upper Amazons (*Bates*). Called *Bouto*.

*a, b.* Skull of *Bouto* from Ega, from Mr. Bates:—

	in.
Length of skull . . . . .	21½
Length of beak . . . . .	13
Length of teeth-line, upper jaw . . . . .	12¼
Length of teeth-line, lower jaw . . . . .	11
Length of lower jaw . . . . .	17½
Length of symphysis of lower jaw . . . . .	8½
Width of skull . . . . .	10
Width in front of orbital notch . . . . .	6
Width at beak . . . . .	3

Teeth  $\frac{28}{6}$ — $\frac{28}{7}$ . The hinder eight or nine teeth only have a distinct internal heel; the succeeding ones gradually assume the usual conical form, but all the teeth are more or less rugulose.

The skull in the Paris Museum, from D'Orbigny, has a prominent tubercle behind the blowholes; eyebrows convex and rugose on the top; beak with a slight groove on each side above; lower jaw with scarcely any ridge on the sides; the symphysis long, occupying more than half the length of the lower jaw; teeth large, regular, hinder ones with a rounded, regular tubercle on the inner side.

	in.
Length of skull . . . . .	19
Length of beak . . . . .	12
Length of symphysis . . . . .	9
Length of teeth-line . . . . .	11

The *Delphinus macrogenius* (Fischer, Cuvier, Oss. Foss. v. 312. t. 23. f. 4, 5, 9–11) appears to belong to this tribe.

The following are the measurements of D'Orbigny's specimen, from Bolivia, as given by M. F. Cuvier:—

	met.	cent.
Length, entire . . . . .	2	4
Length of muzzle . . . . .	0	23
Length to eye . . . . .	0	34
Length to blower . . . . .	0	40
Length to ears . . . . .	0	43
Length to pectoral fin . . . . .	0	52
Length to dorsal fin . . . . .	1	30
Length of pectoral . . . . .	0	42
Breadth of pectoral . . . . .	0	18
Breadth of caudal . . . . .	0	50
Height of dorsal . . . . .	0	9
Circumference of thickest part . . . . .	1	4

*Delphinus Geoffroyii* was described from a specimen procured by the French from the Lisbon Museum during their occupation of that town, which the Portuguese most probably received from the Brazils. I have examined the specimen, and it has the teeth of *Inia*. It is covered with paint. It has no dorsal; and it shows the teeth suffi-

ciently to exhibit their rugose state, and the large and peculiar tubercle on the inner side of the hinder ones, which is characteristic of this genus, and which was observed by M. Desmarest, who describes them as "coniques, obtuses, avec une sorte de collet inférieurement, et entre leur surface est rugueuse."

M. Cuvier (Oss. Foss. v. 278) describes the Lisbon specimen under the name of *D. frontatus*, but his character for that species is taken from a skull of the genus *Steno*, instead of from the teeth in the specimen from Lisbon; he also observes that it is not impossible that the *Masouen blanc* of Duhamel (Pêches, ii. t. 10. f. 4), received from Canada, may not be a bad representation of the animal. Hence M. de Blainville's idea of the Canadian habitat. The *Masouen blanc* of Canada is certainly a *Beluga*, very erroneously represented.

M. F. Cuvier, in his 'Cetacea,' p. 121, describes this specimen under the name of *D. frontatus*.

The *Bouto* is found near Ega. "The animal is very large, and wholly of a pinkish flesh-colour. I have seen them rear themselves entirely above the surface of the water when the sexes are sporting in shoaly bays. They go in pairs, rolling together. There are black dolphins of a larger species, but I do not know if a variety or a separate species. They also roll in pairs, and are abundant towards the delta of the Amazons. I cannot say whether the flesh-coloured species is found in the delta. One fact only I can mention, I have never seen a black and a pink dolphin together in pairs. They are always either black or pink."—*Bates*, 17 Feb. 1856; *Ann. & Mag. N. H.* 1856, xviii. 158.

This animal inhabits "the upper parts and the branches of the great river Amazons, to the Indians living on the borders of which it is a creature of no small value. It was described by D'Orbigny as the type of a new genus under the name of *Inia Boliviensis*, by which it has since been generally known; but it appears to have been previously described by Spix and Martius under the name of *Delphinus Amazonicus*; while, according to M. Paul Gervais, it is identical with the *D. Geoffrensis* of De Blainville, who, however, supposed that his specimen came from Canada."—*Comptes Rendus*, April 28, 1856, 806; *Ann. & Mag. N. H.* xvii. 522.

## Family 6. DELPHINIDÆ.

Head beaked; beak bald, or with only a few whiskers. Nostril united into a transverse blower on crown of head. Teeth in the whole length of the edge of both jaws, simple, cylindrical, conical, smooth. Dorsal fin falcate, rarely wanting: Back rounded. Tail compressed, keeled. The pectoral fin moderate, ovate, on the upper part of the sides of the chest; fingers 4 or 5, short, each formed of four or five joints. Skull beaked; the maxillary bones simple, expanded out or shelving over the orbits. Intermaxillary bones moderate, only partly covering the maxilla. The breast-bone elongate, formed of three portions, with the first three pairs of ribs on

the sides at nearly equal distances, the hinder ribs closer together at the hinder end.

Diodonea et Delphina (pars), *Rafn. Anal. Nat.* 1815, 60.

Cete, Carnivora (pars), *Lesson, N. Règ. Anim.* 197.

Hydraula, *Ch. Bonap. Règ. Anim.*

Delphinusidæ, *Lesson, N. Règ. Anim.* 197.

Delphinus, *Linn.*; *Illiger, Prodr.* 143, 1811.

Delphinus et Monodon, *Cuv. Tab. Elém.* 1798.

Delphinidæ (pars), *Gray* [Delphinidæ, sect. Delphinina et Phocenina], *Ann. Phil.* 1828; *Spic. Zool.* i. 1828; *Cat. Mam. B. M.* 104; *Zool. Erebus & Terror*; *Cat. Cetacea B. M.*; *Proc. Zool. Soc.* 1864, 235; *Ann. & Mag. N. H.* 1863.

Delphinidæ et Monodontidæ, *Gray, L. Med. Rep.* xv. 310, 1821.

Cete (pars), *Illiger.*

Delphinidæ, Delphinina et Monodontina, *Selys-Longchamps*, 1842.

Les Cétacés piscivores et les Narwals, *F. Cuv. D. S. N.* 1829.

Zahnwale (pars), *Oken, Lehrb. Naturg.* 672, 1815.

Delphinidæ seu Mastrogastera, *J. Brookes, Cat. Mus.* 39, 1828.

Trachynichidæ seu Macrodontea, *J. Brookes, Cat. Mus.* 40, 1828.

Delphiniers, *Geoff. Leçons Mammal.* 1835, 66.

This family is easily known from the Toothed Whales or *Catodontidæ* by the smaller and more proportionate head; and in those species which have lost their upper teeth at an early age, by there being no regular series of pits in the gum of the upper jaw for the reception of the teeth of the lower one; and also by the upper part of the skull not being deeply concave, and surrounded on the sides and behind by a high ridge.

These animals when first born are large compared with the size of the parents; according to Dr. Knox, the foetus of the porpoise is half the length, that is, one-fourth the size of the parent, before it is born (*Trans. Roy. Soc. Edinb.* ii. 208); and they appear to attain their full size very rapidly, which may account for the very slight difference to be observed in the size of the skull, and the great uniformity in the number, and in the space which the series of teeth occupy upon the edge of the jaws in the different specimens of the same species. Hunter thought the exact number of teeth in any species was uncertain: observing the teeth in the middle of each series were the largest and the most firmly fixed, he states his belief that "the jaws increase posteriorly and decay at the symphysis, and while the growth is going on, there is a constant succession of new teeth, by which means the new-formed teeth are proportioned to the jaw."—*Phil. Trans.* 1788, 398. Dr. Fleming, from the examination of the jaws of two porpoises of different ages, thinks "the jaws lengthen at the symphysis and at the base;" and that "the new teeth formed at these places are the smallest, and that there is no absorption."—*Phil. Zool.* ii. 208. This may be the case with the specimens before they arrive at their full size; but no skull of this kind has fallen under my observation: and as far as my experience will carry me, the numbers, size, and disposition of the teeth furnish the most important characters for the determination of the species and the definition of genera. M. F. Cuvier's remarks (Cétac. 103, 104) on the teeth as

the characters of genera are not consistent with my observations, for they appear quite as characteristic of the different genera as those of other orders of Mammalia, though they do not present so many different forms. At the same time, it is true that compilers like Lesson, who appear not to have examined a single skull, have made many genera, founded on very slight characters, and brought together species that have very little relation to each other.

For the purpose of more distinctly defining the species, it has been found necessary to divide them into several groups, so as to arrange them in what appears to be a more natural series, and circumscribe the genera.

#### SYNOPSIS OF THE GENERA.

- A. *Head more or less beaked; beak of the skull slender, as long as or longer than the brain-cavity; triangle in front of blowers flat. The lateral wings of the maxilla expanded, horizontal. Bottle-noses.*
- \* *Beak of skull compressed. Symphysis of lower jaw elongate. Dorsal fin distinct.*
1. PONTOPORIA. Beak of skull high, compressed. Symphysis of lower jaw very long.
  2. STENO. Beak of skull rather compressed, higher than broad. Symphysis of lower jaw long.
- \*\* *Beak of skull more or less depressed. Symphysis of lower jaw moderate.*
3. DELPHINUS. Dorsal distinct, medial. Beak of skull elongate. Triangle short, rather depressed, convex above. Crown convex.
  4. TURSIO. Dorsal distinct, medial. Beak of skull short, depressed. Triangle elongate. Crown convex.
  5. LAGENORHYNCHUS. Dorsal distinct. Beak of skull depressed, expanded. Crown shelving in front.
  6. DELPHINAPTERUS. Dorsal none.
- B. *Head rounded in front, scarcely beaked; beak of the skull depressed, broad, scarcely so long as the brain-cavity.*
- \* *Lateral wings of the maxilla horizontal, produced over the orbits. Dorsal distinct. Teeth conical.*
7. ORCA. Triangle in front of blowers flat or concave. Teeth large, acute, permanent. Intermaxillaries moderately wide. Pectoral broad, short.
  8. PSEUDORCA. Triangle in front of the blowers flat. Teeth large, acute, permanent. Intermaxillaries moderately wide. Pectoral small, ovate.
  9. GRAMPUS. Triangle in front of blowers swollen, convex. Upper teeth early deciduous. Intermaxillaries broad.
- \*\* *Lateral wings of the maxilla shelving down over the orbit. Triangle in front of the blower convex.*
- † *Teeth permanent, compressed, sharp-edged.*
10. PHOCÆNA. Dorsal fin distinct
  11. NEOMERIS. Dorsal fin none.



†† *Teeth early deciduous, conical. Dorsal none.*

12. **BELUGA.** Teeth in both jaws, early deciduous. Male without any horn-like tooth.
13. **MONODON.** Teeth very early deciduous. Male with a projecting spiral tusk in the upper jaw.

A. *Head more or less beaked; beak of the skull slender, as long as or longer than the brain-cavity. The lateral wings of the maxilla expanded, horizontal. Triangle in front of the blowers flat or concave. Delphinina. Bottle-noses.*

\* *Beak of the skull longer than the brain-case, compressed. Symphysis of the lower jaw elongate. Dorsal fin distinct.*

### 1. PONTOPORIA.

Head with a very long, slender beak. Blowhole transverse, on the crown. Dorsal fin high, falcate, central; pectoral fins rather elongate, subunate. Skull roundish; beak very long, compressed, with a strong groove on each side above; side of the maxilla rather elevated; the edges form a ridge on the side of the upper surface of the brain-cavity; eyebrow with a long cylindrical crest; lower jaw compressed, with a deep groove on each side; symphysis very long. Teeth small, subcylindrical, smooth, rather hooked, acute.

Pontoporia, *Gray, Zool. Ereb. & Terror*, 46, 1846; *Cat. Cetac. B. M.* 1850, 134.

Stenodelphis, *Gervais, D'Orb. Voy. Amér. Mérid.* 31. t. 23 (not characterized).

#### 1. Pontoporia Blainvillii. *The Pontoporia.*

Skull, with the tubercles behind the blowholes, broad, slightly convex; eyebrows with a strong, longitudinal crest; upper and lower jaw with a deep, well-defined ridge on each side. Teeth  $\frac{5}{5} \frac{3}{3}$ , small, conical, hooked, smooth; symphysis more than half the length of the lower jaw.

Delphinus Blainvillii, *Fremenville, Mus. Paris.*

D. Blainvillei, *Gervais, Institute*, 1842, 170; *Bull. Soc. Philom.* 1844, 38; *Institute*, 1844.

D. (Stenodelphis) Blainvillei, *Gervais & D'Orb. Voy. Amér. Mérid. Mamm.* 31. t. 23 (skull); *Reichb. Cetac.* 128. 70. t. 24. f. 78.

Pontoporia Blainvillii, *Gray, Zool. E. & T.* 46. t. 29 (skull); *Cat. Cetac. B. M.* 134.

Inhab. Monte Video. Skull, Mus. Paris (*M. Fremenville*).

M. Fremenville described the Dolphin belonging to the skull as white, with a black dorsal band, and 4 feet long.

	in.	lin.
Length of skull . . . . .	12	6
Length of beak . . . . .	8	0
Length of symphysis . . . . .	5	9
Length of teeth-line . . . . .	5	4

M. d'Orbigny believes the dolphin he observed near the mouth of

the La Plata, of which the following is a description, is probably the same as *Stenodelphis Blainvillei*; it is figured Voy. Amér. Mérid. t. 23. The skull of this animal was not examined nor preserved. It was blackish, pale beneath, with a white streak along each side from behind the blower, where it is broadest and gradually becoming narrower behind, not quite reaching to the tail.

According to Desmarest, Freminville saw a dolphin on the coast of Brazil which was 15 feet long, with a very convex forehead; ashy, with a white streak on each side of the head, on the back, throat, and belly.

## 2. STENO.

Head convex. Forehead convex. Beak moderate, tapering. Body elongate, fusiform. Pectoral fin moderate, ovate, falcate. Dorsal falcate, in the middle of the back. Skull round, subglobular. Forehead erect. Beak elongate, compressed, higher than broad, tapering in front, convex above. Triangle elongate, deep, produced rather beyond the teeth-line. Palate convex, not grooved on the side. Lower jaw elongate, compressed in front; symphysis elongate, about one-fourth the length.

*Steno*, Gray, *Zool. Erebus & Terror*, 43, 1847; *Cat. Cetac. B. M.* 1850, 127; *Proc. Zool. Soc.* 1864, 236.

This genus is at once known from *Lagenorhynchus* and *Delphinus* by the length, compression, and tapering form of the beak of the skull.

The fœtus of *Steno fuscus* is very peculiar for the elongated tapering head; the pectoral fins are rather large, strongly falcate; the dorsal rather beyond the middle of the back. Its tongue is flat on the top, and nearly as broad as the space between the sides of the jaws; it is entire on the edges of the sides, and slightly dilated in front, crenulated on the edge, and with a larger flat lobe in the middle of the tip. (See 'Zool. Erebus and Terror,' t. 26. f. 1, a, b, c.)

- a. Beak separated from the forehead by a cross groove.
- b. Beak scarcely separated from the forehead.

a. Beak separated from the forehead by a cross groove.

### 1. *Steno Malayanus*. *The Malay Dolphin*.

Grey-ash above and below. Nose of skull about three-fifths of the entire length. Teeth  $\frac{3}{8}$ .

*Delphinus Malayanus*, Lesson, *Voy. Cog.* t. 9. f. 5; *Hist. Cétac.* 152; *Schlegel, Abh.* i. t. 1, 2. f. 2, t. 4. f. 3 (skull and teeth).

*D. Capensis*, Rapp, *Cetac.* t. 2. f. 1 (not Gray nor Cuv.).

*D. Rappii*, Reichb. *Cetac.* iii. 48. t. 18. f. 5, 7.

*D. plumbeus*, Cuv. *R. A.* i. 288; *F. Cuv. Cétac.* 151; *Mamm. Lithog.* t. ; Pucheran, *Rev. & Mag. Zool.* 1856, 145.

*Steno Malayanus*, Gray, *Zool. Erebus & Terror*, 43; *Cat. Cetac. B. M.* 127.

Inhab. Indian Ocean.

	ft.	in.
Length of animal, entire . . . . .	5	11
Length of pectoral . . . . .	1	1
Width of tail . . . . .	1	11

There is a skull in the Paris Museum marked "*D. plumbeus*, Malabar, *Dussumier*." It measures as follows: Length 22 inches, beak  $13\frac{1}{2}$ , teeth-line 12, width at notch  $4\frac{1}{3}$ , symphysis of the lower jaw  $5\frac{1}{2}$  inches; teeth  $\frac{37}{84}$ — $\frac{37}{37}$ , large; beak elongated, higher than wide, compressed in front; triangle extending rather before the teeth-lines. In the Anatomical Museum of the Jardin des Plantes is a skull of a foetal specimen of this species, from Malabar, which is 12 inches long, with the beak  $8\frac{1}{3}$  inches long, and  $2\frac{1}{2}$  in. wide at the notch. The symphysis of the lower jaw is  $2\frac{1}{2}$  inches long. The bones are not united. The upper teeth are 36; they are as large as those of the adult skull, and all enclosed in a cartilage and very close together. From this skull it is evident that these animals are born with the full number of teeth, which only elongate as they gradually develop.

## 2. *Steno roseiventris*.

Greyish black above, under half rosy white; orbit, streak from eye to the pectoral, and pectoral fin dusky. Beak elongate, slender. Beak of skull very long, half as long again as the brain-cavity. Teeth  $\frac{47}{44}$ — $\frac{47}{44}$ .

*Delphinus roseiventris*, *Pucheran, Voy. Dumont d'Urville*, t. 22. f. 2, t. 23. f. 3, 4 (skull).

Inhab. Molucca.

The skull of a *Dauphin à ventre roux* from Molucca, in the Paris Museum, has the nose very slender, attenuated. Palatal bone and intermaxillaries distinctly seen below; intermaxillaries very convex, dense; lower jaw very compressed in front; palate flat, rather convex on each side behind, very spongy.

## 3. *Steno frontatus*. *The Fronted Dolphin*.

Nose of skull about three-fifths of its entire length, three times as long as its width at the notch, rather compressed, rounded in front. Lower jaw subangular and bent up at the end, united about one-third of its length. Teeth  $\frac{21}{21}$ — $\frac{24}{24}$ , often rather rugose.

Skin rough, back greyish black, belly dirty white. Female 9 feet long.—*Dr. Dickie*.

*Delphinus frontatus*, *Cuv. Oss. Foss.* v. t. 21. f. 7, 8, t. 22. f. 8; *R. A.* i. 288; *Gray, List Mamm. B. M.* 105; *Owen, Cat. Osteol. Coll. Mus. Coll. Surg.* ii. 453.

*D. Reinwardtii*, *Schlegel, Abh.* i. 21. t. 2. f. 3, 4, t. 4. f. 7 (skull and teeth).

*Steno frontatus*, *Gray, Zool. Erebus & Terror*, 43; *Cat. Cetac. B. M.* 1850, 128; *Blyth, Cat. Mus. Asiatic Soc. Bengal*, 91.

Inhab. Indian Ocean. Bay of Bengal (*Capt. Lewis*, 1846). Red Sea (*J. Owen, Esq.*, 1844). Pacific.

- a. Part of the upper jaw, teeth large.  
 b. Bones of the ear. India. Presented by General Hardwicke.  
 c, d, e. Three skulls.

Dimensions of skull (No. 1) in the British Museum; No. 2, of skull of female in Dr. Dickie's Collection:—

	No. 1.		No. 2.	
	in.	lin.	in.	lin.
Length, entire .....	20	6	22	0
Length of nose .....	12	0	13	5
Length of teeth-line .....	10	0	11	0
Width at notch .....	3	10		
Width at orbit .....	7	9	7	9
Width of middle of beak .....	2	0	2	0
Length of lower jaw .....	17	0	18	0
Length of symphysis .....	5	6	6	0

Var. 1. Lower jaw rather straighter below and rather wider behind; teeth  $\frac{22}{31}$ .

Var. 2. Nose much compressed on the side and depressed above, rather larger, rather more than three times as long as wide at the notch; teeth  $\frac{22}{22}$ .

Var. 3. Tooth-series rather longer, 10" 6"; teeth  $\frac{21}{21}$ ; lower jaw like Var. 1.

Dr. Dickie's skull has teeth  $\frac{21}{21}$ ; the two front of lower jaw are small, and separated from the rest. A fœtus extracted from the womb of Dr. Dickie's specimen had the tail convex at the end and emarginate.

*D. Geoffroyi*, Desm., which is the type of the genus *Inia*, has been confounded with this species.

There are two skulls in the Museum of the Asiatic Society of Calcutta, one of an animal taken near the Nicobar Islands, the other from the Red Sea.—*Blyth, Rep. l. c.* 11.

#### 4. *Steno compressus*. *The Narrow-beaked Dolphin*.

Nose of skull much compressed, attenuated at the tip, three-fifths the entire length, three times and a half as long as its width at the notch. Teeth conical, acute,  $\frac{26}{28}$ . Head narrow, and rather compressed at the orbit.

*Delphinus compressus*, Gray, *Cat. Mamm. B. M.*

*Steno compressus*, *Zool. Erebus & Terror*, 43. t. 27 (skull); *Cat. Cetac. B. M.* 1850, 129.

Inhab. — ?

a. Skull. The specimen figured in the 'Voyage of the Erebus and Terror,' pl. 27. ....

b, c. Two skulls.

d. Skull. South Sea. Antarctic Expedition. Presented by the Lords of the Admiralty.

	in.
Length, entire .....	20 $\frac{1}{2}$
Length of nose .....	13
Length of lower jaw .....	17
Length of symphysis .....	6 $\frac{1}{2}$
Width of notch .....	3 $\frac{1}{2}$
Width at orbit .....	6 $\frac{3}{4}$

The skulls of this species are easily known from the former by being much more slender and more attenuated in front, and by the head, though longer, being 2 $\frac{1}{2}$  inches narrower over the orbit; lower jaw nearly straight below, united for more than one-third its length.

It may be the same as *D. rostratus*, but the teeth are more numerous; and Cuvier's figure, which he thought might be Breda's species, certainly much better represents a common Indian species than this.

In one of the skulls the nose is rather shorter and more depressed.

### 5. *Steno attenuatus*. *The Slender-beaked Dolphin*.

Nose of skull three-fifths the entire length, once and a half the length of the skull, twice and three-fourths the length of the width of the notch, slender, tapering in front; intermaxillaries forming a long triangular part of the front of the palate; vomer elongate, in middle of palate. Teeth  $\frac{40}{40}$ .

*Delphinus attenuatus*, Gray, *List Mamm. B. M.* 105.

*Steno attenuatus*, Gray, *Zool. Ereb. & Terror*, 43. t. 28 (skull); *Cat. Cetac. B. M.* 1850, 130; *Blyth, Cat. Mus. Asiat. Soc. Bengal*, 92; *Asiatic Researches*, xii. App. xxvii.?

Inhab. Cape Horn. Sea west of Cape of Good Hope and Bay of Bengal (*Blyth*). Mus. Coll. Surg. Edinb.

a. Skull. Presented by Mrs. Ince.

b. Skull. The specimen figured in the 'Voyage of the Erebus and Terror,' pl. 28.

c. Skull. 9° N. lat. Presented by A. Pearson, Esq.

Measurement of the three skulls in the British Museum:—

	a.		b.		c.	
	in.	lin.	in.	lin.	in.	lin.
Length, entire .....	15	9-	16	6	15	6
Length of nose .....	8	9	10	0	9	3
Length of lower jaw .....	13	3	....		13	0
Breadth of temples .....	6	0	6	5	6	1
Breadth of notch .....	3	3	3	3	3	6
Breadth of middle of beak..	1	6	1	7	1	8
Breadth of intermaxillaries	0	1	0	1	0	1

*Delphinus pseudodelphis*, Wiegmann. Schreb. t. 358 (skull); Reichb. *Cetac. Anat.* t. 18. Teeth  $\frac{42}{42}$  or  $\frac{43}{43}$ . "Skull in Mus. Leyden so named has the form of *D. Malayanus*, but beak shorter, and teeth shorter and thinner, very like those of *D. Delphis*. Palate not grooved. Symphysis of lower jaw rather long." May be the same

as the *Steno attenuatus*, but the Museum copy of Schreber does not contain the plate referred to.

There is a skull in the Museum of the Asiatic Society of Calcutta which seems to be that of *Steno attenuatus*, being probably that mentioned as "a Dolphin found near the Isle of France" (Asiatic Researches, xii. App. xxvii.). Lower jaw 14 inches. Teeth  $\frac{41}{41}$ . And another lower jaw, "from the high seas," with series of 38 teeth, presented by Mr. C. Harvey (Journ. As. Soc. x. 737). Also two skulls, toothless, wanting the lower jaw, with series of 39 teeth-sockets. Length 15 and  $15\frac{1}{2}$  inches. All these would appear to be the same.—*Blyth, l. c.*

A left ramus of the lower jaw with series of 43 teeth, in the same museum, is vertically much deeper at the symphysis, and undoubtedly appertains to a distinct species.—*Blyth.*

Captain Jethro Fairweather presented to the Museum of the Asiatic Society of Calcutta a skull of a small but not young *Steno*, which seems to be *St. attenuatus*, Gray. It was procured not far from the Sand-heads, out of an innumerable herd of them, "as far as the eye could reach in all directions," and was of a palish lead-colour. Not therefore, however, the *Delphinus Malayanus*, var. *plumbeus*, which is a much larger species common in the bay. Teeth  $\frac{39.40}{41.42}$ —*Blyth.*

Major R. C. Tyler has also sent to the same museum a skull taken west of the Cape of Good Hope, which agrees, or very nearly so, with the two heads minus the teeth, and the lower jaw, mentioned before.—*Blyth.*

#### 6. *Steno?* *brevimanus*.

Blackish, rather paler below.

*Delphinus brevimanus* (D. à petit pectoral), *Pucheran, Voy. Dumont d'Urville*, t. 21. f. 2, t. 23. f. 7 & 8 (skull).

*Delphinus?* *microbrachium*, *Gray, Cat. Cetac. B. M.* 1850, 119, from *Pucheran*.

The skull named *Dauphin à petit pectoral* in the Paris Museum has the palate flat, rather convex behind. Triangle extended rather in front of the teeth-line. Teeth  $\frac{3}{3}\frac{6}{6}$ . Nose narrowed in front, three-fifths the length, and twice and three-fourths the length of the breadth at the notch. Lower jaw slender in front. Nasal rather high and convex. It may be a *Steno*.

Inhab. Banda, Singapore.

#### 7. *Steno Tucuxi*.

Dark blackish or fuscous. Nose of the skull depressed at the base, convex and attenuated at the tip, rather (one-fifteenth) longer than the length of the head, nearly three times as long as the width at the notch. Frontal triangle elongate, continued considerably in front of the line of the notch. Teeth  $\frac{30.30}{30.30}$ , slender, conical. Lower

jaw rather slender and slightly bent up at the tips. Symphysis rather keeled beneath in front.

Steno Tucuxi, *Gray, Ann. & Mag. N. H.* 1857, xviii. 158.

Inhab. The upper parts of the Amazons River, near Santarem (*Bates*). Called *Tucuxi*.

The males are larger. It does not roll over like the *Bouko*, but comes to the surface to breathe.

	<i>Male.</i>	<i>Female.</i>
	in. lin.	in. lin.
Length of the skull .....	13 0	12 0
Length of the beak .....	7 3	6 6
Length of teeth-line .....	6 0	5 9
Length of lower jaw .....	10 3	9 6
Length of symphysis .....	2 0	1 3
Width of skull .....	6 0	5 6
Width of beak at notch .....	2 6	2 3
Width of forehead over notch .....	4 9	4 6

### 8. *Steno ? fluviatilis.*

Above blackish, a broad band from the eye to the pectoral, and the pectoral fin black. Lower jaw and beneath rosy white, the white bent up so as to form a broad white lobe behind the orbit over the pectoral. Teeth  $\frac{28}{7}$  or  $\frac{29}{8}$  on each side. Dorsal fin moderate, falcate.

*Delphinus fluviatilis*, *Gervais & Delille, Bull. de la Soc. Agric. de l'Herault*, 1853, 148; *Gervais, in Casteln. Voy. Mamm.* 92. t. 19. f. 2; *Hist. Mamm.* ii. 522.

Bufeo negro, *Missionaries of Upper Amazons.*

Bolo preto of the Brazilians, *in Casteln. Hist. du Voy. dans l'Amér. du Sud*, iv. 460, v. 33.

Inhab. Upper part of the River Amazons, near Peru. Probably the same as the former.

An imperfect skin with the ends of the beak of the skull in the Paris Museum. The palate of the beak is flat, without any lateral grooves. The teeth are small, acute, and, like those of *Delphinus Delphis*, without any internal lobe.

### 9. *Steno ? pallidus.*

Teeth  $\frac{31}{1}$  or  $\frac{30}{0}$ . Pale yellowish white above, beneath white. Dorsal fin very low.

*Delphinus pallidus*, *Gervais, Acad. Sci. Montp.* 1855; *Casteln. Voy. Mamm.* 94. t. 19. f. 1; *Ann. & Mag. N. H.* xvii. 521; *Bates, Travels in Brazil.*

Bufeo blanco, *Missionaries of Upper Amazons, Casteln. Hist. du Voy. dans l'Amér. du Sud*, iv. 460.

Inhab. River Amazons. May be the same as *S. Tucuxi*.

10. *Steno? coronatus*.

Black; forehead with two concentric yellow circles. Beak very long. Teeth  $\frac{2}{2}$  $\frac{4}{5}$ . Dorsal fin very minute.

*Delphinus coronatus*, *Fremenville*, *Nov. Bull. Soc. Phil.* iii. 56, 78. t. 1. f. 2, a, B; *Desm. Mamm.* 512; *Gray, Cat. Cetac. B. M.* 132.

*Delphinorhynchus coronatus*, *Lesson, Man.* 405; *Fischer, Syn. Mamm.* 505.

Inhab. Spitzbergen!

“Beak slender, the upper jaw longest. Black, with two yellow concentric circles on the convexity of the forehead. The upper jaw with 15 teeth on each side, the lower with 24, all very acute. The dorsal fin half-crescent-shaped, nearer the tail than the head. The caudal crescent-shaped. The pectoral of a moderate size. Length 36 feet. The skull not known.

“Inhab. Spitzbergen, 1806, near lat. 74°. Found in numerous troops (*Fremenville*). It is singular that no other authors have spoken of it.”—*Cuvier, Oss. Foss.* v. 278.

“b. *Beak scarcely separated from the forehead.*”

11. *Steno? rostratus*. *The Beaked Dolphin*.

“Forehead gradually shelving to the beak” (*Cuv.*). The skull with the nose as long as the brain-cavity. Teeth  $\frac{2}{2}$  $\frac{1}{1}$ — $\frac{2}{2}$  $\frac{3}{3}$ , rather large. Black, lower lip and body beneath rosy white, not separated by distinct lines, lower part of the sides black-spotted.

*Delphinus rostratus*, *Cuv. Ann. Mus.* xix. 9; *R. A.* i. 289; *F. Cuv. Mamm. Lith. t.* ; *Cetac.* 156. t. 10. f. 2; *Schlegel, Dieren van Nederland*, 85. t. 11 (not *Shaw*).

Dauphin de Breda, *Cuv. Oss. Foss.* 278, 296. v. 400. t. 21. f. 7, 8.

*Delphinus Bredanensis*, “*Cuv.*”; *Fischer, Syn.* 505, from *Cuvier, Oss. Foss.*

*Delphinus oxyrhynchus*, *Jardine, Nat. Lib.* t. 27, cop. from *F. Cuv.*

*Delphinus planiceps*, *Breda, Verh. Nederl. Hist.* 1829, 236. t. 1, 2; *Schlegel, Abhandl.* t. 4. f. 8 (teeth).

*Steno? rostratus*, *Gray, Zool. Erebus & Terror*, 43; *Cat. Cetac. B. M.* 1850, 131; *Proc. Zool. Soc.* 1864, 236.

Inhab. North Sea. Holland (*Breda*). Brest (*D'Orbigny*).

“M. Blainville, who observed a skull of this species in the museum of Mr. J. Sowerby, says it had 22 teeth in each jaw, and the symphysis two-thirds the entire length” (*Desm. Dict. H. N.* ix. 160). If this is not a mistake for one-third, it will at once separate it from the other *Stenos*, and connect it with *Pontoporia*, but the figure of the skull in *Cuvier* and *Schlegel* resembles that of the genus *Steno*.

The skulls named *D. rostratus* in the Paris Museum are very like the Museum specimens of *Steno frontatus*. The nose is compressed in front. Teeth  $\frac{2}{2}$  $\frac{1}{1}$ — $\frac{2}{2}$  $\frac{1}{1}$ . Length, entire, 21 $\frac{1}{2}$  inches; nose 12 $\frac{1}{4}$ ; symphysis of lower jaw 5 $\frac{1}{2}$ ; width at preorbital notch 4 inches.

I have not been able to find the skull of this animal, which was in Mr. Sowerby's Museum in Mead Place, Lambeth.



12. *Steno fuscus*. *The Cuban Steno*.

Black above and below (in spirits). Head conical, gradually tapering into a rather long nose, without any separating groove, with five black whiskers on each side. Teeth — ?

*Steno fuscus*, Gray, *Zool. Ereb. & Terr.* t. 26, f. 1 (foetus and tongue); *Cat. Cetac. B. M.* 1850, 131.

Inhab. Cuba (*W. S. MacLeay, Esq.*).

a. Foetus in spirit; not in good state. Presented by *W. S. MacLeay, Esq.*

\*\* *Beak of the skull longer than the brain-case, more or less depressed. Symphysis of the lower jaw moderate.*

## 3. DELPHINUS.

Head longly beaked. Forehead rounded. Nose produced, bald. Dorsal fin falcate, in the middle of the back. Skull with the hinder wings of maxilla horizontal, sometimes thickened on the edge over the orbit. Nose elongate, light, much longer than the head, tapering, depressed in front, broader than high, convex, roundish above, and slightly concave in front of the blowers, nearly parallel on the sides and rounded in front. Teeth  $\frac{4}{0}$  to  $\frac{6}{0}$ , small, conical, extending the greater part of the length of the jaw.

*Delphinus*, Gray, *Spic. Zool.* i. 1828; *Cat. Cetac. B. M.* 1850, 105; *P. Z. S.* 1863; 1864, 236; *Zool. Ereb. & Terr.* 36, 1847; *Wagler, N. S. Amph.* 35.

*Delphinus* (pars), *Linn.*; *Illiger*, 143, 1811.

Most maritime persons call these animals *Bottle-noses*, *Bottle-heads*, *Flounder-heads*, sometimes adding *Whale* to the name. They generally confine the name of *Dolphin* (most used by landsmen) to the *Scomberoid* fish (*Coryphæna*), which changes colour in dying.

In the British Museum there is a foetus, apparently belonging to the *Delphinus Delphis*, figured in the 'Zoology of the Erebus and Terror,' t. 26, with its tongue in detail; it formed part of the collection of Sir Hans Sloane. It differs from the foetus of *Lagenorhynchus acutus* in the nose being more produced (nearly one-third the length of the distance from the end of the nose to the eye); it has seven black rigid bristles on each side; the two front, rather the largest, are on the side of the upper part of the nose, the five hinder forming a descending line nearly parallel to the groove which separates the beak. The tongue is convex on the sides, with a rather narrow flat space on the hinder part, separated from the under sides by a sharp entire edge; the front is rather dilated, sharp-edged, and obscurely crenated.

- a. *Skull round. Triangle not reaching to the teeth-line. Palate convex, with a very concave line on the hinder part of each side. Beak twice as long as the head. Teeth  $\frac{5}{0}$ . No. 1.*
- b. *Skull roundish. Triangle just to the teeth-line. Palate with a deep groove on each side and a high central ridge behind.*

- \* *Beak of skull twice as long as the brain-cavity. Teeth  $\frac{5}{6}\frac{5}{6}\frac{6}{6}$ . No. 2.*  
 \*\* *Beak moderate, once and a half the length of the brain-cavity. Teeth  $\frac{4}{8}\frac{5}{6}$  or  $\frac{5}{6}\frac{6}{6}$ . No. 3.*  
 c. *Skull flattened behind. Triangle to the teeth-line. Palate flat, not grooved on the side. No. 4.*
- 
- a. *Skull round. Triangle not reaching to the teeth-line. Palate convex, with a very concave line on the hinder part of each side. Beak twice as long as head. Teeth  $\frac{5}{6}\frac{6}{6}$ .*

### 1. *Delphinus microps.* *The Small-headed Dolphin.*

Skull small, subglobular. Palate convex. Nose very long, slender, twice as long as the length of the brain-cavity, nearly four times as long as broad at the notch; intermaxillaries convex above, with a broad cavity between them in front, rather contracted in front of the blowers. Teeth  $\frac{4}{8}\frac{6}{6}$ . Maxillaries very spongy. The triangle in front of the blowers short, not nearly reaching to the line of the hinder tooth. Palate with a prominent ridge extending along its hinder two-thirds.

*Delphinus microps, Gray, Zool. Erebus & Terror, 42. t. 25 (skull); Cat. Cetac. B. M. 1850, 126.*

Inhab. Coast of Brazils (*Dr. Dickie*). Near mouth of Rio de la Plata, Mus. Buenos Ayres (*Burmeister*).

- a. Skull — ? From the Haslar Hospital. The specimen figured in the 'Voyage of the Erebus and Terror,' tab. 25. p. 42.  
 b. Skull, larger; the skull behind the frontal longer, slightly compressed. Teeth  $\frac{5}{6}\frac{3}{3}$  on each side. Length, entire, 18 inches; tooth-line  $10\frac{1}{2}$ , beak 12, lower jaw  $15\frac{1}{2}$ ; width at orbit  $6\frac{1}{4}$ , at notch 3, middle of beak  $1\frac{3}{4}$ .

This skull chiefly differs from the type skull of *D. microps* in the back of the skull being much less convex, and in its being of a rather larger size: can this depend on the sex of the specimen?

Dimensions of five skulls, in inches: the 1st is in the Norwich Museum; the 2nd, in the British Museum; the 3rd, in the Museum of the Royal College of Surgeons; the 4th, in *Dr. Dickie's* collection; the 5th, in the Edinburgh College, n. 164.

	1.	2.	3.	4.	5.
	in.	in.	in.	in.	in.
Length, entire	$17\frac{1}{2}$	$15\frac{1}{2}$	15	18	$16\frac{1}{2}$
Length of nose	..	..	$9\frac{1}{2}$	11	$10\frac{1}{2}$
Length of teeth-line	..	..	8	$8\frac{1}{2}$	..
Length of lower jaw	$14\frac{3}{4}$	13	$12\frac{1}{2}$	..	..
Width at notch	..	$2\frac{7}{8}$	$2\frac{1}{2}$	4	3
Width at orbits	..	..	$5\frac{1}{4}$	6	..
Width of middle of beak	$2\frac{1}{4}$	$2\frac{7}{8}$	$1\frac{3}{4}$	$2\frac{1}{4}$	..
Width of intermaxillaries	8	9	..	2	..

Var. 1. Skull in Mus. Coll. Surg. Edin. n. 164. *Barelay* Collection. Head smaller, and the nose rather shorter, only once and three-

fourths the length of the brain-cavity, but quite as long as compared with the width of the notch. Length, entire,  $16\frac{1}{2}$  inches, of beak  $10\frac{1}{2}$  inches; width at notch 3 inches; triangle to the teeth-line rugose. Nose-groove open in front. Teeth  $\frac{5}{8}$ , small, curved.

This skull resembles Schlegel's figure of the skull of *D. longirostris* in general form, but the beak is rather more slender, and the orbits more obliquely truncated in front.

b. *Skull roundish. Triangle just to the teeth-line. Palate with a deep groove on each side and a high central ridge behind.*

\* *Beak of skull twice as long as the brain-cavity. Teeth  $\frac{5.5}{8} - \frac{6.0}{8}$ .*

## 2. *Delphinus longirostris. The Cape Dolphin.*

Black. Dorsal fin large, high. Teeth  $\frac{5.5}{5} - \frac{6.0}{6}$ . Nose three-fifths the entire length. Skull nearly thrice and a half the length of its breadth at the notch.

Delphis, *Gray, P. Z. S.* 1864, 237.

*Delphinus longirostris*, *Gray, Spic. Zool.* 1; *Brookes, Cat. Mus.* 39, 1828; *Cuv. R. A.* i. 288, from *Dussumier, MSS.*; *Schlegel, Abhandl.* t. 1, 2, & 4. f. 1, from *skull of Brookes*; *Faun. Japon.* t. 24; *Gray, List Mamm. B. M.* 105; *Zool. Ereb. & Terr.* 42; *Cat. Cetac. B. M.* 1850, 25; *Pucheran, Rev. & Mag. Zool.* 1856, 315.

*Delphinus Capensis*, *Gray, Spic. Zool.* ii. t. 2. f. 1; not *Cuv. nor Rapp.*

Inhab. Southern Ocean. Cape of Good Hope (*Gray*). Japan and Ceylon (*Schlegel*). Malabar (*Dussumier*).

a. *Stuffed specimen. Cape of Good Hope. Presented by the Trustees of the Royal College of Surgeons. The specimen figured and described in 'Spic. Zool.' and 'Zool. Erebus and Terror.'*

	in.
Length, entire . . . . .	81
Length of beak . . . . .	7
Length to angle of mouth . . . . .	13
Length to blowers . . . . .	$7\frac{1}{2}$
Length to dorsal fin . . . . .	38
Length to pectoral fin . . . . .	21
Length of dorsal . . . . .	12
Length of pectoral . . . . .	13
Breadth of pectoral . . . . .	.5
Breadth of tail . . . . .	26
Circumference . . . . .	42

The figure in the 'Fauna Japonica' is from a drawing by a Japanese artist, made under Mr. Burger's direction.

The skull named *D. longirostris* in the Paris Museum (n. 4), from Malabar, brought by M. Dussumier, 1827, has the palate with a deep groove on each side of a central ridge in the hinder half, slightly keeled behind near the blower; beak long, tapering; nasal convex, rounded. Teeth  $\frac{5.5}{4}$ , small, slightly curved; triangle exactly to the teeth-line.

	in.	lin.
Skull: Length .....	2	0
Length of beak .....	13	9
Width at notch .....	3	2
Width of middle of beak .....	1	7

\*\* *Beak moderate, once and a half the length of the brain-cavity.*

*Teeth*  $\frac{4\frac{5}{8}}{4}$   $\frac{5\frac{0}{8}}{6\frac{0}{8}}$ .

### 3. *Delphinus Delphis.* *The Dolphin.*

Black, sides grey, beneath white; the dorsal moderate. Teeth  $\frac{4\frac{2}{2}}{\frac{5}{3}}$  ( $\frac{5}{3}$ , *Schlegel*). Nose of skull half as long again as the length of the brain-cavity.

*Delphinus vulgaris*, *Lacép. Cét.* 250. t. 14 (skull).

*Delphinus antiquorum*, *Ray, Willughb. Pisc.* t. A 1. f. 1.

*Delphinus Delphis*, *Linn. S. N.* i. 108; *Hunter, Phil. Trans.* 1787, 373, 618; *Bonnat. Cét.* 20. t. 10. f. 2; *Schreb. Säugeth.* t. 343; *Desm. Mamm.* 514; *F. Cuv. Cét.* 123; *Mam. Lith.* t. ; *Jardine's Whales*, t. 23, cop. *Bell's Brit. Quad.* 463. fig.; *Schlegel, Abhandl.* i. 20. t. 4. f. 2 (teeth); *Cuvier, Oss. Foss.* v. 275, 303. t. 21. f. 9, 10; *Gray, Zool. Ereb. & Terror*, 40. t. 26 (tongue and foetus); *Cat. Cetac. B. M.* 1850, 120; *P. Z. S.* 1864, 237; *Schlegel, Dieren*, 82. t. 10; *Turton, B. Fauna*, 17; *Jenyns, Man.* 40; *Fleming, B. A.* 35; *Bell, Brit. Quad.* 463. fig.; *Nilsson, Skand. Fauna*, 591; *Malmgren, Arch. Naturg.* 1864, 88.

*Delphinus*, *Pliny, H. N.* ix. c. 7, 8; *Bellon, Aquat.* 7. fig.; *Rondel. Pisc.* 459. fig.; *Aldrov. Pisc.* 704. fig.; *Willughb. Pisc.* 28. t. A 1. f. 1; *Klein, Misc. Pisc.* ii. 24. t. 3. f. a.

*Dolphin*, *Shaw, Zool.* ii. 507. t. 229; *Borlase, Cornwall*, 264. t. 27. f. 1. *Dauphin ordinaire*, *Cuv. R. A.* i. 278.

*ANAT. Cuvier, Oss. Foss.* v. t. 21. f. 9, 10; *Lacép.* t. 14; *Volkman, Anat. Anim. Tab.* 1831, t. 9. f. 2, 3, 4 (skull); *Spix, Cephalog.* t. 8. f. 8 (skull); *Rapp, Cetac.* t. 1 (skeleton).

Inhab. North Sea. Atlantic Ocean. Mediterranean.

*a, b, c.* Stuffed specimens. English coast. Presented by Messrs. J. and C. Grove.

? *a.* Skull, large.

*b.* Skull, smaller. Australia. Presented by A. Cunningham, Esq.

*c.* Skull. St. Helena. Presented by A. Pearson, Esq.

*d.* Skull. Presented by J. J. Bennett, Esq., F.R.S.

*e-p.* Twelve skulls.

*g.* Skeleton. English coast.

The most prominent difference between the specimens is in the width of the upper jaw in front of the notch, just over the commencement of the teeth-series; but there does not occur any other character in connexion with it. There is also a slight difference in the form of the palate: in *a*, the central ridge is narrow and rounded above behind; in *b* it is broad, flat, sharp-edged, and very deeply concave on the sides, under the edges, but the different specimens vary in this particular. In *d* and *g*, the hinder part of the palate,

near the entrance of the inner nostrils, is sharply keeled; and in  $\alpha$  the two ridges are rounded.

I am by no means certain that, with a larger series of skulls in a perfect condition, and with the animals they belonged to, it might not result that there are more than one species amongst these skulls.

In all these skulls the intermaxillaries are seen below, forming a slender, elongated, triangular space in the front of the palate, and in some the vomer is also more or less seen in the middle of the palate; but the absence or presence of this bone in the palate is of very little consequence, as a character, in this kind.

Measurements of different skulls in the British Museum. The particular localities are unknown.

Delphinus Delphis.	Length, entire.	Length of nose.	Breadth at notch.	Breadth at the commencement of teeth.	Length of nose as compared to width at notch.	Number of teeth.
	in. lin.	in. lin.	in. lin.	in. lin.	in.	
<i>a</i> .....	19 0	12 0	3 10	2 9	3 $\frac{1}{4}$	45
<i>b</i> .....	18 0	11 4	3 10	2 9	3	43
<i>c</i> .....	18 3	11 3	3 8	2 3	3 $\frac{1}{4}$	45
<i>d</i> .....	17 0	10 0	3 4	2 2	3	46
<i>e</i> .....	17 0	10 6	3 6	.....	...	46
<i>f</i> .....	.....	.....	.....	.....	...	...
<i>g</i> .....	17 0	11 0	3 5	2 2	3	45
<i>h</i> .....	17 0	10 6	3 9	2 9	2 $\frac{3}{4}$	46
<i>i</i> .....	18 0	11 6	3 8	2 2	3	50
<i>k</i> .....	17 6	10 6	3 6	2 2	3	48
<i>l</i> .....	16 6	10 3	3 6	2 2	2 $\frac{3}{4}$	46
<i>m</i> .....	17 6	11 6	3 7	2 2	3	48
<i>n</i> .....	18 0	11 0	3 7 $\frac{1}{2}$	2 9	3	43

Cuvier (Oss. Foss. v. 303) described the cervical vertebræ as fused into a single piece, yet in Anat. Comp. i. 105 he states that in the *Dolphins* the atlas and axis only are united, the other cervical vertebræ remaining separate, though extremely thin. Lesson (Cét. p. 226) describes the first six as quite thin in the *D. Delphis*, and the last as somewhat thick. Dr. Jackson, who points out these discrepancies, described the dolphin he examined as having the first and second cervicals scarcely moveable upon each other, and the other five smaller and rather more moveable.—*Bost. Journ. N. H.* v. 155.

The vertebræ are thus enumerated:—

1. Cuvier, *Anat. Comp.* i. 103 ..... 14 dorsal, 52 posterior.
2. Cuvier, *Oss. Foss.* v. 303 ..... 13 " 47 "
3. Lesson, *Cét.* 226 ..... 13 " 52 "
4. Jardine, *Cetacea* ..... 12 " 52 "
5. ? Jackson, *Bost. Journ. N. H.* v. 154 .... 14 " 55 "

Dr. Jackson gives the following description of an American specimen:—

" Dusky black on the back, white on the belly, and lead-coloured on the sides; a dusky line from 1 to 2 inches in width commenced a little above the eye and passing along the sides was lost in the

lead-colour within 18 or 20 inches of the tail, and another much less distinct ran parallel to this. Length  $7\frac{1}{4}$  feet. Forehead convex, divided from the snout by a furrow. Fœtus 38 inches; back dark bluish grey; belly nearly salmon colour; no longitudinal stripes as in the mother, but some very indistinct broad transverse stripes were seen towards the back. Teeth had not yet appeared. Cervical vertebræ 7, dorsal 14, posterior to these 55; the first and second cervicals large and scarcely moveable upon each other, the other five were much smaller and rather more moveable."

Dolphin, *Jackson, Bost. Journ. N. H.* v. 153, 1845.

Inhab. Atlantic Ocean, North America.

"Whales, differing in no appreciable respect from the common dolphin of the British coast, came round us in the high seas of every region of the globe during the voyage. It is widely open to question whether the dolphins of so many distinct climates are not also distinct species, but as long as we are to be guided by general resemblance and are deficient in opportunities of comparing individuals, we must be content to regard them as identical. The contents of the stomach were fish, cuttle-fish, or shrimps. The food contained in the first compartment of the stomach had seldom undergone any change, in the second its digestion had advanced, while in the third and fourth cavities it was reduced to a well-assimilated pulp."—*Bennett, Whaling Voyage*, 238.

Professor Rapp (*Cetac. t. 4*) has described and figured the skeleton. The scapula with a broad dilated coracoid process, and a broad dilatation on the front edge of the condyle. Fingers 5, short; the fourth longest; the third rather short, the fifth shorter; the first very short, shorter than the second. The spinal processes of the dorsal vertebræ with a distinct subbasal anterior process; the caudal vertebræ with a similar process on the hinder part of the spinal process; but the greater part of the lumbar vertebræ are without them; the lateral process of the lumbar vertebræ slender.

The skeleton is also described by Cuvier (*Oss. Foss. v. 303*), and some bones figured (*t. 24*); and by Professor Owen (*Cat. Osteol. Series Mus. Coll. Surg. p. 451. n. 2489*).

Dr. Jackson gives an account of a dissection of a fœtal dolphin taken at Lynn, United States; it was 38 inches long, and the mother  $7\frac{1}{2}$  feet.

Sometimes seen in the fishmongers' shops in London, having been brought to Billingsgate for sale; but their particular habitat is not to be procured, or if one is obtained it is not to be depended on with any confidence, as the animal has generally passed through more than one dealer's hands. There are three specimens in the British Museum, procured at Billingsgate, presented by Messrs. J. & C. Grove.

Mr. Couch says, "They come on the Cornish coast in considerable numbers, more especially when the pilchards and mackerel abound; and not unfrequently are taken in the drift-nets, in the meshes of which they become entangled by the teeth. In the month of September 1845, eight or ten in a day were brought on shore in Mount's Bay for many days in succession."—*Cornish Whales*, p. 39.

According to O. Fabricius, it is not uncommon as far north as Greenland.

M. Gervais states that the species is stationary on the coast of the Mediterranean.—*Comptes Rendus*, 28 Nov. 1864, 876; *Ann. & Mag. N. H.* 1865, 76.

Consult also *Delphinus Delphis*, A. Smith, African Zoology, 125, from the west coast of Africa.

#### 4. *Delphinus marginatus*.

Above black, paler on the head and sides to the middle of the genital region; throat, chest, and abdomen white; edge of the jaws blackish, end black, with a dark band just below the edge of the white on the side, which is rather wider near the vent, with two streaks from the eye to the base of the pectoral, and a streak on the under side bent down behind the base of the pectoral. Beak slender. Teeth  $\frac{33.34}{43.42}$ , larger than those of *D. Delphis*.

*Delphinus marginatus*, Duvernoy, in Pucheran, *Rev. & Mag. de Zool.* 1856, 346. t. 25; Desmarest, *Ency. d'Hist. Nat. Mamm.* v. 284. t. 29. f. 1; *Arch. Naturg.* 1857, 26.

Inhab. Dieppe: two specimens in Mus. Paris.

See also

a. *Delphinus Algeriensis*, Loche, *Rev. & Mag. Zool.* 1860, t. 22. f. 1; *Arch. Naturg.* 1861, 113.

Beak thick. Sides with a narrow streak from the eyes to the tail, curved down over the end of the pectoral. Teeth  $\frac{49.49}{45.45}$ .

Inhab. Mediterranean; coast of Algiers.

b. *Delphinus Mediterraneus*, Loche, *Rev. & Mag. Zool.* 1860, 475. t. 22. f. 2; *Arch. Naturg.* 1861, 113.

Beak slender. Sides with a streak from the eyes nearly to the tail, which is curved down nearly over the base of the pectoral fin. Teeth  $\frac{41.41}{41.39}$ .

Inhab. Mediterranean.

#### 5. *Delphinus Janira*. *The Janira*.

Skull roundish; nose depressed, half as long again as the head; triangle rather in front of the tooth-line; intermaxillaries very convex behind, with a wide groove between, above in front; palate with very wide, deep grooves on each side, extending two-thirds of the length, centre ridge flattened in the middle, the intermaxillaries forming a long triangle in front. Teeth  $\frac{43}{42}$ .

*Delphinapterus Peronii*, *Mus. Bristol Institution*.

*Delphinus Janira*, Gray, *Zool. E. & T.* 41. t. 23 (skull); *Cat. Cetac. B. M.* 1850, 123.

Inhab. Newfoundland. Skull. Presented to the Bristol Institution by G. Thorne, Esq.

	in.	lin.
Skull: Length, entire . . . . .	17	10
Length of head . . . . .	6	1
Length of nose . . . . .	11	9
Length of lower jaw . . . . .	12	6
Width at orbit . . . . .	7	8
Width at notch . . . . .	4	3
Width at middle of beak . . . . .	2	5

This skull differs from that of *D. Delphis* of the Atlantic in the beak being much shorter and narrower.

### 6. *Delphinus Novæ Zealandiæ*. *The New Zealand Dolphin*.

Teeth  $\frac{43}{47}$ . Body elongated, rounded in front. Nose cylindrical, rather flattened above. Black-brown, edge of the upper jaw and beneath dull white, a yellow band from the eye along the side to below the dorsal; tail slate-colour; pectoral and dorsal dull white, the latter dark-edged. Skull — ?

*Delphinus Novæ Zealandiæ*, *Quoy et Gaim. Voy. Astrol.* 49. t. 28;  
*Gray, Zool. E. & T.* 41; *Cat. Cetac. B. M.* 1850, 123.

Inhab. New Zealand, near Cape Gable, and Bay of Talago.

- a. Skull, from Antarctic Expedition. Length 14 inches, of nose 8 inches, lower jaw 12 inches, width in middle of beak 1 inch 9 lines. Is very like figure of skull of *D. Janira*.
- b. Skeleton. Antarctic Seas. Antarctic Expedition. Presented by the Lords of the Admiralty.

Form elongate, rounded in front, with a cylindrical beak, flattened above and pointed. The lower jaw projects beyond the upper. The forehead is gradually rounded, and forms on the middle of the beak a well-marked prominent ridge. The sides are well rounded. The lobes of the tail are flattened, with a compressed keel between their base and the dorsal fin. The dorsal large, triangular, rounded at the tip; the caudal is small, nicked, and cordate in the middle; the pectoral moderate, falciform. Above black-brown, like polished leather; the belly, and the edge of the upper jaw and the whole of the lower dull white. A broad yellow band commences at the eye, narrows on the sides, and ends below the dorsal. The tail slate-colour. The pectorals are lead-white, like the middle of the dorsal, with black edges. A black line from the upper part of the head, enlarging, and enclosing the eye, which is bordered above and below with a white line. The eye large, black. The lower jaw with small rings of pores, and the body with small plates of regularly twisted white striæ. Teeth small and pointed,  $\frac{43}{47} \cdot \frac{43}{47} = 180$ .

Length 5 feet 10 inches, circumference 2 feet 11 inches, length from muzzle to blower 1 foot 1 inch, to eye 1 foot, to dorsal 2 feet  $8\frac{1}{2}$  inches, to base of pectoral 1 foot 5 inches, of hips  $10\frac{1}{2}$  inches, from middle of dorsal to tail 2 feet 5 inches, from vent to caudal 1 foot 1 inch, length of pectoral 9 inches.



The following is probably the same:—

Dauphin à bande fauve, *Voy. Pole Sud*, t. 21. f. 1, t. 23. f. 1, 2 (not described).

Skull (in the figure) rather suddenly contracted behind; nose seven-elevenths of the entire length of the skull, and twice and three-fourths the breadth at the notch; intermaxillaries convex. Teeth  $\frac{47}{4}$ . Skull so named in Mus. Paris has a deep groove on each side the palate, and the triangle to the teeth-line.

Inhab. Van Diemen's Land.

### 7. *Delphinus albimanus*.

Snout, head, back, tail, and dorsal fin blue-black; belly and pectoral fin white; sides pale tawny; eyes small, brown, and surrounded with a black ring, which joins the black of the snout; body between the dorsal fin and tail very much compressed. Teeth  $\frac{43 \cdot 43}{47 \cdot 47}$ .

*Delphinus albimanus*, Peale, *Zool. Expl. Exped. Mamm.* 33 (ed. 1, 1848); Cassin, *U. S. Expl. Exped. Mamm.* 29. t. 6. f. 1.

Inhab. Coast of Chili.

“Total length 6 feet 6 inches, snout  $5\frac{3}{4}$  inches; dorsal fin, measured along the front edge,  $9\frac{1}{2}$  inches; tail 6 inches long, 4 inches wide; from the end of the snout to the eye 12 inches; body 6 inches; above the tail, when most compressed,  $1\frac{1}{2}$  inch wide; circumference in front of dorsal fin  $40\frac{1}{2}$  inches. Weight estimated to be 150 pounds.

“The specimen was a female. Its *uterus* contained a single foetus, which was a male, of a reddish flesh-colour, and about 9 inches long. The stomach contained fragments of cephalopod mollusca only. It was harpooned from the bows of the U. S. ship ‘Peacock,’ on the coast of Chili, latitude  $27^{\circ} 16' S.$ , and longitude  $75^{\circ} 30' W.$ , on the 12th of June.”

“This species was captured by the Expedition on the coast of Chili. Its locality therefore is widely different from that of the species of which we have cited the name provisionally and inquiringly as a synonym, and which, as its name implies, is from the coast of New Zealand. We are, however, inclined to suspect that they are identical, on grounds which will be apparent on comparison of our plate with that in the Zoological Atlas of the ‘Voyage of the Astrolabe,’ Mammifères, pl. 28. figs. 1 & 2, or in Schreber's Säugethiere, pl. 357. The small circular openings on the throat of *D. Novae Zelandiae*, represented in the plate of the ‘Voy. Astrolabe,’ just cited, and particularly in fig. 2, and called “pores,” by Messrs. Quoy and Gaimard, we regard as very probably the work of a parasitic animal infesting it. The fact that these orifices are placed with entire irregularity is, in our opinion, fatal to the supposition that they are a character of the animal. Their absence in the present species is probably a consideration of no moment in the question of identity. The dentition of the two species is stated by their describers as exactly the same.”

### 8. *Delphinus Forsteri*. *Forster's Dolphin*.

Greenish brown or rust-coloured, beneath white; a small white spot on the disk of the dorsal and pectoral fin. Teeth  $\frac{44}{44}=176$ , acute, erect, conical, incurved. Skull — ?

*Delphinus Delphis*, *Forster, Descript. Anim.* 280; *Icon. ined. Brit. Mus.* t. 31.

*Delphinus Forsteri*, *Gray, Zool. Ereb. & Terror*, 42. t. 24 (from *Forster*); *Cat. Cetac. B. M.* 1850, 124.

Inhab. Pacific Ocean, between New Caledonia and Norfolk Island (*Forster*, 1774).

“Body straight, round, thickest behind; the pectoral fin tapering at both ends; head rounded, shelving in front, beaked; beak straight, pointed, cylindrical, depressed, attenuated and blunt at the tip; upper jaw shorter, both blunt, toothed; eyes small, lateral, oblong, nearly in the middle of the side, near the gape of the mouth; a small hole (the ears) above and behind the eyes; blower single, between the eyes in crown, lunate; a linear abdominal slit a little behind and beneath the dorsal fin, the front part the vulva, the hinder the vent; teats 2, one on each side the vulva, with a nipple the size of a pea; tail compressed on the sides, keeled above and below, and attenuated towards the tip; pectoral fin lanceolate, scarcely as long as the beak; dorsal fin in the middle of the back, nearly three-sided, falcate behind, as long as the beak; tail horizontal, two-lobed, each lobe oblong, lateral, subfalcate.

“Gregarious, swimming very rapidly around the ships and boats.

“Length 6 feet from nose to tail.”—*Forster*.

This species resembles, in the distribution of its colouring, the *Dauphin à bande fauve* (*Voy. Pole Sud*), but the band on the side is whitish, not fulvous.

### 9. *Delphinus Sao*. *The Sao*.

Skull: beak elongate, shelving on the sides, with central cartilage near half its length in front; triangle to the teeth-line; teeth  $\frac{53}{51}-\frac{52}{51}$ , small, cylindrical, hooked; palate flat in front, with a broad groove extending nearly half its length behind; intermaxillaries and palatine distinct, former broad in front; lower jaw slender, shelving, and flat-sided in front. Length 17 inches, teeth-line  $8\frac{3}{4}$  inches, beak  $10\frac{1}{2}$  inches, width at notch  $3\frac{1}{2}$ .

*Delphinus Sao*, *Gray, Cat. Cetac. B. M.* 1850, 125.

Inhab. Madagascar (*Dussumier*, 1838). Skull, Mus. Paris.

### 10. *Delphinus Frithii*.

*Delphinus Frithii*, *Blyth, Rep. Asiatic Soc. Calcutta*, 12; *Journ. A. S. B.* xxviii. 192; *Cat. Mus. Asiatic Soc. Bengal*, 91.

Inhab. “Procured during a voyage from England to India” (*R. W. G. Frith, Esq., Journ. Asiatic Soc.* xvi. 386).

Skull in the Museum of the Asiatic Society of Calcutta, presented by Mr. Frith, and probably an undescribed species, with a general

resemblance to that of *Delphinus Delphis*. The intermaxillaries, united as far as the middle of the *rostrum*, are vaulted, so that the section of their united middle portion forms a complete semicircle; arising abruptly from the maxillaries, and being there only as broad as the exposed portion of each maxillary: probably a distinctive specific character. Teeth  $\frac{52 \cdot 55}{50 \cdot 50}$ .

### 11. *Delphinus perniger*.

*Delphinus perniger*, *Elliot, Journ. Asiatic Soc.* xvii. 250, xxviii. 491; *Blyth, Rep. Asiat. Soc. Calcutta*, 11; *Cat. Mus. Asiat. Soc. Bengal*, 91.

Teeth large.

Inhab. Bay of Bengal.

A stuffed specimen of this small Cetal is in the Museum of the Asiatic Society, Calcutta. Presented by the Hon. Walter Elliot of the Madras Civil Service, 1848.

"This species is distinct from any of those described by Dr. Gray, and having the teeth proportionally large."—*Blyth*.

c. *Skull flattened behind. Triangle to the teeth-line. Palate flat, not grooved on the side. Clymene.*

### 12. *Delphinus Clymene*.

Skull rather depressed, the hinder part slightly convex; nose rather depressed, shelving on the sides; intermaxillaries convex, with an elongated groove between them in front, three-fifths the entire length, twice and a half the length of the width at the notch; the triangular impression in front of the blower rather elongate, produced a little beyond the line of the hinder tooth, rugose in front, with oblique grooves on each side. Teeth  $\frac{40}{40}$ , small, slightly incurved, acute, six in an inch.

*Clymene*, *Gray, P. Z. S.* 1864, 237.

*Delphinus Clymene*, *Gray, Cat. Osteol. Spec. B. M.* 35; *Cat. Cetac. B. M.* 1850, 115.

*Delphinus Metis* (No. 2), *Gray, Zool. Erebus & Terror*, 39 (not No. 1, nor figure).

Inhab. — ?

	in.	lin.
Skull: Length, entire . . . . .	15	7
Length of head . . . . .	6	3
Length of nose . . . . .	9	4
Length of teeth-line . . . . .	7	4
Width of temple . . . . .	6	10
Width at nostril . . . . .	3	7
Width at middle of beak . . . . .	2	2
Width of intermaxillaries . . . . .	1	0

This species is like the *D. Doris* in size, but the skull behind the frontal ridge is much flatter and gradually shelving to the *foramen magnum*, and the beak is more depressed.

Var. In the Museum of the Bristol Institution there is an imperfect skull, apparently of this species, which differs in the nose being about three-quarters of an inch shorter, and rather narrower. It has 36 teeth in the upper jaw.

	in.	lin.
Skull: Length of nose . . . . .	8	7
Width at notch . . . . .	3	8
Width at middle of nose . . . . .	2	0

A lower jaw is fitted to it, which has no teeth and a short gonyx, but it is doubtful if it belongs to the same animal; its length is  $12\frac{1}{4}$  inches, symphysis  $1\frac{1}{2}$  inch.

A second skull in the same collection is very similar, and has  $\frac{38}{8}$  teeth.

	in.	lin.
Skull: Length, entire . . . . .	15	0
Length of nose . . . . .	9	0
Width at notch . . . . .	3	4
Width at middle of nose . . . . .	1	10

This skull only differs from the former in the lower jaw being slenderer and united by a longer symphysis in front. Lower jaw  $12\frac{1}{2}$  inches long; symphysis 2 inches.

These are probably indications of two other species. The hinder part of the skull of the latter is also rather more convex than the same part in *D. Pherusa*.

In the description of this species in the 'Zoology of the Erebus and Terror,' *D. Metis* is mentioned in three places instead of *D. Doris*.

### 13. *Delphinus Styx*. *The Styx*.

Skull roundish, flattened behind; nose depressed, convex in the middle, shelving on each side, longer than the head, five-ninths the entire length, nearly twice and a half as long as the width at the notch; the triangular impression just to the line of the hindermost teeth. Teeth  $\frac{4}{2}$ , slender, subcylindrical, acute, about five in an inch; palate nearly flat; lower jaw rather produced and rounded in front.

*Delphinus Styx*, Gray, *Zool. E. & T.* 40. t. 21 (skull); *Cat. Cetac. B. M.* 1850, 117.

Inhab. W. Africa (*Capt. W. T. W. Owen, R.N.*).

Skull in Mus. United Service Institution:—		
	in.	lin.
Length, entire . . . . .	18	0
Length of nose . . . . .	10	3
Length of lower jaw . . . . .	14	9
Width at the notch . . . . .	4	6
Width at the orbit . . . . .	8	6
Teeth . . . . .	$\frac{42}{2}$	

This species is very like *D. Euphrosyne*, but is somewhat smaller and the beak rather shorter: it may prove to be only a variety.

14. *Delphinus Tethyos*.

*Delphinus Tethyos*, *Gervais, Bull. Soc. Herault*, 1853, 140. t. 1. f. 14 (skull); *Bull. Soc. Philom. Extr. Proc. Verb.* 1853, 23; *L'Institute*, 1853, xxi. no. 1001. 85; *Bull. Sci. Nat.* 1853, xx. 289.

*Orca Tethyos*, *Gerard, Cat. Osteol. Mamm. B. M.* 155.

Inhab. Mediterranean; Department of Herault (*Gervais*).

Two specimens of *Delphinus Tethyos* have been taken, one at the mouth of the Orb Herault in 1852, and the other in the vicinity of Port Vendres, Pyrénées Orientales, of which the skull is in the collection of Dr. Pinchenat (*Gervais, Comptes Rendus*, 28th Nov. 1864, 876; *Ann. & Mag. N. H.* 1865, 76). The groove on the side of the palate does not exist in *D. Tethyos*.

15. *Delphinus Euphrosyne*. *The Euphrosyne*.

Skull round, flattened behind; nose broad and tapering in front, depressed, flat at the base, shelving on the sides and rounded in the middle above, about half as long again as the head, or three-fifths the entire length, and twice and a half the length of the width at the notch. Teeth  $4\frac{5}{2}$ , slender, elongate, slightly curved, acute. The intermaxillaries are convex and rounded above, with a wide groove between them for half their length in front.

*Delphinus Euphrosyne*, *Gray, Cat. Ost. Spec. B. M.* 147; *Zool. Erebus & Terror*, 40. t. 22 (skull); *Cat. Cetac. B. M.* 1850, 117; *Nilsson, Skand. Fauna*, i. 595.

*Delphinus Styx* (pars), *Gray, Cat. Osteol. Spec. B. M.* 38.

*Delphinus Hölbölli*, *Fischricht, Naturf. möt i Köpenh.* 1847, fide *Nilsson*.

*Delphinus Delphis*, *Cat. Mus. Coll. Surg.* 161. n. 1117.

Inhab. North Sea. Coast of England. South Atlantic. Near mouth of Rio de la Plata, Mus. Buenos Ayres (*Burmeister*).

Skull, Mus. Norwich:—

	in.	lin.
Length, entire .....	18	6
Length of head .....	7	4
Length of nose .....	11	3
Length of lower jaw .....	16	0
Length of temple .....	9	6
Width at notch .....	4	6
Width at middle of beak .....	2	4
Width at temples .....	8	3

a. Skull, imperfect behind. Specimen figured in 'Zool. Erebus and Terror,' t. ined.

This skull only differs from the one at Norwich in being rather smaller in all its dimensions.

	in.	lin.
Length, entire .....	17	6
Length of nose .....	10	3
Length of lower jaw .....	14	3
Width at notch .....	4	3
Width at orbit .....	7	6
Teeth .....	$4\frac{5}{1}$	$4\frac{5}{1}$

This and the former species are very like *D. Clymene*, but are broader and more depressed; the intermaxillaries are more convex, especially behind, and form a regular defined front edge to the triangle, which is rough in front, and marked with oblique cross grooves, while in *D. Clymene* the triangle is furnished with an acute, raised margin on each side in front.

A skull in Mus. Coll. Surgeons (*Delphinus Delphis*, Cat. Mus. Coll. Surg. 161. n. 1117), with the palate convex, not grooved on the side; intermaxillary and vomer forming part of the palate; teeth  $\frac{4}{3}$ ; obtained from the Leverian Museum in 1806, may be another variety.

	in.	lin.
Skull: Length, entire .....	16	0
Length of nose .....	10	0
Length of lower jaw .....	13	3
Width at notch .....	3	6

Professor Nilsson thinks that *D. Doris* (Gray), *D. pseudodelphis* (Schlegel, Abhandl. i. 22), and *D. dubius* (Cuvier, Mus. Paris), all probably belong to this species.—*Skand. Fauna*, i. 598.

There is a skull from the Bay of Bengal in the Museum at Calcutta, which Mr. Blyth has named *Delphinus Eurynome*, Gray (Blyth, Cat. Mus. Asiat. Soc. Bengal, 90). Inhab. Bay of Bengal.

Professor Burmeister informs me that he has a skull of this species, in the Museum of Buenos Ayres, taken at the mouth of the Rio de la Plata. I think it very probable that when the skulls from India, the North Sea, and La Plata are compared, they may prove to be distinct; or there may be some confusion in the habitats.

### 16. *Delphinus Alope*. *The Alope*.

Skull moderate; beak elongate, depressed, once and three-quarters the length of the brain-cavity, rather more than three times the width at the notch; intermaxillaries convex, rounded, with a very narrow cavity between them; maxillaries spongy, shelving; triangle elongate, reaching just beyond the tooth-line, rugose. Teeth very slender,  $\frac{4}{8}$ ; palate rather convex; lower jaw slender; gonyx keeled, short.

*Delphinus Alope*, Gray, *Zool. Erebus & Terror*, t. ined.; *Cat. Cetac. B. M.* 1850, 118.

Hab. —?

a. Skull —? Mr. Warwick's Collection.

Skull: length, entire,  $16\frac{3}{4}$  inches; of nose,  $10\frac{3}{4}$  inches; skull, 6 inches; width at orbit, 6 inches; at notch,  $3\frac{1}{2}$  inches; at middle of beak, 2 inches.

### 17. *Delphinus fulvifasciatus*.

Blackish; side of back fulvous; throat and beneath white; beak, orbit, streak from angle of mouth to pectoral fin, and pectoral fin

blackish. Beak of skull more than half as long again as the brain-cavity. Teeth  $\frac{47 \cdot 47}{44 \cdot 44}$ .

*Delphinus fulvifasciatus*, Pucheran, Voy. Dumont d'Urville, Mamm. t. 21. f. 1, t. 23. f. 1, 2 (skull).

Inhab. Van Diemen's Land.

### 18. *Delphinus dubius*.

Beak of skull depressed, like *D. Delphis*, but rather shorter; the teeth small and sharp,  $\frac{3}{7}$ , thin, pointed.

*Delphinus dubius*, Cuv. R. A. i. 288; F. Cuv. Mamm. L'ith. t. ; Cétac. 154; Ann. Mus. xix. 14; Gray, Cat. Cétac. B. M. 1850, 119.

I found three skulls under this name in the Paris Museum.

1. "D. dubius, Cuv. n. 10." (Mus. Paris.)

Skull: length (in inches and lines) 15·3, of beak 10·0, width at notch 2·9, at middle of beak 1·7; teeth  $\frac{4}{7}$  or  $\frac{4}{7}$ ; palate flat, rather convex; lower jaw flat, obliquely in front and keeled in front beneath.

2. "D. dubius, Cuv. n. 2." (Mus. Paris.)

Skull: length 16·6, of beak 10·0, of teeth-line 8·6, width at notch 3·8, at middle of beak 1·7½; teeth  $\frac{3}{4}$  or  $\frac{3}{4}$ , small, hooked; palate flat, rather convex; beak tapering in front, reflexed before the notch; intermaxillaries rather convex; triangle extending rather in front of the teeth-line, rugose in front.

3. "D. dubius, Cuv. n. 7." (Mus. Paris.)

Skull, from the Cape de Verd: length 16·0, of beak 9·4, of teeth-line 7·6, width at notch 3·7½, at middle of beak 1·4; teeth  $\frac{3}{7}$ — $\frac{3}{7}$ ; triangle scarcely extended in front of the teeth-line; palate flat; lower jaw oblique, compressed and flat on the sides, rather turned up at the tip; intermaxillaries convex behind; nose tapering in front.

This last is perhaps *D. frontalis* (Dussum. Cuv. R. A. i. 288; Pucheran, Rev. & Mag. Zool. 1856, 449).

"Black, belly white, with a lead-coloured band from angle of mouth to pectoral.

"Inhab. Cape Verd."

M. Pucheran observes, from the examination of the bones, that he believes that *D. frontalis* differs more from *D. dubius* than from *D. frænatus*. In the skulls of all the three specimens the palate is flat; but in *D. frontalis* the beak is longer than in *D. dubius*, and the anterior groove of the intermaxillaries is more open and more prominent. The skull of *D. frænatus* resembles that of *D. dubius* in the length of the beak. (See *l. c.* pp. 459, 460.)

*Delphinus dubius*.—This skull differs from that of *D. Delphis*, as Cuvier has observed, by the appearance of the vomer in a longitudinal space on the palate between the maxillaries and premaxillaries. The palatal prominence formed by the palatine bone is broader and shorter, and the grooves on each side are shallower and much

shorter, not extending forward beyond the last four alveoli. The cranium is more convex behind, especially in the vertebral direction, than in the *D. Delphis*, and the supraoccipital ridge bends forwards towards the rudimental nasal bones. Alveoli in number 2494:  $\frac{40 \cdot 40}{40 \cdot 40} = 160$ ; in number 2495:  $\frac{51 \cdot 51}{50 \cdot 50} = 102$ ." (202?)

*Delphinus plumbeus*.—The adult specimen of *D. plumbeus*, figured by F. Cuvier (Mamm. Lithog.), is in the Paris Museum. M. Pucheran describes it at length.

M. Pucheran (Rev. & Mag. de Zoologie, 1856, pp. 148 & 315) gives some additional particulars of the specimen received from M. Dussumier in the Paris Museum, on which this species was originally described, and corrects some part of the description of M. F. Cuvier. He describes it thus:—" *Delphinus plumbeus*, Duss. Adulte. Taille grande; couleur de cors gris plombé; extrémité et dessous de la mâchoire inférieure blanchâtre; nageoire dorsale peu élevée mais allongée; nageoire, pectoral et caudal bien étalées et bien développés; formule dentaire  $\frac{36-37}{32 \cdot 33-34 \cdot 37}$ ; jeune bord de la mâchoire supérieure et dessous du corps jusqu'à la moitié de la queue de couleur blanchâtre.

"Hab. Côte de Malabar."

The *Delphinus plumbeus*, although very common on the Malabar coast and Penang, and rather heavy in its movements, is rarely captured, except by chance in fishing-stakes. It is called *Parampuan Laut* by the Malays of the Peninsula.

"The stomach of a single young specimen observed contained remains of small fish, apparently *Clupea* and *Glyphisodon caelestinus*, Cuvier."—Cantor, *Malay Mammalia*, Journ. Asiat. Soc. xv.

#### 19. *Delphinus lateralis*.

*Delphinus lateralis*, J. Peale, *U. S. Expl. Exped.* 35 (t. 8. f. 1. ined.); Gray, *Cat. Cetac. B. M.* 133.

Snout small; body thick, but much compressed behind the dorsal; light purplish grey beneath, while a dark lateral line edged with spots separates the colours of the upper and under parts of the body; a separate line, paler in colour, branches from the lateral line opposite the pectoral fin and passes downwards and backwards; another connects the eye and pectoral fin; fins and snout black. Teeth  $\frac{41}{41}, \frac{41}{41} = 164$ . Length 90 inches.

Inhab. Pacific Ocean, lat. 13° 58' N., long. 161° 22' W.

#### 4. TURSIO.

Head shortly beaked; forehead convex. Nose short, bald. Dorsal fin falcate, near the middle of the back. Skull with the hinder wing of the maxilla horizontal, somewhat thickened over the orbit edge. Nose of skull moderate, scarcely produced, depressed, scarcely or not so long as the brain-cavity. Triangle on hinder part of the beak, elongate, produced before the teeth-line. Teeth  $\frac{24}{4}$  to  $\frac{40}{4}$ ,



small, conical, extending the greater part of the length of the jaws. Palate flat.

Grampus, sp., *Gray, Spic. Zool.* 2, 1828.

Delphinus § a (Tursio), *Gray, Zool. Ereb. & Terr.* 36, 1817; *Cat. Cetac. B. M.* 105, 1850; *P. Z. S.* 1863; 1864, 236.

Cephalorhynchus, *F. Cuvier, Cétac.*

Delphinus § Cephalorhynchus, *Gray, Cat. Cetac. B. M.* 106.

Tursiops, *Gervais, Mamm.* 323.

- I. *Beak short. Rostrum of skull expanded over the orbits, thick, conical, convex above, half as long as the head.*
- Rostrum of skull slender, subcylindrical. Nos. 1, 2.*
  - Rostrum of skull rather thick, conical, evenly tapering. Nos. 3, 4.*
  - Rostrum of skull rather thick, and rather swollen on the sides. 5, 6, 7, 8.*
- II. *Beak short. Rostrum of skull very broad, half as long as the head, shelving on the side. Skull shelving over the orbits. Eutrope.*
- III. *Beak scarcely produced. Rostrum of skull rather depressed, scarcely longer than the brain-cavity, convex. Skull expanded over the orbit. Teeth  $\frac{24}{24}$ — $\frac{30}{30}$ .*
- I. *Beak short. Rostrum of skull thick, conical, convex above, half as long as the head. Tursio.*

*Tursio, Gray, Zool. Ereb. & Terr.* 37; *Cat. Cetac. B. M.* 1850, 109.

*Cetus, sp., Brisson.*

a. *Rostrum of skull slender, subcylindrical. Teeth  $\frac{36}{36}$ — $\frac{45}{45}$ .*

#### 1. Tursio Doris. *The Doris.*

Skull roundish; rostrum depressed, four-sevenths of the entire length, and twice and one-third the length of the width at the notch, concave behind, rounded on the sides, convex in the middle of the central ridge, flattened in front; intermaxillaries convex, especially in the middle of their length, with a groove between them in front; an irregular impression in front of the blower, rather clongate, extending a little before the line of the hinder teeth. Teeth  $\frac{35}{5}$  or  $\frac{36}{6}$ , slender, conical, incurved, acute; lower jaw slender, very obliquely truncated; palate rather convex in front, tapering, shortly grooved behind.

Delphinus Doris, *Gray, Cat. Osteol. B. M.* 36; *Zool. Erebus & Terror*, 39. t. 20 (skull); *Cat. Cetac. B. M.* 1850, 114.

Inhab. — ?

- a. Skull — ? The specimen figured in the ‘Voyage of the Erebus and Terror,’ t. 20.

	in.	lin.
Skull: Length, entire	17	4
Length of head	7	3
Length of nose	10	1
Length of teeth-line	9	2
Width at temples	7	9
Width at nostrils	4	4
Width at middle of beak	2	4
Width at intermaxillaries	1	1

b. Skull. From Haslar Hospital.

c. Skull.

This species, in the slenderness and length of the beak and number of teeth, forms the passage between this and the next section.

In the Ipswich Museum there is a skull of a species allied to this, if not the same. The beak is twice and a half as long as wide at the notch; intermaxillaries convex, solid, with an elongate lanceolate space in front; triangle elongated, about one-third before the end of the tooth-line, rugulose; lower jaw slender in front, slightly truncated; back of the head convex, rounded; palate flat, rather concave in the middle of the front part. Teeth  $\frac{3}{3}$ .

	in.	lin.
Length, entire	16	0
Length of lower jaw	13	3
Length of beak	9	3
Width at notch	3	6
Width at orbits	7	9

## 2. *Tursio frænatus*. *The Bridled Dolphin*.

Blackish, paler on the sides, the belly white, end of tail black beneath; head black; sides ashy, with a dark band from the angle of the mouth under the eye.

*Delphinus frenatus*, *F. Cuv. Mamm. Lith. t.* ; *Cétac.* 158. t. 1. from *Dussumier's description and drawing*; *Pucheran, Rev. & Mag. Zool.* 1856, 449; *Gray, Cat. Cétac. B. M.* 1850, 115.

Inhab. Cape de Verd.

Skull in the Paris Museum, from Cape de Verd, sent by Dussumier. Length 18 inches, of beak 8·3, width at notch 3·5, of middle of beak 1·11. Teeth  $\frac{3}{3}$ , rather larger than in *D. dubius*; palate smooth; intermaxillaries large, expanded; nasal convex beneath; triangle rather extended in front of the teeth-line, rugose, and rather more so than in *D. dubius*. There is a second skull marked *D. frenatus*, No. 2; width at notch 3·7; teeth  $\frac{3}{5}$  or  $\frac{3}{5}$ ; palate flat; nasal very convex, especially behind; triangle extending rather in front of the teeth-line, very rugose; jaws rather strongly reflexed in front of the notch.

b. *Rostrum of skull rather thick, conical, evenly tapering.*

## 3. *Tursio Metis*. *The Metis*.

Skull globular; back of blower tubercular; rostrum thick, conical, regularly tapering, upper part convex, longer than the head and more than twice as long as the width at the notch; intermaxillaries convex, more than half the width at the beak. Teeth  $\frac{2}{2}$ , conical, acute, curved.

*Delphinus Metis*, *Gray, Cat. Osteol. B. M.* 36; *Zool. Erebus & Terror*, 38. t. 18 (skull); *Cat. Cétac. B. M.* 1850, 113.

Inhab. — ?

a. Skull. The specimen figured in the 'Voyage of the Erebus and Terror.'

	in.	lin.
Skull: Length, entire .....	21	0
Length of nose .....	11	9
Length of lower jaw .....	17	0
Breadth at orbit.....	9	6
Breadth at notch .....	5	0
Breadth at middle of beak.....	3	0

This skull is like that of *D. Euphrosyne*, but differs in the nose being rather shorter compared with the length of the head, more tapering, and the teeth rather larger. It differs from *Delphinus Tursio's* in the nose being much shorter and more conical and acute.

#### 4. Tursio Cymodoce. *The Cymodoce.*

Skull roundish; rostrum broad, rounded above, broad at the base, gradually tapering in front and convex on the sides, one-twelfth longer than the head—or more than half the entire length, and more than twice as long as the width at the notch; the triangular impression in front of the blowers elongate, extended beyond the line of the hinder teeth. Teeth  $\frac{2}{1}$ , moderate, conical, slightly incurved, acute, more than three in one inch; lower jaw regularly converging, straight on the sides, the front obliquely truncated, and the gonyx slightly produced.

*Delphinus Cymodoce*, Gray, *Cat. Osteol. B. M.* 35; *Zool. Erebus & Terror*, 38. t. 19; *Cat. Cetic. B. M.* 1850, 113.

Inhab. — ?

a. Skull — ? The specimen figured in the 'Voyage of the Erebus and Terror,' t. 19.

	in.	lin.
Skull: Length, entire .....	18	6
Length of head .....	8	6
Length of nose .....	10	0
Length of teeth-line .....	7	9
Length of lower jaw .....	15	0
Width of temple.....	8	6
Width of notch .....	4	9
Width at middle of nose .....	2	8
Width of intermaxillary .....	1	7

This skull is very like *D. Metis*, but much smaller, and the beak more conical.

c. *Beak of skull rather thick, and rather swollen on the sides. Teeth  $\frac{2}{0} - \frac{3}{0}$ .*

#### 5. Tursio? Guianensis. *The Guiana Dolphin.*

Teeth  $\frac{2}{3}$  .  $\frac{2}{3}$  or  $\frac{3}{0}$  .  $\frac{3}{0}$ .

*Delphinus Guianensis*, Van Beneden, *Mém. Acad. Roy. Brux.* 1862, xvi. t.

Inhab. British Guiana (*Van Beneden*). From Mus. Stutgardt.

6. *Tursio truncatus*. *Bottlenose Dolphin*.

Black, whitish beneath. Teeth  $\frac{21}{2}$ , truncated when old; skull-nose five-ninths of the entire length; intermaxillaries very convex, forming a strong rib on each side above; intermaxilla and vomer forming part of the palate.

Delphinus Tursio, *O. Fabr. Fauna Græc.* 49; *Wright, Mag. N. H.* ii. 609, 1838; *Bonnat. Cétac.* 21. t. 11. f. 1; *Schreb. Säugeth.* t. 344; *Desm. Mamm.* 514; *Fischer, Syn.* 508; *Gray, Zool. Erebus & Terror*, 37. t. 10 (animal); *Cat. Cétac. B. M.* 1850, 109; *P. Z. S.* 1864; *W. B. Clark, Ann. & Mag. N. H.*; *Van Beneden, Nouv. Mém. Acad. Roy. Brux.* xxxii. 32; *Schlegel, de Dieren*, 86. t. 12 (var. obtusus, t. 13); *Fleming, Brit. Anim.* 35; *Jenyns, Man.* 41; *Bell, Brit. Quad.* 469. fig., 472. fig.; *Nilsson, Skand. Fauna*, 602.

*Tursio truncatus*, Bottle-nose Whale, *Gray, List Mam. B. M.* 104.

*Tursiops Tursio*, *Gervais, Comptes Rendus*, 1864, 876.

*Delphinus Orca*, *Gerard, Dict. Sci. Nat.* 75.

*Delphinus Nesarnak*, *Lacép. Cét.* 307; *Desm. Mamm.* 515, from *O. Fabr.*

*Delphinus truncatus*, *Montagu, Wern. Trans.* iii. t. 5. f. 3 (skull), cop. *Bell, Brit. Quad.* 472, fig.

Bottle-nose, *Hunter, Phil. Trans.* lxxxvii. t. 18, cop. *Bonnat. Cétol.* t. 11. f. 1, and *Bell, Brit. Quad.* 469, 1787, fig.

L'Orque (Orca), *Bellon, Aquat.* f. 6. tab. at p. 18.

Dauphin vulgaire, *Camper, Cétac.* t. 35-40 (skull).

Grand Dauphin, ou Souffleur, *Cuvier, R. A.* i. 278.

ANAT. *Cuvier, Oss. Foss.* v. 277. t. 21. f. 3, 4, t. 23. f. 18, 22, 23, 29; *Camper, Cétac.* t. 35-40; *Mont. Wern. Trans.* iii. t. 5.

Var. ? Uniform deep black. *Delphinus Tursio*, *Schlegel, Abhandl.* t. 5. f. 1, 2, t. 4. f. 9.

Black: a blotch over the pectoral and over the vent.

Var. ? *Delphinus Tursio*, *Sundevall, Öfv. Kongl. Vetensk. Akad.* 1861, 385, t. 7.

Inhab. Mediterranean and North Sea. Coast of south of Ireland, Nov. 1828 (*R. Templeton*). Mouth of the Thames, Nore, June 1828 (*Howship*); skull, Mus. Coll. Surg. no. 1125. Orwell, May 10, 1849. Devonshire, River Dart (*Montagu*); skull Brit. Mus. Firth of Forth; skeleton, Mus. University, Edinburgh; skeleton in Surgeons' Hall, Edinburgh, teeth acute. Holland; skeleton, Leyden. North coast of France; skeleton at Paris. Belgium; skeleton, Ghent. Denmark; skeleton, Mus. Copenhagen.

a. Skull and teeth.

b. Skull: bad state. From Dr. Mantell's Collection.

In the 'Zoology of the Erebus and Terror,' tab. 10, is a copy of a most accurate drawing, by Mr. R. Templeton, of a specimen caught on the south coast of Ireland, in November 1828. The following are its measurements:—

	ft.	in.	lin.
Length, entire . . . . .	8	1	3
Length from snout to the eyes . . . . .	1	0	0
Length to the ear . . . . .	1	2	5
Length to the base of the pectoral . . . . .	1	6	9
Length to the end of the pectoral . . . . .	2	6	7

	ft.	in.	lin.
Length to the front of the dorsal . . . .	3	2	5
Length to the end of the dorsal . . . . .	4	2	5
Length to the genital organ . . . . .	5	3	0
Length to the vent . . . . .	5	6	3
Length to base of tail . . . . .	7	0	0
Length to end of middle of tail . . . . .	7	6	0
Length to end of tail-fin . . . . .	8	1	3

There is some difficulty about the colour of this species, which may arise from two being confounded under one name. Bonnaterre, Montagu, and Wright describe it as black above and whitish beneath; O. Fabricius as all blackish, the belly a little whiter, and the young paler; Schlegel figures it of a uniform deep black.

The following are the measurements of five skulls, the first being Montagu's specimen in the British Museum, and four in the College of Surgeons; the fourth is No. 1126, and the fifth No. 1125 of the College Catalogue:—

	1.	2.	3.	4.	5.
	in.	in.	in.	in.	in.
Length, entire . . . . .	21 $\frac{1}{2}$	21	21	21	22
Length of nose . . . . .	11 $\frac{1}{2}$	12	12	11 $\frac{1}{2}$	12
Length of teeth-line . . . . .	..	9 $\frac{3}{4}$	10	10	10 $\frac{1}{2}$
Length of lower jaw . . . . .	..	18 $\frac{1}{2}$	18 $\frac{1}{2}$	..	18
Width at notch . . . . .	5 $\frac{3}{4}$	5	5 $\frac{1}{2}$	5 $\frac{3}{4}$	5 $\frac{3}{4}$
Width at orbits . . . . .	10 $\frac{1}{4}$	..	10 $\frac{1}{2}$	10 $\frac{1}{2}$	9 $\frac{1}{2}$
Width at middle of beak . . . . .	..	3 $\frac{1}{2}$	4 $\frac{1}{2}$	..	..

In the skull of Montagu's specimen, in the British Museum, the fourth and tenth teeth from the front on each side appear, from the hole, to have been larger than the rest. We have a second imperfect skull of the same measurement.

The skull of the skeleton presented by Mr. Howship, in Mus. Coll. Surg. (n. 1125), taken below the Nore, in June 1828, has the teeth  $\frac{2}{2}$ , the two hinder upper without any opposite them; the fourth, fifth, and sixth upper are largest, the middle lower are truncated; the lower jaw obliquely truncated, with a rather prominent gonyx. The elongated intermaxillaries and the vomer are visible in the palate. In the old skulls the intermaxillaries are one-half width above, and the sides of the maxillaries are shelving. In skull n. 1126 (Mus. Coll. Surg.) the teeth are very oblique and truncated at the end.

In all the skulls I have seen of this species the teeth are more or less worn down, but Mr. Bell says he has two skulls in which they are acute (Brit. Quad. 472). M. F. Cuvier (Cétac. 223) complains of Montagu's figure of the skull of *D. truncatus*; he does not recognize in it the *D. Tursio*, but thinks it most resembles *D. Delphis*! hence the origin of his complaint.

A stuffed specimen and skeleton, in the Edinburgh University Museum, from the Firth of Forth, have all the teeth truncated and

flat. A skeleton in the Surgeons' Hall of Edinburgh, from the same locality, has them all acute. The latter is named *D. Delphis*. The atlas (or first) and second cervical vertebræ united by the body and lateral processes; the third to the seventh cervical vertebræ free.

A specimen with teeth  $\frac{21}{1}$ , large, conical, acute, was taken in the River Orwell, May 10, 1849.

Mr. Charles D. Meigs described the foetus of *Delphinus Nesarnak*, Journ. Acad. Nat. Sci. Philad. i. 267; see Arch. Naturg. 1832, 64.

Col. Montagu described an old specimen, taken on the 3rd of July 1814, in Duncannon Pool near Stoke Gabriel, about five miles up the river Dart, as *D. truncatus* (Wern. Trans. iii. 75. t. 3). It was 12 feet long. The skull, which came into Montagu's possession, is now in the British Museum.

First described as British by John Hunter, under the name of the Bottle-nose Whale, in the 'Phil. Trans.' for 1787, t. 18. It was caught on the sea-coast near Berkley, and the skeleton is now in the Museum of the College of Surgeons.

Mr. Jenyns mentions one observed by Mr. Gilbertson in the river at Preston in Lancashire (Manual, p. 41).

The skeleton of this species is described by Professor Owen from a female specimen taken at the Nore, June 1828, in company with a male. "It survived many hours after having been dragged out of the water, during which time it emitted a sound not unlike the bellowing of a calf."—*Cat. Osteol. Series Coll. Surg.* p. 449. n. 2483.

Professor Owen observes that Cuvier assigns to *Delphinus Tursio* from 42 to 46 teeth in each jaw; so that the teeth seem to vary from 40 to 50 in each jaw.

In a second skull in the same collection (no. 2484) "a greater portion of the crown is worn away in all except the last two or three, and a large proportion of the unenamelled fang is exposed, upon which their more oblique position and larger proportionate size appear to depend" (p. 451).

In the same collection (no. 2485) is "the skull of an apparently aged specimen, with a disease of the jaws; all the teeth are lost, and the sockets are obliterated, except at the anterior part of the alveolar tracts, where they are very shallow."

The axis and atlas coalesced (nos. 2483, 2488). "The cervical vertebræ are very thin, and separate. Vertebræ 41, of which 13 are dorsal. First bone of the sternum not pierced, with blunt lateral angles. Bladebone with the acromion larger and more rectilinear with the spine than in *D. Delphis*."—*Cuvier, Oss. Foss.* v. 305.

"This species is not so beautifully marked with lines as the *D. Delphis*. The snout is much shorter, the upper jaw not so long as the lower. The dorsal fin smaller and more posterior, as I noticed in a specimen inspected at Plymouth. The eye appears small, and is placed more directly over the angle of the mouth; the teeth small, conical, 23 on each side."—*Couch, Cornish Whales*, 39.

*Tursiops Tursio* is not so rare as *Grampus Rissoanus*, but far less common than *Delphinus Delphis*. M. Gervais has specimens taken in the Gulf of Lyons, especially at Cette and La Nouvelle, and at

Gruissau in the Mediterranean.—*Gervais, Comptes Rendus*, 28 Nov. 1864, 876; *Ann. & Mag. N. H.* 1865, xv. 76.

### 7. Tursio Abusalam. *The Abusalam.*

Black, below white, with small dark spots; teeth  $\frac{2\frac{5}{5}}{3\frac{0}{0}}$ . Nose of skull in length about five-ninths of total, twice and a half its width at the notch. Intermaxillary bones very convex, forming a strong ridge on each side. Lower jaw tapering in front.

*Delphinus abusalam*, *Rüpp. Mus. Senck.* 1842, t. 12. f. 1, 2, 3; *Gray, Zool. Erebus & Terror*, 38; *Cat. Cetac. B. M.* 1850, 111.

*Tursiops aduncus*, *Gervais, Mamm.* 323.

Inhab. Red Sea.

Only known from Dr. Rüppell's description and figure. It has been said to be the same as *D. Tursio*, but it appears to be different.

*Delphinus aduncus*, Hempr. & Ehrenb. *Sym. Phys.* ii. (Beak depressed, elongate; teeth  $\frac{2\frac{5}{5}}$ , conical, strong. Inhab. Island of Belhosse), is perhaps the same as the former.

### 8. Tursio Eurynome. *The Eurynome.*

Skull roundish; nose thick, broad, rounded above; intermaxillaries rather convex, one-half as wide as maxillaries; nose one-third longer than the length of the head (or contained four times and one-seventh in the entire length), twice and one-third the width at the notch; hinder edge of blower largely tubercular; teeth  $\frac{2\frac{5}{5}}$ , moderate, cylindrical, rather curved, acute.

*Delphinus Eurynome*, *Gray, Cat. Ost. B. M.* 143; *Zool. Erebus & Terror*, 38. t. 17 (skull); *Cat. Cetac. B. M.* 1850, 112; *Blyth, Journ. Asiat. Soc. Beng.* 1860, 202.

Inhab. Bay of Bengal (*Blyth*).

a. Skull. Figured in 'Voy. Erebus and Terror,' t. 17.

	in.	lin.
Skull: Length, entire	22	0
Length of head	9	1
Length of nose	12	3
Length of teeth-line	10	0
Length of lower jaw	18	0
Width at temples	11	0
Width at notch	5	4
Width at middle of beak	3	6

The skull of this species is most like *D. Tursio*; but the nose is one-fourth longer than the length of the head, slenderer, and more rounded, and the teeth smaller.

II. *Beak short; of skull very broad, shelving on the sides. Maxilla shelving over the orbits. Teeth  $\frac{3}{4}$  or  $\frac{5}{7}$ .* Eutropia.

Eutropia, Gray, P. Z. S. 1862, 145.

### 9. Tursio Eutropia. *The Eutropia.*

Nose of skull rather longer than the length of the brain-cavity, slightly dilated on the sides before the notch, very convex and rounded above. Triangle elongate, produced in front of the teeth-line, concave on the sides and strongly keeled in the centre behind; hinder edge of blowhole prominent. Intermaxillaries wide, convex above, leaving a broad open space in front. Lower jaw thick, blunt, and produced beyond the upper in front. Skull compressed behind. Palate concave in front, convex in the centre behind, and keeled on each side. Teeth  $\frac{3}{4}$ , slender, cylindrical, conical at the top. The frontal ridge half the distance between the notch on the convexity of the condyles. Condyles large, oblique. Foramen magnum wider than high.

Delphinus Eutropia, Gray, P. Z. S. 1849, 1; *Ann. & Mag. N. H.* v. 1850, 48; *Zool. Erebus & Terror*, t. 34, ined. (skull); *Cat. Cetac. B. M.* 1850, 111.

a. Skull. Pacific Ocean. Chili. From Dr. Dickie's Collection.

	in.	lin.
Skull: Length, entire . . . . .	15	0
Length from notch . . . . .	6	10
Length of beak . . . . .	7	10
Length of teeth-line . . . . .	6	10
Length of lower jaw . . . . .	11	11
Width at notch . . . . .	3	6
Width at orbit . . . . .	6	5
Width at middle of beak . . . . .	2	10
Width, middle intermaxillaries . . . . .	1	3
Width of condyle above . . . . .	3	3
Height of each condyle . . . . .	1	3

### 10. Tursio Catalania.

Delphinus Catalania, Gray, P. Z. S. 1862, 144.

Inhab. North-west coast of Australia, Cape Melville.

a, b. Skulls. Collected by Mr. John Macgillivray.

These skulls were accompanied by the following notes:—

"*The larger of the two skulls belonged to an individual killed off Cape Melville (within the Great Barrier Reefs), north-east coast of Australia, Sept. 5, 1860. It was a female,  $7\frac{1}{2}$  feet in length; and from it were taken two foetuses, each 10 inches in length. The adult was of a very light lead-colour above and on the sides, gradually passing into the dirty leaden white of the lower parts, which were covered (as also the flippers) with longitudinally elongated blotches of dark lead-colour.*



"The smaller of the two skulls represents another Porpoise of the same species, harpooned off Cape Flattery, on the north-east coast of Australia, Oct. 9, 1860. It was considerably smaller than the first one, being only  $6\frac{3}{4}$  feet in length. It was a *female*. The colour was *exactly* lead-colour, fading into whitish on the lower parts between the anus and the snout. The sides were marked with small oblong spots of the same colour as the back. Measurements when recent:—

"Total length, snout to centre of tail, 6 feet 9 inches.

"Snout to base of dorsal, 3 feet; length of anterior border of dorsal 13 inches; height of dorsal 8 inches; width of dorsal 12 inches; from posterior border of dorsal to tip of tail, 2 feet 8 inches.

"Swimming-paws (midway between snout and dorsal) 13 inches long, and  $5\frac{1}{2}$  inches broad; from their base to end of snout 13 inches.

"Tail 22 inches across from tip to tip.

"Anus 2 feet 2 inches in front of tail (centre of tip).

"Eye  $\frac{3}{4}$ ths of an inch in diameter, situated  $1\frac{1}{2}$  inch behind angle of mouth, and 12 inches from tip of upper jaw.

"Lower jaw projecting 1 inch beyond the upper.

"This porpoise was occasionally seen, in small droves of from three to six, along the north-east coast of Australia, within the reefs. Two other species also were seen, but we could not fasten."

The two skulls slightly differ in shape and size.

No. 1 is 17 inches long; the beak to the notch is 10 inches, and the upper teeth-bone  $8\frac{1}{2}$  inches long; the front lower teeth are worn away and truncated, like the teeth of the common *Delphinus Tursio*, which was described as *D. truncatus* by Montagu. There are twenty-seven teeth on each side in the upper, and twenty-five teeth on each side in the lower jaw.

No. 2 is 17 inches long; the beak  $9\frac{1}{2}$ , and the upper teeth-bone 8 inches long. The teeth, twenty-four above (perhaps one on each side is deficient, as the end of the jaw is very tender), twenty-three or twenty-four below. The front lower teeth are slightly truncated; but this skull chiefly differs from No. 1 in being rather more convex and rather narrower, especially in the hinder part, from the middle of its length.

The skull is smaller in size, and has a much smaller brain-cavity than *D. Cymodoce* (Gray, Zool. Erebus & Terror, t. 19) and *D. Metis* (Gray, Zool. Erebus & Terror, t. 18); and the beak is not so tapering as in these species, while the teeth are rather more numerous.

It is equally distinct from *Delphinus Eurynome* (Gray, Zool. Erebus & Terror, t. 17), believed to be from the North Sea.

III. *Beak scarcely produced. Nose of skull rather depressed, scarcely longer than the brain-cavity. Teeth  $\frac{24}{24}$ — $\frac{30}{30}$ . Cephalorhynchus.*

Cephalorhynchus, *F. Cuvier, Cétac.*; Gray, *Cat. Cétac. B. M.* 1850, 106.  
Grampus (pars), Gray, *Spic. Zool.* 2, 1828.

11. *Tursio Heavisidii. The Hastated Dolphin.*

Black, with a white streak and two diverging lines beneath;

teeth  $\frac{25}{5}$ ; nose of skull nearly half the length of head; lower jaw truncated in front.

*Delphinus* (*Grampus*) *Heavisidii*, *Gray, Spic. Zool.* 2. t. 2. f. 6, 1828; *Schlegel, Abh.* t. 3. f. 1-4, t. 4. f. 6; *A. Smith, South African Quart. Journ.* 125.

*D. Capensis*, *Dussumier, MS.*; *Cuv. R. A.* i. 288; *Rapp, Cetac.* 31. t. 2 (not *Gray*).

*D. Dussumieri*, *Fischer, Syn. Mamm.* 656.

*D. Cephalorhynchus*, *F. Cuv. Cétac.* 158.

*Marsouin du Cap*, *F. Cuv. Mamm. Lith.* 3.

*D. hastatus*, *F. Cuv. Cétac.* 161; *Rapp, Cet.* 37 a, b, *Mus. Stutt.*, t. 3 a, b.

*Phocæna Homei*, *A. Smith, Zool. Journ.* xvi. 441; *Bull. Sci. Nat.* xviii. 276.

*D. tridens*, *A. Smith, MS.*

*Delphinus Homei*, *Fischer, Syn. Mamm.* 656.

*Grampus Heavisidii*, *Gray, Cat. Mamm. B. M.* 134.

*D. Phocænoides*, *Fischer, Syn.* 657.

*D. Cephalorhynchus Heavisidii*, *Gray, Cat. Cetac. B. M.* 1850, 107.

*Phocæna Capensis*, *Pucheran, Rev. & Mag. Zool.* 1856, 449.

Inhab. South Sea, Cape of Good Hope, gregarious (*A. Smith*); called *Tonine* by the Cape colonists.

a. Stuffed skin. Cape of Good Hope. Presented by the Council of the College of Surgeons. The specimen described and figured by *Gray, Quoy*, and *A. Smith*.

*M. Quoy's* description and figure, on which *F. Cuvier* founded *D. hastatus*, are from the specimen originally described by me, and now transferred from the College of Surgeons to the British Museum.

There is a skull, marked *D. Cephalorhynchus*, in the Paris Museum. Beak flat; palate flat, rather concave behind; teeth rather blunt,  $\frac{28}{8}$ ; orbits rather shelving; symphysis of the lower jaw very short, rather keeled below. Length  $11\frac{1}{4}$ , beak  $4\frac{3}{4}$ , width at notch  $2\frac{1}{2}$  inches.

## 12. *Tursio obscurus*. Dusky Dolphin.

Black, with oblique diverging streaks on the side, and beneath whitish; teeth  $\frac{24}{4}$   $\frac{26}{6}$ ; nose of skull about five-ninths of its length, and nearly twice and a half the length of its width at the notch; lower jaw truncated in front.

*Delphinus* (*Grampus*) *obscurus*, *Gray, Spic. Zool.* ii. t. 2. f. 2, 3; *Zool. E. & T.* 37. t. 16 (skull); *A. Smith, S. Afr. Quart. Journ.* 125.

*Delphinus obscurus*, *Fischer, Syn. Mamm.* 656; *Cassin, U. S. Expl. Exped.* 27. t. 5. f. 1.

*D. cruciger*, *Quoy & Gaim. Voy. Uran.* t. 12. f. 3, 4 (from animal in ocean), 1824; *Fischer, Syn. Mamm.* 507.

*D. bivittatus*, *D'Orb. Voy. Amér. Mérid. Mamm.* t. 21 (animal and skull); *Lesson, Bull. Sci. Nat.* vii. 373; *Zool. Coq.* 178. t. 9. f. 3, 1826; *Fischer, Syn. Mamm.* 510.

? *Delphinus albigena*, *Quoy & Gaim.*; *Lesson, Nouv. Tab. R. An.* 198.

*D. superciliosus*, *Schlegel, Abh.* 22. t. 1, 2. f. 3, t. 4. f. 4 (skull); *Fischer, Syn. Mamm.* 510.

*Phocæna superciliosa*?, *Lesson, Mamm.* 415.

*D. Fitzroyii*, Waterhouse, *Zool. Beagle*, t. 10 (jan.).

*D. obscurus*, var., Quoy, *Voy. Astrol.* 151. t. 28.

Dauphin à museau court, *Voy. Pôle Sud*, t. 22. f. 1.

? *D. superciliosus*, Lesson, *Voy. Cog.* t. 9. f. 2??; *F. Cuv. Cétac.* 149?

*D. Cephalorhynchus obscurus*, Gray, *Cat. Cétac. B. M.* 1850, 107.

*Phocæna australis*, Peale, *Zool. Expl. Exped. Mamm.* 33, 1848.

Inhab. Southern Ocean, Cape (*Heaviside*).

*a, b.* Skulls. Cape of Good Hope?

*c.* Stuffed skin. Cape of Good Hope. Presented by the Council of the College of Surgeons. The specimen described and figured in Gray's 'Spicil. Zool.'

	ft.	in.
Skull: Length, entire	15	0
Length of nose	8	0
Length of lower jaw	12	0
Width at orbits	6	6
Width at notch	3	9
Width at middle of beak	3	0
Body: Length, entire	5	1
Length to dorsal fin	2	1
Width of tail	1	2

The skull of this species is intermediate in form between the *Lagenorhynchus* and *Delphinus*.

M. Garnot's description of *D. bivittatus*, as given by F. Cuvier, is very short, but it appears to fit this species.

The skull, marked *Dauphin à museau court*, in the Paris Museum, has teeth  $\frac{3}{8}$ ; triangle extends much in front of the tooth-line; nasal grooves wide in front; length  $14\frac{1}{2}$ , beak 8, width at notch  $3\frac{1}{2}$  inches. It is evidently this species.

There is a skull, named *D. bivittatus*, D'Orbigny, 1830, in the Paris Museum (beak quite flat above; triangle to near the middle of the beak; length of skull 14, of beak 7, width at notch 4 inches), which appears to be only a variety of this species.

This is probably the skull of the specimen and skull figured as *D. cruciger* (D'Orbigny, *Voy. Amér. Mérid.* Mamm. t. 21), which is represented as black, the underside from back of chin, and streak on upper part of the side from the eyes to the base of the tail white. Teeth — ?

The *Delphinus obscurus*, var. (Quoy & Gaim. *Voy. Astrol.* i. 151. t. 28) is described from a specimen prepared by M. Jules Verreaux, belonging to the Museum of Cape Town. He prepared the specimen I described; indeed it is probably the same example.

*Phocæna australis*, J. Peale, *U. S. Expl. Exped.* 33. t. 6. f. 2.

Snout black; fins (all) dark slate-colour; sides paler or grey; a white lateral line commences opposite the posterior edge of the dorsal fin, and reaches the tail; beneath white, which joins the grey of the side by an undulated line. Teeth  $\frac{3}{8}$ — $\frac{3}{8}$ =120. Length 84, pectoral fin 16 inches.

Inhab. South Atlantic Ocean; coast of Patagonia. Is perhaps the same species.

13. *Tursio compressicaudus*. *The Compressed-tailed Dolphin.*

Teeth  $\frac{4\frac{1}{2}}{4\frac{1}{2}}$ , small, conical, hooked; head coloured; belly whitish; pectoral short; upper jaw longest; nose short; base of the tail compressed on each side.

*Phocæna compressicauda*, Lesson, *Cétac.* 199; *F. Cuv. Cétac.* 186 (from Garnot, *M.S.*).

*Delphinus compressicauda*, Gray, *Cat. Cétac. B. M.* 1850, 109.

Inhab. lat. 4° S., long. 26° E. of Paris.

	ft.	in.
Animal: Length to pectoral . . . . .	1	8
Expansive of tail . . . . .	1	7

The following species of this family require further examination:—

1. *D. velox*, *Dussim.*; *Cuv. R. A. i.* 288; *F. Cuv. Mamm. Lith. t.* ; *Cétac.* 154; *Pucheran, Rev. & Mag. Zool.* 1856, 362.

Teeth  $\frac{4\frac{1}{2}}{4\frac{1}{2}}$ ; nose rather more elongated.—*Cuvier.* Teeth  $\frac{3\frac{1}{2}}{3\frac{1}{2}}$ ; grey, lips and lower jaw whitish.—*F. Cuv.*

Inhab. Ceylon.

Skull: Mus. Paris (*Pucheran*).

2. *Delphinus Boryi*, *Desm. Mamm.* 515; *Desmoulin, Dict. Class. H. N. t.* 141. f. 2; *Gray, Cat. Cétac. B. M.* 1850, 132.

Inhab. Madagascar. (Coast of New Holland?)

3. *Delphinus loriger*, *Schreb. Säugeth. t.* 362?; *Wiegmann; Reichb. Naturg. Cétac.* 12, 41. t. 16. f. 51; *Gray, Cat. Cétac. B. M.* 1850, 120.

Lead-coloured; middle of sides, chest, and belly white; rather flexuous line from orbit to the lumbar region lead-coloured.

Inhab. — ?

4. *Delphinus Pernettyi*, *Desm. Mamm.* 543; *Gray, Cat. Cétac. B. M.* 1850, 132.

*D. Pernettyi*, *Blainv.*; *Desm. N. D. H. N.* ix. 154.

*D. Delphis*, var. *a*, *Bonnat. Cétol.* 21.

*Delphinorhynchus Pernettyi*, *Lesson, Man.* 406, from Dauphin, *Pernett. Voy.* 99. t. 2. f. 1.

Inhab. — ?

5. *D. Chinensis*, *Desm.*, from *Osbeck, Voy.*; *Gray, Cat. Cétac. B. M.* 1850, 132.

Shining white.

Inhab. Chinese seas.

6. *Delphinus hamatus*, *Ehrenb.*; *Reichb. Cétac. No. 1, Anat. t.* 21; *Gray, Cat. Cétac. B. M.* 1850, 131.

Beak once and a half the length of the skull, twice and a half the width at the notch; teeth  $\frac{2\frac{1}{2}}{2\frac{1}{2}}$ .

7. *Delphinus Chamissonis*, *Wieg.*; *Schreb. Supp. t.* 359; *Reichb. Cétac.* 126. 66. t. 22. f. 64, 65; *Gray, Cat. Cétac. B. M.* 1850, 131.

*Delphinus albirostratus*, *J. Peale, U. S. Expl. Exped.* 34 (t. 6. f. 2. ined.); *Gray, Cat. Cétac. B. M.* 1850, 133.

Elongate, dorsal fin nearer the head, dark blue-grey; fins and

back nearly black; a dark line connects the corner of the mouth with the pectoral fin; front and sides dark grey, covered with small vermicular white spots; end of the snout white, commissure of the lips pale yellow.

Inhab. Pacific Ocean, lat. 2° 47' S., long. 174° 13' W., 22 Aug.

8. ? *D. Bertini*, *Desm. Mamm.* 516, from Dauphin de Bertin, *Duham. Pêch.* ii. 41. t. 10. f. 3; *Gray, Cat. Cetac. B. M.* 132.

Cachalot, junior, *Blainv.*

Beak distinct; lower jaw toothless.

Inhab. — ?

The following species have been named and figured by the sight caught of them when swimming! (see *Gray, Cat. Cetac. B. M.* 1850, 133):—

*D. albigenas*, *Quoy, l. c. t.* 11. f. 2.

*D. rhinoceros*, *Quoy, l. c. t.* 11. f. 1, both from New Holland.

*D. lunatus*, *Lesson, Voy. Coq. t.* 9. f. 4, Tunenas of the *Chilians*, from Chili.

*D. leucocephalus*, *D. minimus*, et *D. maculatus*, *Lesson, Voy. Coq. i.* 183.

The following species have been named only from figures or very slight descriptions:—

*D. Senedetta*, *D. Commersonii*, *D. niger*, et *D. Pernetii*, *Lacép.*

*D. Epidon* et *D. Mongitori*, *Rafinesque.*

The Porpoises come up the backwaters of the coast of South Malabar, in March, when they are salt, but the *Susu* I do not think is known here.—*Rev. H. Baker of Alipi, South Malabar; and Blyth.*

Lacépède described from a Chinese drawing (*Mém. Mus.* iv. 475) *Delphinus niger*, black, with white edges to the lips and fins.

Mr. Couch had been informed that a dolphin with two dorsal fins had been observed in April 1857, on the coast of Cornwall. (See Couch, 'Whales of Cornwall,' p. 40.)

## 5. LAGENORHYNCHUS.

Head convex, gradually sloping into the beak in front. Beak short, tapering in front. Lower jaw longest. Body elongate, tapering behind, largest at the pectoral fins. Pectoral fins far back, elongate and slightly falcate. Dorsal fin high, falcate, behind the middle of the back. The back with a low, rounded, fin-like ridge near the tail. Tail-lobes narrow, elongate. Skull depressed, the hinder ends of the maxillary bones expanded, horizontal, and thickened on the edge; crown shelving. The beak is short, broad, flat above and narrowed in front, and scarcely longer than the length of the brain-cavity. The triangle in front of the blowers is flat, elongate, and reaches beyond the middle of the nose of the skull, and the intermaxillaries are separated by a deep groove filled with cartilage.

*Lagenorhynchus*, *Gray, Zool. Erebus & Terror*, 34, 1846; *Cat. Cetac. B. M.* 1850, 97; *P. Z. S.* 1863; 1864, 238.

*Grampus* (pars), *Gray, Spic. Zool.* 2, 1828.

*Delphinus*, sp., *Brightwell, Ann. & Mag. N. H.* 1846.

This genus is easily known from *Delphinus* by the lowness of the forehead, the short and depressed form of the beak, the posterior position of the dorsal fin, the body being attenuated behind, and by the breadth and flat, expanded form of the nose of the skull.

The os hyoides of *L. leucopleurus* is large and broad.

- a. *Beak elongate. Rostrum of skull longer than the length of the brain-case. Teeth-line some distance from the notch. Electra.*
  - b. *Beak moderate. Rostrum of skull only as long as the brain-case. Teeth not quite to the notch.*
  - c. *Beak very short. Rostrum of skull only as long as the brain-case. Teeth nearly to the notch.*
- a. *Rostrum of skull longer than the length of the brain-case. Teeth-line some distance from the notch. Electra.*

### 1. *Lagenorhynchus Electra. The Electra.*

Skull rather depressed; nose flattened above, expanded and reflexed on the side behind, rather shelving in front, sides rather contracted in the middle, rather longer than the head, and once and three-quarters the length of the width at the notch; intermaxillary broad, flattened, nearly two-thirds of the width, with a large, wide groove for the greater part of its length; triangle flat, rather concave behind, with a lozenge-shaped, rather raised, rugose space in the front half; teeth  $\frac{2\frac{5}{8}}$ , rather small, cylindrical, conical, slightly curved, acute, four in an inch; the lower jaw regularly converging, straight on the sides in front, rather swollen behind, and shortly obliquely truncated in front, the gonyx rather produced.

*Lagenorhynchus Electra, Gray, Zool. Erebus & Terror, 35. t. 13 (skull); Cat. Cetac. B. M. 1850, 100.*

Inhab. — ?

- a. Skull — ? Purchased. The specimen figured in the ‘Voyage of the Erebus and Terror.’

Skull: length, entire,  $17\frac{1}{2}$  inches; of head,  $8\frac{1}{4}$ ; of nose,  $9\frac{3}{4}$ ; of teeth-line, 7; of lower jaw,  $14\frac{1}{2}$ ; width of temple,  $10\frac{1}{4}$  inches; at notch,  $5\frac{1}{2}$ ; at middle of beak, 4; of intermaxillary,  $2\frac{1}{2}$ .

This skull is very like the former, but it is considerably larger, the nose is longer in proportion, and the head is much more depressed in the middle and spread out at the sides.

### 2. *Lagenorhynchus cæruleo-albus.*

Teeth  $\frac{4\frac{8}{8}}$ ; white, back bluish, with oblique streaks on the sides, belly white.

*Delphinus cæruleo-albus, Meyen, Act. Nat. Cur. xvi. 609. t. 43. f. 2; Gray, Zool. E. & T. 42; Reichenb. Cetac. Anat. t. 19 (skull).*

*Lagenorhynchus cæruleo-albus, Gray, Cat. Cetac. B. M. 1850, 100; Cassin, U. S. Expl. Exped. 31. t. 6. f. 2.*

*Delphinus albirostratus, Peale, Zool. Expl. Exped. Mamm. 38, ed. 1, 1848.*

Inhab. East coast of South America, Rio de la Plata.

Length 5 feet 6 inches. Skeleton in Anat. Mus. Berlin.

Skull: beak one-fourth longer than the length of the brain-cavity, and rather longer than double the width of the skull at the notch; teeth to the notch (see fig. Reichenb.).

Cassin, *l. c.*, describes, "Teeth  $\frac{40 \cdot 40}{40 \cdot 40} = 160$ . Form elongate, the dorsal fin being nearest the head; colour dark blue-grey, the fins and back nearly black; a dark line connects the corners of the mouth with the pectoral fins; front and sides dark grey, covered with small vermicular white spots; end of the snout white; commissure of the lips pale yellow.

"Total length 6 feet 7 inches, perpendicular diameter at the dorsal fin 13 inches."

"Inhab. Pacific Ocean."

"Though Mr. Peale's figures, from which those in the plate of the Atlas to this volume have been prepared, differ in some measure from the figures of *D. cœruleo-albus*, in the distribution of the light and dark colours, we have no doubt of the identity of the present animal with that species. The figures of the latter to which we more especially allude are that of its first describer in 'Nova Acta Physico-medica Academiæ Cæsaræ Leopoldino-Carolinæ Naturæ Curiosorum,' xvi. pl. 43. fig. 2, and those in Schreber's 'Säugethiere,' pl. 363, and in Reichenbach's 'Cetaceans,' pl. 14. fig. 43.

"Taken in the Pacific Ocean, latitude 2° 47' 5" S., longitude 174° 13' W. of Greenwich, on the 22nd of August.

"We find no specimen in the collection of the Expedition."

### 3. Lagenorhynchus Asia. *The Asia.*

Skull: nose rather depressed, broad, flattened, rather contracted in the middle of each side; triangle concave, with a slightly raised, flat, rugose space in the front half; teeth  $\frac{2}{3}$ , small.

*Lagenorhynchus Asia*, Gray, *Zool. Erebus & Terror*, t. 14 (skull); *Cat. Cetac. B. M.* 1850, 101.

Inhab. — ?

a. Skull (teeth wanting). The specimen figured in the 'Voyage of the Erebus and Terror,' t. 14.

The skull, which is without teeth, very much resembles, in the depressed and expanded form of the brain-cavity and shape of the beak, the skull of *L. Electra*, but it differs from that in the beak being rather more acute in front and more contracted in the middle of the sides, and in being rather smaller in size. It may be only a variety of that species. It measures as follows:—

Skull: Length, entire . . . . .	16 $\frac{3}{4}$ inches.
Length of nose . . . . .	9 "
Length of lower jaw . . . . .	12 $\frac{1}{2}$ "
Width at orbit . . . . .	8 $\frac{3}{4}$ "
Width at notch . . . . .	4 $\frac{3}{4}$ "
Width at middle of beak . . . . .	3 $\frac{1}{3}$ "

4. *Lagenorhynchus acutus*. *Eschricht's Dolphin*.

Body —?

Teeth  $\frac{32}{31}$ ; nose of skull half its length, and nearly twice as long as wide at the notch; lower jaw obliquely truncated in front.

*Phocæna acutus*, *Gray*, in *Brookes's Cat. Mus.* 39, 1828.

*Delphinus* (*Grampus*) *acutus*, *Gray, Spic. Zool.* 2, 1828 (from a skull); *Fischer, Syn. Mamm.* 656.

*Delphinus leucopleurus*, var., *Nilsson, Skand. Fauna*, i. 598.

*Lagenorhynchus acutus*, *Gray, Zool. E. & T.* 36; *Cat. Cetac. B. M.* 1850, 101; *P. Z. S.* 1864, 239.

*Delphinus* (*Lagenorhynchus*) *Eschrichtii*, *Van Beneden, Nouv. Mém. Acad. R. Brux.* xxxii. 31.

*Delphinus Eschrichtii*, *Schlegel, Abhandl.* 122. t. 1, t. 2. f. 4, t. 4. f. 5; *M. Clausen, Dissert. de Lagenorhynchis, Ato, Kihæ*, 1853; *Eschricht, Compt. Rend. Acad. Sci.* 1852, 12th July.

Inhab. North Sea, Faroe Islands (*Eschricht*).

Skulls and skeleton in the Leyden Museum:—Length, entire, 7 in. 2 lin.; of skull, 16 lines.

This species was first described by me from a skull in Brookes's Museum, from Orkney, which is now at Leyden, and M. Schlegel has described and figured a skull from a skeleton sent from the Faroe Islands. It differs from the other species of the genus in the nose of the skull being more slender and the teeth more numerous. The teeth-series, as in *L. Electra* and *L. Asia*, do not reach to the notch which separates the beak of the skull from the brain-cavity.

Professor Eschricht informs me that the animal is very like *D. leucopleurus*, and Professor Nilsson considers them to be the same.

The skull in Mr. Brookes's collection was 15 inches long, the head 7, the beak being 8 inches, and it was  $4\frac{1}{2}$  inches wide at its base; the teeth small and slender; the beak long, attenuated, acute, convex on the sides, and flat in the centre above, and with a deep central groove. The teeth  $\frac{28}{30}$ .  $\frac{28}{30}$ , small, slender. The bones in front of the inner nostrils keeled.

The peculiar character of this species is, that there are 82 or 83 vertebræ; the muzzle is narrower, the shoulder-blade narrower, a phalange to the thumb, the atlas and axis are ankylosed to the third and fourth cervical vertebræ by the spinous apophysis, and the sixth cervical alone has an inferior transverse process. Teeth  $\frac{30 \cdot 30}{30 \cdot 30}$ .—*Van Beneden, l. c.* 31.

*Delphinus Eschrichtii* (*Schlegel, Abh.* 23. t. 1, t. 2. f. 4, t. 4. f. 5) is described from a skeleton from the Faroe Islands. Length 7 feet 4 inches. Teeth  $\frac{32}{31}$ .

A male was thrown ashore on the 20th December, 1863, at Flushing, now stuffed in the Museum at Ghent. Vertebræ 80: cervical 7, dorsal 15, lumbar 19, caudal 39. The first and second are soldered by their bodies and spinous apophyses; the third and fourth only by the spinous processes; the fifth, sixth, and seventh are free; the sixth has two irregular processes on the lower part of the sides, which are directed forwards. Teeth  $\frac{28 \cdot 28}{32 \cdot 32}$ , visible. In the upper jaw five were hidden in the membrane, one or two of



which were in the intermaxillary, and in the lower jaw there were four or five hidden (see Poelman, Bull. Acad. Roy. Belg. xvii. 608, t.). Length 237 millim. Black, lower part of the beak and the body to the reproductive organs shining white; a white band forms a line under the dorsal to the base of the tail; above yellow, beneath white.

### 5. *Lagenorhynchus clanculus*.

Skull wide and rather high behind. Beak flat; outline wide at the base, rapidly tapering and acute in front, but rather convex on the sides, these being slightly rounded; the hinder edge near the notch only slightly turned up and rounded. Triangle to near the middle of the beak. Lower jaw high behind. Teeth  $\frac{3}{3}\frac{3}{2}$ , small, cylindrical, curved, rather acute at the tip; the lower front one very small. Intermaxillaries broad, hard.

*Lagenorhynchus clanculus*, Gray, *Proc. Zool. Soc.* 1849, 2; *Ann. & Mag. N. H.* 1849, v. 48; *Zool. Erebus & Terror*, t. 35, ined. (skull); *Cat. Cetac. B. M.* 1850, 102.

a. Skull. Pacific Ocean. From Dr. Dickie's Collection.

Length, entire	14 $\frac{1}{2}$ inches.
Length of beak	7 $\frac{1}{4}$ "
Length of skull	7 $\frac{1}{4}$ "
Length of teeth-line	6 $\frac{1}{2}$ "
Length of lower jaw	11 $\frac{1}{4}$ "
Length of symphysis, lower jaw	1 $\frac{1}{3}$ "
Width at notch	4 $\frac{1}{4}$ "
Width at orbit	7 $\frac{1}{2}$ "
Width at middle of beak	2 $\frac{1}{2}$ "
Width of intermaxillary in middle	1 $\frac{1}{3}$ "
Width of condyles above	2 $\frac{3}{4}$ "

Very peculiar for the elongation and reflexion of the beak before the notch, and the regular bevelling of the sides of the beak.

### 6. *Lagenorhynchus breviceps*.

Blackish; under part white; pectoral fin dusky.

*Delphinus breviceps*, Pucheran, *Voy. Dumont d'Urville*, t. 22. f. 1.

Beak very short; snout produced. Beak of skull depressed, only slightly longer than the length of the brain-cavity. Teeth  $\frac{31}{29}\frac{31}{29}$ .

Inhab. Rio de la Plata.

### 7. *Lagenorhynchus thicola*.

Skull rather narrow behind. Beak elongate, about one-fifth longer than the length of the head, rather dilated and concave above behind, with the side edges in front of the notch elongate, keeled, and turned up; the middle of the beak flat, with flat shelving sides, the shelving part being broader and forming a slight keel in front. Intermaxillaries flat, gradually tapering. Triangle to near middle of

the beak, concave on the sides, and keeled in the middle behind. Teeth  $\frac{40}{0}$ ?, very slender, curved, elongate, conical, tapering, acute; the front one very small.

*Lagenorhynchus Thicola*, Gray, *Proc. Zool. Soc.* 1849; *Ann. & Mag. N. H.* 1849, v. 48; *Zool. Erebus & Terror*, t. 36, ined. (skull); *Cat. Cetac. B. M.* 1850, 103.

Inhab. West coast of North America.

a. Skull: imperfect behind. From Dr. Dickie's Collection.

	in.	lin.
Length of skull, entire . . . . .	14	6? (end of nose injured),
Length of beak . . . . .	8	4
Length of teeth-line . . . . .	7	0
Length of lower jaw . . . . .	12	3 (entire).
Width at orbits . . . . .	7	0
Width at notch . . . . .	3	11
Width at middle of beak . . . . .	2	2
Width of intermaxillary at middle . .	1	2
Width of condyles . . . . .	3	0

b. *Beak moderate. Rostrum of skull only as long as the brain-case. Teeth not quite to the notch.*

### 8. *Lagenorhynchus albirostris.* *White-beaked Bottlenose.*

Upper part and sides very rich deep velvet-black. External cuticle soft and silky, so thin and delicate as to be easily rubbed off. Nose, a well-defined line above upper jaw, and the whole under jaw and belly cream-colour, varied with chalky white; fins and tail black. Teeth  $\frac{2\frac{1}{2}}{4}$ , small, curved. Jaws moderately elongate, lower rather the longest. Blowhole horseshoe-shaped and convex towards the head. Nose of skull as long as the brain-case, gradually and evenly tapering to a rather rounded point in front, the edge rather reflexed on each side behind. The triangle in front of the blower convex and swollen on each side behind, smooth in front.

*Delphinus Tursio*, *Brightwell*, *Ann. Nat. Hist.* 1846, 21. t. 1 ♀.

*Delphinus albirostris*, Gray, *Ann. & Mag. N. H.* 1846; *M. Clausen, Dissert. de Lagenorhynchis, Kilia*, 1853.

*Lagenorhynchus albirostris*, Gray, *Zool. Erebus & Terror*, t. 10 (animal, from *Brightwell's* drawing), t. 11 (skull), 1846.

*Delphinus pseudotursio*, *Reichenb. Cetac.* t. 24. f. 7, 6, cop. *Brightwell*.

*Delphinus (Lagenorhynchus) albirostris*, *Van Beneden, Nouv. Mém. Acad. R. Brux.* xxxii. t. 1, 2 (animal, skeleton, and viscera).

Var. ? Teeth smaller,  $\frac{32}{32}$   $\frac{32}{32}$ . Beak narrower.

*Delphinus Ibsenii*, *Eschricht, Undersøgelse over Hvaldyrene 5te Afh.* 73; *och d. Ss. föredrag vid Naturforsk. mötet. i Köpenh.* 1847; *Nilsson, Skand. Fauna*, i. 600.

Inhab. North Sea, Faroe Islands. Yarmouth, 1846 (*Brightwell*); skeleton in British Museum; skull figured in 'Zool. E. and T.' 11. Ostend, July 1851, female. Winter 1852, female (*Van Beneden, l. c.* p. 20).

- a. Skeleton. Yarmouth. Skull figured in 'Voy. of H.M.S. Erebus and Terr.' tab. 11, p. 35. Mr. Brightwell's specimen.  
 b. Stuffed skin of a. Yarmouth.  
 c. Skeleton. England? Mr. Stevens's Collection.

Measurements of specimen from Yarmouth:—

	in.	lin.
Animal: Length, entire .....	(?)	
Length of mouth .....	9	6
Length of nose to eye .....	13	0
Length to pectorals .....	20	0
Length of pectoral .....	15	0
Length to dorsal.....	41	0
Length of dorsal .....	11	6
Height of dorsal.....	10	0
Width of tail .....	22	0
Skull: Length, entire .....	18	0
Length of nose .....	8	6
Width at orbit .....	9	5
Width at notches .....	5	6
Width of middle of beak .....	3	6
Width of lower jaw at condyles ..	8	0

Bladebone broader than high, with long acromion and a prominent articulation (t. 11. f. 9). Arm-bones very short; fingers four, short, outer longest, second rather shorter, third and fourth very short. Ear-bones large (see Van Beneden, *l. c. t. 1. f. 7 & 8*). Vertebrae 90 or 94. The atlas and axis only ankylosed; the rest of the cervical vertebrae free. Scapula large. Thumb without a phalange.

Skeleton, Mus. Bruxelles; Louvain; at Mus. Copenhagen, Kiel, and Berlin.

- c. *Beak very short. Rostrum of skull only as long as the brain-cavity. Teeth nearly to the notch.*

### 9. *Lagenorhynchus leucopleurus*. *White-sided Bottlenose.*

Skull: brain-cavity large, high at the top behind the blowhole. Nose nearly as long as the brain-cavity, gradually and regularly tapering on each side. Triangle in front of the blowhole flattened and concave behind, with a slightly raised, lozenge-shaped space in the front half.

Above bluish-black, beneath white, with a large, oblique grey or white longitudinal streak on the hinder part of each side. Teeth  $\frac{2}{5}$ , small, acute, curved.

*Delphinus Tursio*, Knox, *Cat. Prep. Whale*, 29, 1838; *Ann. & Mag. N. H.* 1864, xiv. t. 3.

*Delphinus leucopleurus*, Rasch, *Nyt Mag. for Naturv.* 1843, iv. 97; *Mag. Zool.* 1843, 369; Nilsson, *Skand. Fauna*, i. 598.

*Delphinus Ibsenii*, Eschricht.

*Lagenorhynchus leucopleurus*, Gray, *Zool. Erebus & Terror*, 34. t. 3

(foetus), t. 12 (skull), t. 26. f. 3 (tongue); *Ann. & Mag. N. H.* 1864, t. 3; *Proc. Zool. Soc.* 1864, 238.

<sup>m</sup> Inhab. North Sea. Orkney (*Knox*), 1835. Gulf of Christiania, 1843.

- a. Skeleton. Greenland. From Mr. Brandt's Collection. The specimen figured in the 'Voyage of the Erebus and Terror.'  
 b. Foetus. North Sea, Faroe Islands. From Mr. Brandt's Collection.  
 c. Skeleton. North Sea. From Mr. Brandt's Collection.

The foetus has six bristles on each of the upper lips, the hinder one being rather further from the rest than the others are apart, which are equidistant, and of the same size. The tongue is flat on the top and as wide as the space between the sides of the jaws, with a regular sharp denticulated edge on each side, and with a rather larger, conical, separate tubercle in front. The teeth are not developed through the gums. The nose is nearly one-fifth the length of the distance between the end of the nose and the eye. The hinder part of the back has a rather thick convexity, like a long, low, rounded, second dorsal fin, just before the tail; the same part of the foetus of *Delphinus Delphis?* and *Steno? fuscus* is very much compressed, and fined off to a very thin knife-like edge.

The skull is at once known from the skull of the *L. albirostris* at Norwich, by being smaller and the nose rather narrower, and especially by the hinder part of the intermaxillaries, which form the triangle in front of the blower, being flattened and concave instead of swollen and convex. Length, entire, 16; of nose,  $8\frac{1}{2}$ ; of lower jaw, 13 inches. Breadth at orbit,  $8\frac{1}{4}$ ; at notch, 4; at middle of beak,  $2\frac{3}{4}$  inches.

Mr. Knox gives the following description and measurements of a female sent from the Orkneys in May 1835:—It weighed 14 stone. Length along margin, from snout to centre of tail,  $77\frac{1}{4}$  inches; circumference, anterior, to dorsal fluke,  $38\frac{1}{2}$  inches; length of pectoral extremity free, 10 inches; breadth from tip to tip of tail, 14 inches; length from snout to angle of mouth, 9 inches; greatest possible gape,  $3\frac{1}{2}$  inches. Length of cranium, 15 inches; of spinal column,  $55\frac{1}{2}$  =  $70\frac{1}{2}$  inches. Weight of skeleton,  $7\frac{1}{2}$  lb. Teeth  $\frac{30}{0}$ .  $\frac{30}{0}$  = 120. Vertebrae 81: cervical 7; dorsal 15; posterior 59. V-shaped bones commencing between the fortieth and forty-first vertebrae. Pelvis rudimentary, consisting of two cylindrical bones; pelvic extremities not developed. The external opening of the nostrils near the vertex of the head was crescent-shaped, and placed transversely. The dorsal fluke was midway between the snout and tail.

The skeleton of this specimen is now in the Museum of the University of Edinburgh. The first, second, and third cervical vertebrae are united by the spinous processes, the second and rest are thin. The palate smooth, not grooved. Length of skull,  $15\frac{1}{2}$  inches; of nose,  $7\frac{1}{2}$  inches; of lower jaw, 10 inches. Width of skull, at notch,  $8\frac{3}{4}$  inches; at orbit, 8 inches; at middle of beak, 3 inches. Nose of skull twice as long as the width at notch. Intermaxillaries narrowed in front. The skull has two large foramina on the flat part of the

temple on each side, instead of the single one in the skull from Christiania.

*Delphinus Delphis?*, Jackson, *Boston Journ. N. H.* v. 154. t.

“Dusky black on the back, white on the belly, and lead-coloured on the sides; a dusky line, from 1 to 2 inches in width, commenced a little above the eye, and passing along the sides was lost in the lead-colour within 18 or 20 inches of the tail; and another, much less distinct, ran parallel to this.

“Inhab. Lynn, April 1842. Female,  $7\frac{1}{4}$  feet long; nearly mature.

“Fœtus 38 inches long.

“Teeth not yet developed.

“Vertebræ 76: viz. cervical 7, dorsal 14, caudal 55. The viscera, &c., described.”—*Jackson, l. c.* 155. t.

“Shape slender. Jaws projecting, forming a large snout somewhat like the beak of some species of water-birds. Spiracle near the top of the head, about 1 inch in diameter and 13 inches from extremity of snout. Greatest depth of body at origin of dorsal fin, 18 inches. From snout to origin of dorsal fin 39 inches; to the pectoral fin  $19\frac{1}{2}$  inches; to eye 12 inches; to posterior teeth 8 inches. Width of jaw at the insertion of the posterior teeth  $2\frac{1}{2}$  inches. Jaws armed with numerous small, conical, incurved teeth, projecting above the jaw from one-fourth to half an inch. Distance between the eyes 9 inches. The eyes, situated low on the side of the head, are black, one-fourth of an inch in diameter, and present an oval appearance from the reflection of the integument forming a sort of eyelid by which the eye may be closed. Pectoral fin: length  $4\frac{1}{2}$  inches; height 11 inches. Dorsal fin falciform or lunated: length 10 inches; height 10 inches. Caudal fin: length of each lobe 6 inches, and height 13 inches; united they form a beautiful lunated fin.”—*Dr. Prescott, MS., in letter from Dr. Jackson, 27th June 1840.*

See also

1. *Lagenorhynchus?* Nilssonii, *Gray, Proc. Zool. Soc.* 1864, 238.  
*Delphinus obscurus, Nilsson, Skand. Fauna* (not Gray).

Inhab. North Sea.

Nilsson, in the ‘Scandinavian Fauna,’ records a species under the name of *Delphinus obscurus*, and refers it with doubt to the description and figure of the skull, and the species under that name, in the ‘Zoology of the Erebus and Terror,’ and equally with doubt to *D. superciliosus* of Schlegel. Both these species are described from the same specimens, which were procured at the Cape of Good Hope, and therefore very unlikely to be of a species found also in the North Sea. Nilsson’s species may very likely be found in the British seas; so I have referred to it to draw zoologists’ attention to the description. It is the only Swedish species that has not hitherto been observed here.

2. *Lagenorhynchus lateralis, Cassin, U. S. Explor. Exped.* 32. t. 7. f. 1.  
*Delphinus lateralis, Peale, Zool. Explor. Exped. Mamm.* 35.

“Teeth  $\frac{41 \cdot 41}{41 \cdot 41} = 164?$  Form thick; snout small; body much

compressed behind the dorsal fin. Colour light purplish grey; beneath white; a dark lateral line, edged with spots, separates the colours of the upper and under parts of the body; a separate line, paler in colour, branches from the lateral line opposite the pectoral fins, and passes downwards and backwards; another connects the eyes and pectoral fins; snout black; fins black. Total length 7 feet 6 inches."

"Caught, on the 13th of September, in the Pacific Ocean, latitude 13° 58' N., longitude 161° 22' W."

"This is the description of Mr. Peale, to which we can add nothing. We find no specimen in the collection of the Expedition; but, from the figure and description as above cited, this species does not appear to intimately resemble any other. From the latitude and longitude given, it appears to have been captured at sea, some degrees south of the Sandwich Islands."—*Cassin, l. c.*

## 6. DELPHINAPTERUS.

Head rather convex, shelving towards the nose. Nose rather produced, obscurely divided from the forehead. Dorsal fin none. Back rounded. Pectoral oblong, rather slender. Skull moderate; beak broad, depressed, tapering, rounded above; the triangle before the blowers elongate, extending nearly to the middle of the beak. Palate flat. Teeth conical, tapering, acute, curved. Symphysis of the lower jaw short.

The bladebone very broad, nearly semicircular, with a very distinct spinal ridge and a very large acromion and coracoid apophysis (see Cuvier, *Oss. Foss.* v. 307. t. 24. f. 20). (Very different from *Delphinus*.)

*Delphinapterus*, Gray, *Zool. Ereb. & Terror*, 35; *Cat. Cetac. B. M.* 1850, 103.

*Tursio* (pars), Wagler, *N. S. Amph.* 34.

*Delphinus*, sp., Lacép.

*Delphinapterus*, sp., Blainville (not Lacép.); Lesson, *Voy.*

*Leucoramphus*, Lilljeborg.

### 1. *Delphinapterus Peronii*. Péron's *Dolphin*.

Black; beak, pectoral fins, and under part of body white.

Teeth  $\frac{38}{8}$ — $\frac{40}{8}$ .

*Delphinus Peronii*, Lacép. *Cét.* 517, 1804; Cuvier, *Oss. Foss.* v. 287, 295, 307, t. 21. f. 5, 6, & f. 20; F. Cuv. *Cétac.* 164; D'Orb. *Voy. Amér. Mérid. Mamm.* t. 21. f. 5.

*Leucoramphus Peronii*, Lilljeborg.

*Delphinus leucoramphus*, Brookes, *Cat. Mus.* 39, 1828.

*Delphinapterus leucoramphus*, Péron, *Voy.* i. 217. t. 1; Owen, *Cat. Osteol. Mus. Coll. Surg.* 454. n. 2503 (skeleton).

*Delphinapterus Peronii*, Lesson, *Voy. Cog.* t. 9. f. 1 (bad), cop. F. Cuv. *Cétac.* 164. t.; Jardine, *N. Lib.* t.; Gray, *Zool. Erebus & Terror*, t. 15. f. 4; *Cat. Cetac. B. M.* 1850, 103; Cassin, *U. S. Expl. Exped.* 33; Schlegel, *Abhandl.* 24; Rosseau, *Mag. Zool.* 1856, 204.

Dauphin de Péron, *Cuv. Oss. Foss.* v. t. 21. f. 5, 6 (skull).

*D. bicolor*, *Stephenson, MS. icon. ined.*; *Gray, Zool. Ereb. & Terr.* 36. t. 15. f. 1-3, from *Stephenson's drawing*, t. 15. f. 4, from *Lesson.* \*

*Delphinus Peronii*, or Right-Whale Porpoise of the Whalers, *Bennett, Narrat. Whaling Voy.* ii. 235. fig.

Inhab. Higher Southern latitudes. Brazil Bank. Lat. 40° S. to 54° S., long. 50° W. (*Bennett*). New Guinea (*Quoy*). West coast of South America, lat. 50° 35' (*Pickering*).

Skull, from Péron, in Mus. Paris. Length 18½, of beak 10, of teeth-line 8½, of lower jaw 14½ inches. Width at orbit 9, at notch 4½, at middle of beak 2½ inches. Teeth  $\frac{44}{44}$ , small, slender, six in an inch. Beak broad, depressed, rather tapering in front; the sides spongy; the centre hollow, filled with cartilage, broader in front, flattened behind. Triangle extending nearly to the middle of the length of the beak. Orbits rather shelving above, and slightly thickened on the edge. Palate flat in front, rather convex behind, without any groove on the sides. Lower jaw gradually tapering, angularly shelving, and flat on the sides in front. Symphysis short, not 2 inches.

A second skull, in Mus. Paris, brought by M. Housard in 1822, is rather more depressed in the middle in front, and with the triangle reaching near to the middle of the beak. Teeth  $\frac{38}{35}$ . Length, entire, 17.6; of beak 9.6; of lower jaw 14.6 inches. Width at notch 4.3; at middle of the beak 2.6 inches. Orbits rather shelving above, and slightly thickened on the edge.

Cuvier justly observes that the beak of Lesson's figures (*Voy. Coq.* t. 9) is too pointed. Lesson also represents the black as only occupying the upper part of the back, as represented in fig. 4 of the plate t. 15 of the 'Zoology of the Erebus and Terror,' copied from his plate. M. d'Orbigny and Bennett represent the black as down to the base of the fins, and the hinder edge of the fin as black. In the 'Zoology of the Erebus and Terror,' t. 15, is given a new figure of the species, copied from a drawing, one-twelfth the natural length, communicated by W. Wilson Saunders, Esq., of Lloyd's, which was made by Dr. Stephenson, during the voyage of the ship 'Glenarn,' Captain Guy, in lat. 46° 48' S., long. 142° W., Jan. 12, 1844.

They live in large shoals; the flesh is esteemed a delicacy.—*Bennett*, ii. 237.

The skeleton referred to this species in the Museum of the College of Surgeons (see *Osteol. Cat.* 454, n. 2503) is the body of a *Phocæna* with the head of a *Delphinus*, like *D. Delphis*.

## 2. *Delphinapterus? borealis*.

*Delphinapterus borealis*, *Peale, Zool. Explor. Exped.* 38, ed. 1, 1848; *Gray, Cat. Cetac. B. M.* 105, 1850.

*Delphinus borealis*, *Cassin, U. S. Explor. Exped.* 30. t. 7. f. 2.

"Form elongate; snout slightly produced. Black, with a white lanceolate spot on the breast, which is extended in a narrow line to the tail. Length 4 feet. Teeth ——— ?

"Inhab. North Pacific Ocean.

“Having no specimens for examination, we cite Mr. Peale’s description of this interesting species. From his figures, however, to be found in the Atlas to the volume above cited, it appears to us probable that it does not belong to the genus *Delphinapterus*, or to the group of which *D. Peronii* is the type. In colour and general appearance this species appears to resemble *D. hastatus*, F. Cuvier (Schreber, Säugethiere, vii. pl. 351; Reichenbach, Cetaceans, pl. 10. figs. 29 & 30), notwithstanding that it has no dorsal fin. It may be the young of a species of *Beluga*. From *Delphinus hastatus* the present species appears to differ essentially in size, and it is without the large hastate spot on the abdomen which characterizes that animal, and it does not belong to the same generic group. To this species Mr. Peale alludes as follows:—

“While in the water it appears to be entirely black, the white line being invisible. It is remarkably quick and lively in its motions, frequently leaping entirely out of the water, and, from its not having a dorsal fin, is sometimes mistaken for a seal.

“Specimens were taken in the North Pacific Ocean, latitude 46° 6' 50", longitude 134° 5' W. from Greenwich. Great quantities of a species of *Anatifa* were floating on the surface of the sea, on which they were probably feeding. Two, which had been struck and badly wounded with the harpoon, escaped, but the others did not leave the ship as the *Delphini* usually do when one of their number is wounded.”

“From the latitude and longitude given by Mr. Peale, it will be found that the land nearest to the point at which the animal was obtained is the coast of Oregon. It is therefore to be regarded with additional interest as entitled to admission into the fauna of the United States.”—*Cassin, l. c.*

This species appears to resemble *Delphinapterus* only in the absence of the dorsal fin, in which respect it also resembles *Beluga*, of which it is probably a species.

B. *Head rounded in front, scarcely beaked. The beak of the skull broad, depressed, scarcely so long as the brain-cavity.*

\* *Lateral wings of the maxilla horizontal, produced over the orbits. Dorsal distinct. Teeth conical.*

## 7. ORCA.

Head rounded, scarcely beaked. Skull rounded; the hinder wing of the maxilla horizontally spread over the orbits; beak short; the intermaxillaries about half the width of the jaw-bones; forehead flattened. Triangle in front of blowers slightly concave. Palate convex.

Teeth conical, acute, large, occupying the whole edge nearly to the notch, permanent. Dorsal fin high, falcate, in the middle of the back. Pectoral broad, ovate. Black, with white streaks beneath.

Orca, *Rondel. Pisc.*; *Gray, Zool. Ereb. & Terr.* 33, 1846; *Cat. Cetac. B. M.* 1860, 92; *Proc. Zool. Soc.* 1864, 244.



- Phocæna, sp., *Wagler, N. S. Amph.* 34.  
 Grampus, sp., *Gray, in Brookes's Cat.* 40, 1828.  
 Delphinus, sp., *Linn.; Illiger, Prodr.* 143, 1811.  
 Grampus (pars), *Gray, Spic. Zool.* 2, 1828.  
 Megalodontia, *J. Brookes, Cat. Mus.* 40, 1828.

a. *Brain-case depressed, broad. Teeth large, strong, conical. Orca.*

1. *Orca gladiator. The Killer.*

Black; circumscribed spot behind eye, spot on belly and under-side of tail white. Nose of skull nearly twice as long as the width of the notch. Teeth  $\frac{11}{11}$ , large, conical, slightly hooked.

Balænae minores in utrâque maxilla dentatis qu. Orcae vocantur, *Sibbald, Phal.* 6. t. 2. f. 3 (tooth).

Delphinus Orca, *Linn. Mant. Plant.* ii. 523; *S. N.* i. 108; *Schreb. Säugeth.* t. 340; *Fischer, Syn. Mamm.* 511; *Mag. Nat. Hist.* iv. 329. fig. 2; *Schlegel, De Dieren*, 87. t. 14 (good); *Abhandl.* ii. 33. t. 7, 8 (from life); *Sundevall, Æfv. K. Vetén. Akad.* 1861, 386. t. 8?; *Cuv. Oss. Foss.* v. 281; *Turton, B. F.* 17; *Fleming, B. A.* 34; *Jenyns, Man.* 42; *Bell, Brit. Quad.* 477. fig. (bad); *Nilsson, Skand. Fauna*, 603; *Gervais, Zool. et Paléont. Franç.* t. 37. f. 3, 4.

Grampus, *Hunter, Phil. Trans.* 1787, t. 16 (skull in *Mus. Coll. Surg.* n. 2515), cop. *Bell, Brit. Anim.* fig.; *Bonnat. Cétac.* t. 12. f. 1; *Shaw, Zool.* ii. 513. t. 232, lower fig.

Cachalot d'Anderson, *Duhamel.*

Delphinus Duhamelii, *Lacép. Cétac.* 314. t. 9. f. 1 (good).

Phocæna Orca, *Wagler, N. S. Amph.* 34.

Delphinus gladiator, *Bonnat. Cét.* 23; ? *Lacép. Cétac.* 302. t. 5. f. 3.

Delphinus Grampus, *Desm. N. Dict. H. N.* ix. 168; *Mamm.* 517, from *Hunter.*

Delphinus Grampus (The Large Grampus), *Owen, Cat. Mus. Coll. Surg.* n. 1136.

Grampus Orca, *Gray, in Brookes's Cat. Mus.* 40, 1828; *Lilljeborg, Skand. Hvaldjur*, 15.

Phocæna gladiator, *Lesson, Man.* 414.

Phocæna Grampus, *Lesson, Man.* 415.

Orca gladiator, *Sundevall, K. Vet. Akad. Ofvers.* 1861, 391; *Gray, Cat. Cétac. B. M.* 1850, 93; *Proc. Zool. Soc.* 1864, 244; *Malmgren, Arch. Naturg.* 1864, 90.

Grampus gladiator, *Lilljeborg, Skand. Hvaldyr*, 15.

Stour wagn, at *Finmark.*

Orca, *Rondel. Pisc.* 483. fig.; *Gesner, Aquat.* 748, fig. from *Rondel.*

? *Agluck, Pallas, Zool. Rosso-Asiat.* 305.

? *Aguluch, Chamisso, Nov. Act. Acad. Nat. Cur.* xii. 262. t. 20. f. 9?

*ANAT. Cuv. Oss. Foss.* v. t. 22. f. 3, 4; *R. A.* i. 289 (skull); *Jacob, Dublin Phil. Journ.* 1825, t. 2. f. 3 (very small and bad skull); *Gervais, Zool. et Paléont. Franç.* t. 37. f. 3, 4 (skull, from *Cette*).

Inhab. North Sea.

a. Skull. Coast of Essex. From Mr. Cross's Collection.

b. Skeleton 20 feet long. From Weymouth. Presented by R. Pearce, Esq.

c. Skull. From Mr. Turner's Collection.

There is a skull in Mr. Bell's museum, from a male 19 feet long, taken in Lynn Harbour, Nov. 1830. The animal was described in

Loudon's Mag. Nat. Hist. v. The following are the measurements of this specimen:—

	ft.	in.
Length along curve . . . . .	21	3
Length, straight . . . . .	19	0
Length to dorsal fin . . . . .	8	2
Length to pectoral fin . . . . .	4	0
Height of dorsal . . . . .	4	0
Height to dorsal . . . . .	13	1
Length of dorsal . . . . .	2	4
Length of pectoral . . . . .	4	0
Breadth of pectoral . . . . .	2	8

The following are the measurements of two skulls—No. 1 the specimen *a*, from Essex, in the British Museum, and No. 2 the specimen numbered 1136 in the Museum of the College of Surgeons:—

	No. 1.	No. 2.
	in.	in.
Skull: Length, entire . . . . .	33	41½
Length of nose . . . . .	19½	22½
Length of teeth-line . . . . .	14½	20
Length of lower jaw . . . . .	27¼	35
Breadth at notch . . . . .	10½	14
Breadth at orbit . . . . .	18	
Breadth at temple . . . . .	18	
Breadth at middle of beak . . . . .	9½	
Breadth of intermaxillary . . . . .		
Breadth in front . . . . .	4	6
Breadth in middle . . . . .	3½	3½

The skull, n. 1136 (see Owen, n. 2512) of the Museum of the Royal College of Surgeons, called the Large Grampus (*D. Grampus* in the Catalogue), is of most colossal size. It formed part of the Hunterian collection, and is probably the skull of the large specimen, 31 feet long, killed at Greenwich in 1793.—*Banks, in Lacépède*. It has teeth  $1\frac{1}{2}$ , very large, nearly to the notch. Intermaxillary rather dilated, broader over the front of the nose. The rest of the skeleton has been lately mounted and exhibited in the Museum of the Royal College of Surgeons.

“The skeleton from Ostend in the Louvain Museum:—Vertebra 50 or 51, viz. 7 cervical, 11 dorsal, 10 lumbar, and 22 or 23 caudal. Ribs 11. 11. The sternum formed of three bones, the first largest and longest, the last short and broad. The first ribs on the front outer edge of the first, the second on the suture between the first and second, the third on the suture between the second and third, the three others on the outer hinder edge of the last bone.”—*Flower, P. Z. S.* 1864.

The pelvic bones are elongate, subcylindrical, slightly curved.

In the Firth of Tay it goes up as far as the salt water reaches, almost every tide at flood, during the months of July and August, in pursuit of salmon, of which it devours immense numbers.

“The species is gregarious, and moves rapidly forward in the water.

When it comes to the surface to respire it remains, like the porpoise, but for an instant, and then dives, describing however in its course a much wider arch."—*Flem. B. A.* 34.

Lilljeborg has two species: one he calls "*Grampus gladiator*, Lacépède," which he describes as having twelve pairs of ribs, a white spot on the neck, and a very high dorsal fin; and the other, "*G. Orca*, Schlegel," with only eleven pairs of ribs, no white spot on the neck, and a moderately high dorsal fin. The former is evidently the *Orca gladiator* of the English zoologists; the other is probably a distinct species; but it cannot be the *Delphinus Orca* of Schlegel (*Abhandlungen*, ii. p. 2. t. 7 & 8), as that species has a distinct white spot on the side of the neck and a high dorsal fin, and well represents the *D. Orca* of our coast, and the skeletons of the English specimens which I have been able to examine have only eleven pairs of ribs.

The accuracy of the following habitats has been authenticated by the examination of the specimens or bones:—Greenwich (*Hunter*); skull Mus. Coll. Surg. n. 2515. Coast of Essex; skull in British Museum. Weymouth (*R. Pearce*); skeleton in British Museum. Lynn Harbour, 19th Nov. 1830; skull in Mr. Bell's museum (see Loudon's *Mag. N. Hist.* iv. 329, figure far too short). A school of ten in the Parrett, near Bridgewater, 24th March 1864 (*J. Clark*), varying from 11 to 22 feet long. Young specimen in the Thames at Greenwich, 1793 (*Banks*, in *Pennant*), length 31 feet; skeleton in British Museum and Museum of the Royal College of Surgeons. Ostend, adult male, and female of two years; adult skeleton, Mus. Louvain. Holland, 1841, 16 feet long; skeleton, Mus. Leyden.

The *Orca gladiator* has been twice captured in the Mediterranean. One was taken about twenty years ago at Cette; its dental formula was  $\frac{1}{1}$ : another came ashore at Elne, Pyrénées orientales, in 1857, but the fragment of the lower jaw, which is preserved, contains ten teeth, so that M. Gervais does not feel sure of its being the same species as the Cette specimen. It is also impossible to say whether it may be identical with the *Delphinus Feres*.—*Gervais, Ann. & Mag. N. H.* 1865, xv. 75. M. Gervais, in the '*Zool. et Paléont. Franç.*,' figures the skull of *D. Orca* from Cette.

*Delphinus Orca* (Linn. *S. Nat.* i. 108) is evidently from *Orca*, Belon, Poiss. 18, Rond. *Pisc.* 433, fig., copied by Gesner, *Aquat.* 748. In the '*Mantissa*,' ii. 523, the reference to the *Schwerdtfische* of Anderson and some other whalers is added, and probably from them is taken the following note:—"Bellum gerit cum Phocis, quas ope gladii dorsalis e lapidibus detrudit; Balænarum Phocarumque tyrannus, quas turmatim adgreditur. Pinna dorsalis est spina ensiformis, sexpedalis, cute vestita, basi latior." (*Mant.* ii. 523.) Bonaterre gave the name of *Delphinus gladiator* to Anderson's figure, which represents the dorsal fin as situated near the nape.

Cuvier believed that the *Orca* of the ancients was probably a Cachalot, and that the Killer is the *Aries marinus* of Pliny, Ælian, and the Latins, who compared the white streak behind the eye to a horn. Desmarest (*Mamm.* 515) confines the name *Delphinus Orca*

to the animal intended by the ancients, and characterizes it, "Museum conformé comme celui du Dauphin vulgaire, dents larges et crénelées sur leurs bords"—being a translation of Artedi (Gen. Piscium, 76, 3), "D. rostro sursum repando, dentibus latis serratis."

O. Fabricius observes that he never saw *D. Orca*; but Professor Eschricht believes the *Physeter microps* of O. Fabricius to be the Killer, or *D. Orca* of Linnæus (Dan. Trans. xii.).

Fabricius says, "The *Aidluik* has in the lower jaw 22 teeth, 11 on each side, arched, falciform, hollow internally as far as the point, projecting scarcely a third part (and this visible part is enamelled, compressed-conical, with the point sharp, curved inwardly and at the same time verging a little backwards; but the concealed part broader and having two parts, compressed anteriorly and posteriorly, and, especially on the side nearest the throat, channelled); of the length of a finger, and  $1\frac{1}{2}$  inch broad; the middle ones larger, the anterior and posterior smaller. Beak rather obtuse. Beside the pectoral fins, it has a long, erect dorsal fin. In size it is to be regarded as amongst the smaller whales. Skin glabrous, black; the fat thick, but little oily; flesh red."—*Fabricius, Faun. Grœnl.*

Of the *Aidluik* wonderful stories are told: the following is not the most extraordinary:—"Where these appear, all the seals disappear, else they make desperate slaughter among them; for they have such sagacity and skill in catching them with the mouth and fins, that they are sometimes seen loaded with five at a time, one in the mouth, a couple under each fin, and one under the back fin."—*Crantz, Greenland*, i. 116.

I formerly thought that the *Aidluik* of O. Fabricius was identical with the *Balœna microcephala* of Sibbald; but Professor Eschricht observes that it is most important, in the determination of O. Fabricius's synonyma, to attend to the Greenlanders' names, as they are most accurate *cetologists*. He states (on the authority of Captain Holböll) "that two of the animals which Fabricius referred to *Physeter*—viz. 1st, the 'Pernak' (which he called *P. Catodon*), probably, and, 2nd, the 'Aidluik,' called by him *P. microps* (which Cuvier thought might be *D. globiceps*), certainly—are the Northern Sword-fish, *Delphinus Orca*."—*Kong. Danske Afhandl.* xi. 136. (See also Eschricht, *Øversigt Kong. Vid. Selsk. Förh.* 1862, 65.) In his last paper he regards the *Ardluksøak*, or the Large Greenland *Orque*, as the male, and the *Aidluik* as the female of the *Delphinus Orca*.—*Ann. Sci. Nat.* 1864, 209.

Fabricius's description of the 'Aidluik' will do for *Orca gladiator*, except that he calls it black, and does not mention the very remarkable white marks of that species, and he described the lower jaw only as toothed. Now the upper teeth of *Orca* are not deciduous. It is more probably a *Grampus*.

Lilljeborg describes two species of *Orca*, one with 11, and the other with 12 ribs; but they seem to vary in number in the same specimens. Professor Eschricht thinks there are more than one European species of *Orca*; but he has not characterized the species, and only gives some rambling notes on their wanting systematic consideration.

## 2. *Orca intermedia*. *The Small Killer*.

Nose of skull half the entire length. Teeth  $\frac{11}{11}$ , long, conical.

*Delphinus intermedius*, Gray, *Ann. Phil.* 1827, 396 (not Harlan).

*Orca intermedia*, Gray, *Zool. E. & T.* 34. t. 8 (skull); *Cat. Cetac. B. M.* 1850, 96.

*Grampus intermedius*, Gray, *List Mamm. B. M.* 104.

a. Skull —? The specimen described in the 'Annals of Phil.' and described and figured in the 'Voyage of the Erebus and Terror.'

The following are its measurements:—

	in.	lin.
Skull: Length, entire	14	0
Length of nose	7	0
Length of teeth-line	5	6
Length of lower jaw	11	0
Breadth at orbit	8	3
Breadth at notch	4	6
Breadth at middle of beak	0	9

This skull, which has all the appearance of being that of a full-grown animal, is just one quarter the length and breadth of the skull of the adult common Killer (*Orca gladiator*).

"In the 'Zoology of the Erebus and Terror,' Dr. Gray has figured and described a skull (in the British Museum, locality unknown) under the name of *Orca intermedia*. This is evidently that of a very young individual, probably of one of the above-mentioned large species. At all events the number of the teeth ( $\frac{11}{11}$ ) and the form of the premaxillaries distinguish it from the Tasmanian skulls."—*Flower, P. Z. S.* 1864.

## 3. *Orca Capensis*. *The Cape Killer*.

Skull flattish above, rather concave in the middle before the blow-hole. Nose rather convex on the side, rather tapering in front. Teeth  $\frac{12}{12}$ , side upper very large, thick, nearly to the preorbital notch, concave on each side for the reception of the teeth of the opposite jaw; the front upper small, acute; front lower large, worn down, rounded. Intermaxillaries rather dilated, and broader over the front of the nose, contracted behind.

*Delphinus globiceps*, Owen, *Cat. Mus. Coll. Surg.* 165. n. 1139; *Grant, Proc. Zool. Soc.* 1833, 65.

*Delphinus Orca*, Owen, *Brit. Foss. Mamm.* 516; *Eydoux, Mus. Paris.*

*Orca Capensis*, Gray, *Zool. Erebus & Terror*, 34. t. 9 (skull); *Cat. Cetac. B. M.* 1850, 95.

*Grampus*, Bennett, *Whaling Voyage*, ii. 239.

*Grampus gladiator*, A. Smith, *African Zool.* 126.

*The Killer of the Whale-fishers.*

Inhab. Southern Ocean. Cape of Good Hope (*M. Vilete*, 1818), *Mus. Coll. Surg.* n. 1139. Northern Pacific Ocean (*Captain Delvitte, R.N.*). Chili (*Eydoux*), *Mus. Paris.*

a. Skull. Northern Pacific Ocean. Presented by the Zoological

Society of London. The specimen figured in the 'Voyage of the Erebus and Terror,' fig. 9. p. 34.

The following are the measurements, first, of the specimen n. 1139 in the Museum of the Royal College of Surgeons, and, secondly, of the skull in the British Museum:—

	in.	lin.	in.	lin.
Skull: Length, entire . . . . .	37	0	36	6
Length of nose . . . . .	18	0	18	0
Length of teeth-line . . . . .	14	6	14	6
Length of lower jaw . . . . .	29	6	29	6
Breadth at notch . . . . .	12	6	12	0
Breadth at orbit . . . . .	21	0	21	0
Breadth at temple above . . . . .	20	0	20	0
Breadth at middle of beak . . . . .	10	0	10	0
Breadth of intermaxillaries . . . . .	3	9	3	6
Breadth in front . . . . .	4	6	4	6
Breadth in middle . . . . .	3	3	3	3

Professor Owen observes, "The skull of the Cape Grampus (*Delphinus Orca*) is of a somewhat small size, and differs from the preceding specimen (the *Orca* of the Thames) chiefly in the greater development of the tuberosities and curved ridges on the sides of the superoccipital, and in the less development of the median vertical ridge. The contour of the occiput at this part is straight; it presents a double sigmoid curve in the Great Grampus (*D. Orca*). The slender nasal processes of the premaxillaries form convex ridges on this skull: they are more flattened in the Great Grampus. There are two small additional teeth at the back of the series, which may depend upon the present specimen having belonged to a younger individual. The slight differences noticeable in the skull chiefly depend on the muscular attachment, and are of a kind to characterize varieties, not to establish specific distinctions." (*l. c.* 456. no. 21519.)

The skull in the Royal College of Surgeons appears to be the one which Professor Owen gives the measurement of as *D. Orca*, in his account of *Phocæna crassidens* in the 'British Fossil Mammalia.'

The Grampus of the South Sea whalers is very frequently noticed in the Pacific Ocean, from the equator to 44° N. and 10° S. latitude. They occur in herds, and their appearance is supposed to indicate the resorts of the Cachalots. Whether this whale is identical with the Grampus (*Phocæna Orca*) of the North Sea may be fairly questioned; but should it prove to be so, the geographic range of the latter species must be indeed extensive.—*Bennett, Whaling Voyage*, ii. 238.

Mr. Bennett mentions a Killer which appears in small bands, chiefly in the vicinity of the equator, of a moderate size, spouts much like the Cachalot, and has a tall erect dorsal fin.—*Bennett, l. c.* 239.

Sir Andrew Smith has given me the drawing of a species of an *Orca*, from the Cape of Good Hope, which exactly agrees, in the distribution of the colour, with the *Orca gladiator* of the British coast. It only differs from Schlegel's beautiful figure of the European *Orca* in the bands which extend up the hinder part of the sides being rather narrower and with more parallel edges, instead of broad, and

curved outward on the sides. This similarity of the external colouring in two species of such different geographic distribution, easily explains why they have been considered the same species though they are half the globe apart. The examination of the skeleton, and especially of the skull, shows that they are quite distinct. It is the same with the species of *Globiocephalus* of the North Sea and of the Southern Ocean.

- b. *Brain-case high, subglobular. Rostrum very short, narrowed in front. Teeth small, slender. Orcaella.*

#### 4. *Orca brevirostris.*

The brain-case subglobular, evenly convex above. The rostrum very short, tapering, and subacute in front, about two-thirds the length of the brain-case to the notch. The maxilla narrow in front, wider in the middle, where it is about as wide as the intermaxillary on each side. The premaxillary broad, rather convex, solid, separated by a wide central groove. The rostral triangle very large, produced much in front of the notch. Palate flat in front. Teeth  $\frac{17.17}{14.14}$ , slender, subcylindrical.

*Phocæna (Orca) brevirostris*, Owen, *Zool. Trans.* v., ined.

Inhab. East coast of India, the harbour of Vizagapatam.

- a. Skull. Presented by Walter Elliot, Esq., of Woolflee. The skull described by Professor Owen.

The following description, by Professor Owen, is taken from the skull of a small Cetacean which was cast ashore in a decomposed state in the harbour of Vizagapatam, east coast of India. It belongs to Cuvier's section of Blunt-headed Dolphins, in which, by the form of the teeth, it is allied to the *Phocæna globiceps*, Cuv.; but it indicates, by the shortness of the muzzle and some osteological characters, a nondescript species, for which the name *Phocæna brevirostris* is proposed.

"The basioccipital forms the lower fifth of the foramen magnum, intervening, for an extent in a straight line of  $10\frac{1}{2}$ "', between the lower ends of the occipital condyles; it is here thick, concave transversely, becoming thinner vertically and expanded transversely as it advances to join the basisphenoid, with which it has coalesced.

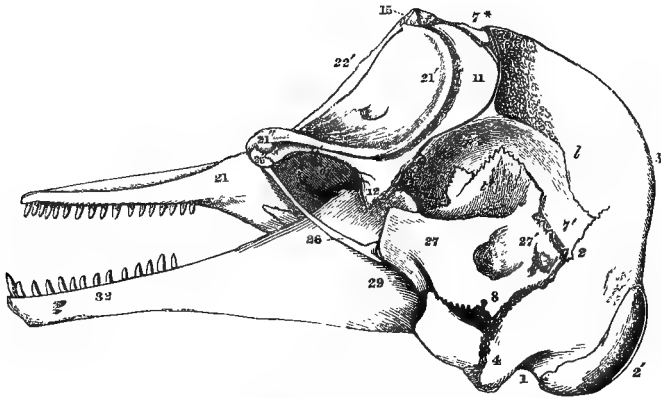
"A slight median longitudinal obtuse ridge divides the back part of the under surface of the basisphenoid into two shallow concavities, from the sides of which the otocranial plates extend, which bend slightly downward to form the lower and inner or mesial wall of the otocrane.

"The occipital condyles (2', fig. 57) are narrow, vertically elongated, oval convexities, wider at their lower half, with the mesial margin gently convex, the lateral or outer margin sinuous, through a slight concavity marking off the upper third of the condyle: the length of the condyle in a straight line is 2" 1"', the greatest breadth 1" 12"':

the upper ends of the condyles are 1" 3''' apart. They are low and sessile.

"The foramen magnum is vertically oval, widest above, and notched at the middle of the upper border; its length, to the end of the notch, is 2'', its breadth 1" 3''' ; the breadth across the broadest parts of both condyles is 2" 9''' .

Fig. 57.

Skull of *Orca brevirostris*.

"The paroccipital (4), an exogenous growth of the exoccipital, forms the back part of the otocrane, towards which it is sinuous or slightly concave, and terminates below in a thick, rough border: this border is divided by a notch from the otocranial plate of the basisphenoid; and just within the verge of that notch opens the canal for the 'nervus vagus.'

"The superoccipital (3) rises and expands, as in other Delphinidæ, into a broad and lofty convex plate, reaching the vertex and there articulating with the parietals (7) and interparietal (7\*): a low median ridge divides vertically the upper half of the superoccipital. On the inner surface, 1" 6''' above the foramen magnum, a vertical triangular plate of bone descends into the falx; it is thickest behind, where its base is grooved transversely by the lateral sinus.

"The alisphenoids coalesce with the fore part of the lateral border of the basisphenoid, in advance of the otocrane, of which it forms the anterior wall or boundary: the base of the alisphenoid is notched posteriorly (*tr*) for the third, and anteriorly (*m*) for the second division of the integument; it expands as it passes outwards, slightly rising to join the parietal (7) and frontal (11), and to overlap the process of the squamosal continued mesiad from the glenoid cavity. The suture between the interparietal (7\*) and superoccipital (3) is obliterated, and that with the parietals is partially so. The suture between the parietal and superoccipital remains at its lower half, showing that a narrow strip of the parietal appears on the external surface of the



cranium, extending backward, between the squamosal (27') and superoccipital (3) to the exoccipital (2), and slightly expanding at its junction therewith.

"The presphenoid is distinct from the basisphenoid, and extends in the form of a compressed rostrum forward, contracting, to be enclosed by the posterior sheath-shaped part of the vomer. The orbitosphenoids extend outward, overlapping the pterygoids, contract where they form the fore part of the foramen lacerum anterius and the optic foramina, beyond which they expand to support the orbital plate of the frontal.

"The frontals (11, 11'), in great part overlapped, as in other Cetacea, by the maxillaries (21), show, at their narrow exposed strip, extending transversely across the summit of the cranium, the persistent frontal suture, half an inch in length: from this suture, the strip curves outward and backward, expanding beyond the interparietal (7\*), and then downward and forward, contracting, and again expanding to form the postorbital process (12), which is triangular and three-sided, one facet being a continuation of the exposed strip, a second contributing to the temporal fossa (*t*), and a third to the orbit (*or*).

"In the temporal fossa (*t*) the frontal (11) articulates with the parietal (7) and alisphenoid (6), in the orbit with the orbitosphenoid and malar; then arching forward from the postorbital process, the frontal forms the superorbital ridge (11'), and articulates anteriorly by a kind of gomphosis with the malar (26'): it is overlapped here, as on the cranium, by the maxillary (21''). The medial parts of the frontals are united posteriorly with the interparietal (7\*), anteriorly with the nasals (15).

"The vomer extends forward to within  $1\frac{1}{2}$  inch of the end of the premaxillaries, and, behind these, intervenes upon the bony palate between the maxillaries, along a strip of 2 inches extent and 3 lines across the broadest part. This palatal part of the vomer is the lower convexity of the canal formed by the spout-shaped bone: the hollow of the canal is exposed at the upper interspace of the premaxillaries. Here also is seen, 2 inches behind the fore end of the vomer, the rough, thick, anterior border of the coalesced prefrontals, which contracts as it passes into their upper border, forming the septum of the nostrils, expanding below and behind to form the back wall of the nasal passages. Here a trace of the suture between these foremost neurapophyses of the skull remains. The small, transversely extended, subquadrate nasals (15) intervene between the frontals and prefrontals.

"The palatine bones appear in the palate as narrow strips wedged between the maxillaries and pterygoids, and united together beneath the vomer by a longitudinal suture of 3''' in extent: passing outward and forward, after a brief contraction, they suddenly expand and bend upward to line or form the mesial wall of the orbit, and again contract to articulate with the frontal, at the superorbital fossa. The mesial borders of the palatines articulate with the vomer and prefrontals; and, between the pterygoids and the vomer, the palatines form the fore part of the lower half of the nasal passages.

“The orbital plate of the palatine sends off an outer thin lamina, which terminates by a free margin at the back of the orbit. The palatine plates of the maxillaries unite together for about an inch in front of the palatines, then slightly diverge to give place to the vomer, which, however, does not sink to their level: in advance of the vomer the plates slightly diverge to their anterior ends, giving place to the premaxillaries, which form the apex of the muzzle. The rest of the disposition of the maxillaries accords with Cuvier's account in *Phocœna globiceps*. The superorbital plate is divided by a notch from the rostral part of the maxillary, and forms a tuberosity articulated with the underlying malar (26).

“The premaxillaries (22) accord equally with those in *Phocœna globiceps*, save in their shorter proportions concomitantly with those of the maxillaries and of the muzzle. They are perforated near the outer margin, between the posterior and middle third, the canal leading forward and inward: the three perforations in the maxillary, external to the nasal portions of the premaxillary, are of canals which converge to open in an oblong fossa beneath the fore part of the roof of the orbit.

“The pterygoid is a large, sinuous plate, folded upon itself from within upward, outward, and backward: the thick fore part articulates with the palatine, whence it continues the bony roof of the mouth backward for the extent of 1" 8"', with a convex surface, divided from its fellow by a vacancy of 8"' breadth, exposing the presphenoid and vomer: the inner plate of the pterygoid forms the outer wall of the lower part of the nasal passage, and continues that passage obliquely backwards, as an open canal, beneath the base of the alisphenoid (6), as far as the otocranial plate of the basisphenoid (5'). This posterior production of the pterygoid is three-sided: the inner or narial one is concave; the outer one is also concave, forming a channel leading upward and forward to the orbit; the upper facet is sutural, and articulates with the basi-, pre-, ali-, and orbito-sphenoids. The anterior external lamina of the pterygoid bends outward and upward to articulate with the corresponding free lamina of the palatine (*r*), bounding the narrow and deep sinuous fissure between the outer and inner portions of both bones.

“The malar (26), as in other Delphinidæ, consists of the antorbital and styliform (26) portions. The former is a narrow triangle with the base thick, convex, turned forward, underpropping the fore part of the superorbital plate of the maxillary (21'), and articulating with the same part of the frontal; the apex extends backward, and is wedged into the roof of the orbit between the frontal and maxillary. The styliform portion (26) is given off by a process extending inward (mesiad), at right angles to the antorbital portion; and a few lines behind its fore part it suddenly contracts, and extends backward, with a slight upward bend, to the squamosal, articulating by a concave, oblique terminal facet to a tubercle at the fore and under part of the zygomatic process of the squamosal (27); the length of this part of the malar is 3", its thickness throughout the greater extent is 1½" by 1"; its squamosal articulation is 4"' across. The form of

the orbit (*or*), so defined below, is longitudinally oblong, more arched above than below, 2" 2'" in fore-and-aft diameter, 1" 2'" in greatest vertical diameter, the chamber communicating, of course, largely with the temporal fossa (*u*) and the small antorbital fossa (*d*), external to which is the rough malo-maxillary fossa (*e*).

"The squamosal consists chiefly of its articular or zygomatic part (27); which is deep in proportion to its length, truncate, and three-sided; the outer side is slightly convex or rather rough, 1" 5'" deep posteriorly; the inner side is divided between the articular cavity, rough for syndesmosis with the mandible, and the smoother surface internal to it, which extends mesiad in a triangular depressed form (27') beneath the back part of the alisphenoid (6), but without joining it; the upper surface, of an inequilateral shape, contributes a lower wall to the temporal fossa. The squamous portion (*t*) continued upwards from this facet, is triangular, with a rounded apex, about an inch in height and rather more in breadth; it is applied against the alisphenoid and parietal: the rough posterior tract (8) articulating with the parietal (7') and exoccipital (2), and contributing to the outer wall of the otocrane, I consider to be the 'mastoid,' confluent with the squamosal, and forming the bone which should be termed 'squamo-mastoid' (27-8, fig. 57). The mastoid part (8) terminates below in a rough, flattened, triangular surface, 5" 7'" in diameter, which is divided from the zygomatic or articular process of the squamosal (27') by a deep fissure. On the inner side of the base or back part of the mastoid, in the line of its suture with the parietal, is the (stylomastoid?) fossa, &c.: the squamosal forms no part of the inner or proper wall of the cranial cavity.

"The glenoid or mandibular-articular surface is longitudinally oblong, 1" 5'", by 8'" in diameter, moderately concave, least so transversely, and looking inward, downward, and with a slight inclination forward.

"The mandible (29-32, fig. 57) offers no notable peculiarity, save that which relates to shortness in proportion to the entire skull, concurrently with the same specific character of the upper jaw. The depth of the ramus at the coracoid process is relatively as great as in the longer-jawed species, and consequently bears a greater ratio to the length of the entire ramus; this in the present skull is 7", the greatest vertical extent of the ramus being 2" 6'" : the shallowest part of the ramus is where it supports the teeth (32); it deepens a little at the short symphysis. There are fourteen alveoli, approximated in a common groove, in each mandible, extending along 3" 3'" from the symphysis. The corresponding groove of the upper jaw shows seventeen alveoli, along an extent of 3" 6'". The deeper part of the alveolus is distinct for the anterior teeth; but as they recede the sockets are indicated by depressions merely in the common groove. The teeth are slender cones."

See also

1. ♀ *Delphinus Feres*, *Bonnat. Cétac.* 27; *Gray, Cat. Cétac. B. M.* 1850, 91.

Blackish; teeth  $\frac{1}{0}$ , large and small, curved, compressed before

and behind; crown oval, rounded, and divided into two lobes by a groove which extends their whole length.

Inhab. Mediterranean: Malta.

Length 14 feet. Skull 1 foot 10 inches, breadth 1 foot 5 inches; length of teeth 1 inch, breadth of line  $\frac{1}{2}$  inch. Cuvier thinks this is probably *Orca gladiator*.

2. *Delphinus Orca*, *Chamisso*, *Nov. Act.* xii. t. 20. f. 9; *Pallas*, *Zoogr. Rosso-Asiat.* i. 285; *Tilesius*, *Isis*, 1835, 726.

Inhab. North Pacific: Kamtschatka.

3. Dr. J. R. Foster mentions *Delphinus Orca* as occurring in the Eastern tropical islands.—*Descrip. Anim.* 210.

## 8. PSEUDORCA.

Head rounded, scarcely beaked. Skull rounded, the hinder wings of the maxilla horizontally spread over the orbits. The beak short, broad, tapering; intermaxillary broad, covering great part (more than half) of the maxilla. The triangle in front of the blowers, concave. Teeth conical, acute, large, occupying the whole edge nearly to the notch. Dorsal fin moderate, in the middle of the back. Pectoral small, ovate. Black, rather paler below.

*Pseudorca*, *Reinhardt*, *Overs. K. D. Vid.* 1862; *Flower*, *Proc. Zool. Soc.* 1865.

*Orca*, sp., *Gray*, *Cat. Cetac.* 1851, 95.

*Phocæna*, sp., *Owen*, *Brit. Foss. Mamm.*

### 1. *Pseudorca crassidens*. *The Lincolnshire Killer*.

Intermaxillaries rugose in front. Teeth  $\frac{10}{0}$ , large, conical, rather acute (all but the front lower false), extending nearly to the pre-orbital notch. Lower jaw very depressed, and broad in front at the symphysis.

*Phocæna crassidens*, *Owen*, *Brit. Fossil Mamm.* 516. f. 213, 214, 216 (skull and united cervical vertebræ).

*Orca crassidens*, *Gray*, *Zool. Erebus & Terror*, 33; *Cat. Cetac. B. M.* 1850, 95.

*Pseudorca crassidens*, *Reinhardt*, *Overs. K. D. Vid. Selsk. Forhand.* i. 1862, 104. f. 1, 2, 3.

Inhab. North Sea, in shoals (*Reinhardt*). Fens of Lincolnshire: fossil skull in Mus. Stamford (now in Mus. Cambridge), of the following measurements:—

	in.	lin.
Skull: Length, entire . . . . .	23 or 24	0
Length of nose . . . . .	12	6
Length of teeth-line . . . . .	10	0
Length of lower jaw . . . . .	21	0
Breadth at notch . . . . .	8	6
Breadth at middle of beak . . . . .	8	0
Breadth of intermaxillaries . . . . .	5	6

In the figure the length of the beak is once and a half the breadth of the base at the notch, and exactly the length of the skull.

The bladebone a nearly equilateral triangle, with an arched upper edge; a large coracoid and acromion process, which are narrow at the base and dilated at the end. Ribs 10.10. The humerus short, subtriangular, broad at the distal end. The ulna thick, compressed, nearly twice as long as the humerus, the ulna rather produced at the upper outer edge. Metacarpi 5, subtriangular; fingers 5, tapering: the second longest, of seven joints; the third very little shorter, of six joints; the fourth very short and thick, of three short joints; the fifth very short and thick, of two joints; and the first shorter still and more slender, of a single joint (see Reinhardt, 142, fig. 3, one-third size). Cervical vertebræ anchylosed (see Owen, Brit. Fossil Mammalia, fig. 214, p. 520, and side view of skull, f. 213, and palate, f. 216).

Dr. Reinhardt states that in one specimen there were all the seven, and in the other only six, cervical vertebræ united, while in a third there were only five, including the first; and he believes that this is dependent on age. The lateral process of the atlas is strongly developed.

## 2. *Pseudorca meridionalis*. *The Tasmanian Blackfish*.

Colour, black on the back and sides, lighter below. Males much larger than the females. Head obtuse, after the fashion of the Sperm Whale. Pectoral fins small; dorsal fin hook-shaped, and situated about two-thirds along the body towards the tail. Teeth  $\frac{8.8}{10.10}$ , very large, rather compressed on the sides. Nose of skull broad, tapering, rounded above. Lower jaw broad, and flat at the symphysis.

Orca (*Pseudorca*?) *meridionalis*, *W. Flower, Proc. Zool. Soc. 1864*, f. 1 & 2 (skull).

Blackfish, *Van Diemen's Land whalers*.

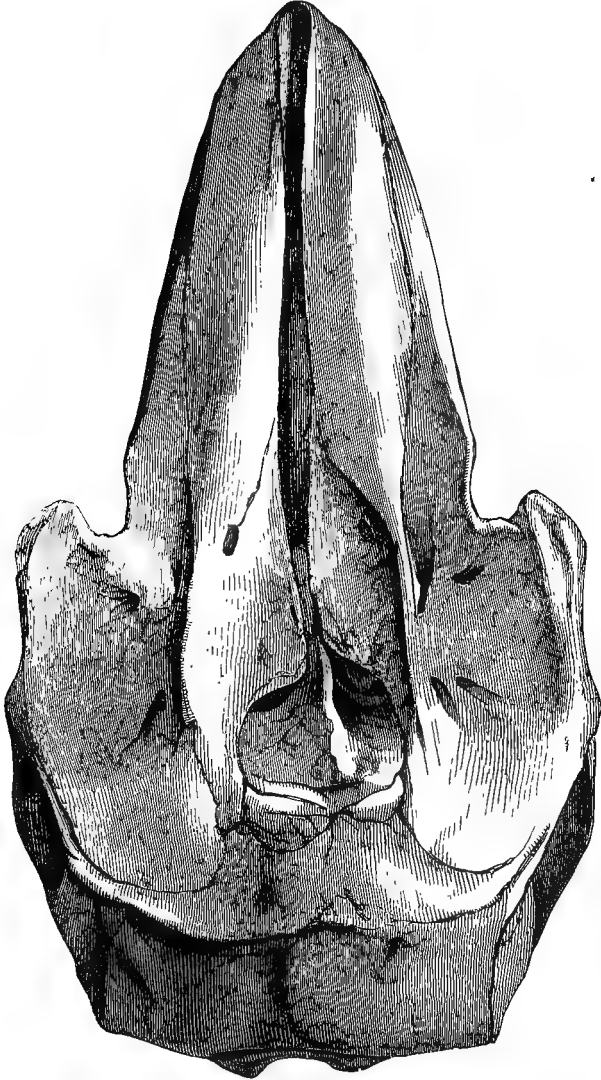
Inhab. Van Diemen's Land: Hobart Town; called with other whales Blackfish (*W. L. Crowther*). Two skulls, Mus. Coll. Surg.

"To find distinctive characters to separate the present species from *O. crassidens* is a matter of greater difficulty. I speak of the animal now existing in the northern seas, which Reinhardt has fully described in an illustrated memoir in the Danish language, and which he believes to be identical with the Lincolnshire specimen.

"The beak is much more pointed at the extremity, and the premaxillaries are of different form. In *Pseudorca crassidens* they are of nearly equal breadth from one end to the other, their outer margins being almost parallel; in the Tasmanian skulls they are contracted at the root of the beak, and then gradually expand to about the middle, beyond which they slowly diminish in breadth to the point. An examination of the skulls placed side by side might possibly reveal other differentiating characters; but I think that these are sufficient, together with the great improbability of the same species being found in such widely different regions, to justify my regarding the small Grampus from Tasmania, however familiar

to the inhabitants of that country, as a species new to zoological literature, and imposing upon it the name of *Orca* (*Pseudorca?*) *meridionalis*.

Fig. 58.



Upper surface of the adult skull (*Pseudorca meridionalis*); one-fourth  
... natural size.

Fig. 59.



Side view of the adult skull (*Pseudorca meridionalis*); one-fourth natural size.

“The two skulls present considerable individual peculiarities; but

these all arise, I believe, from difference of age. One is perfectly adult; the suture between the frontal and occipital bones is entirely obliterated; the upper ends of the maxillaries are ankylosed to the frontal; the teeth, though pointed at the tips, have a polished surface, and many of them are worn at the sides by the mutual action upon each other of the upper and lower series. In the other skull the ossification of the sutures is less advanced; the teeth show no signs of wear, and have a uniform slightly rufous or granulated surface. This skull differs from the other, as will be more particularly shown by the measurements, in having the facial portion and all the ridges and outgrowths of the cranium for the attachment of muscles much less developed in proportion to the size of the cerebral cavity. In all essential specific characters they agree. Unless otherwise expressed, the description and comparisons which follow refer to the adult skull.

“The principal dimensions of the two skulls in the Royal College of Surgeons are as follows:—

	Adult.	Young.
	in.	in.
Length from tip of beak to condyles .....	23 $\frac{1}{2}$	20 $\frac{1}{2}$
Internal length of brain-cavity .....	7 $\frac{1}{2}$	7
Length of beak (from a line drawn between the maxillary notches, to the tip) .....	11 $\frac{1}{2}$	9 $\frac{1}{2}$
Length from tip of beak to anterior margin of superior nares..	14 $\frac{1}{2}$	12
Length of palate (from tip of beak to posterior margin in middle line) .....	15	12 $\frac{3}{4}$
Length from tip of beak to hinder edge of posterior tooth ...	9 $\frac{1}{2}$	8 $\frac{1}{2}$
Height of skull at vertex .....	8 $\frac{3}{4}$	8 $\frac{1}{2}$
Greatest breadth (at zygomatic processes of squamosals).....	13	11
Breadth of brain-case in parietal region .....	9 $\frac{1}{2}$	9 $\frac{3}{4}$
Breadth at supraorbital ridge .....	11 $\frac{3}{4}$	10
Breadth of the base of the beak, inside maxillary notch .....	7 $\frac{1}{2}$	6 $\frac{1}{2}$
Breadth of the middle of the beak .....	5 $\frac{1}{2}$	5 $\frac{1}{2}$
Breadth of the two premaxillaries, with their intervening space at the middle of the beak .....	4 $\frac{1}{2}$	3 $\frac{3}{4}$
Width of condyles.....	5 $\frac{3}{4}$	4 $\frac{3}{4}$
Foramen magnum, height .....	2 $\frac{1}{2}$	
Foramen magnum, width.....	2 $\frac{1}{2}$	2
Lower jaw, entire length of each ramus .....	19	16 $\frac{1}{2}$
Lower jaw, from tip to the posterior edge of last tooth .....	9 $\frac{3}{4}$	8 $\frac{1}{2}$
Length of symphysis .....	3 $\frac{1}{2}$	2 $\frac{1}{2}$
Height of ramus, at coronoid process .....	5	4
Width, posteriorly, between outside of articular surfaces ...	12 $\frac{1}{2}$	10 $\frac{1}{2}$

“The teeth are nearly circular in section, stout, conical, pointed, incurved, and very slightly recurved. The crowns of the largest measure 1·2 inch in length, and 0·65 inch in diameter at the base. With the exception of the two anterior and the posterior, they are of very nearly equal size throughout. Their number is the same in both skulls, viz. eight on each side above, and ten below; but though the whole number is the same, I suspect that it is not exactly the corresponding teeth which are in place in both specimens, at all



events as far as the upper jaw is concerned. By comparing tooth with tooth, especially as regards their position in the alveolar margin, the older specimen would appear to have lost the small anterior pair present in the younger one; while in the latter the posterior pair appear not yet to have been developed. It must be confessed that our knowledge of the growth and succession of these organs in the Cetacea is at present so imperfect that we ought not to lay much stress upon any trifling variations in their number or character in discriminating species."—*Flower, P. Z. S.* 1864.

"'Blackfish.'—This fish is in reality a miniature Sperm Whale in its habits, &c., feeding upon the same food ('squid'), geographically occupying the same localities as the Sperm Whale, following the great equatorial currents so long as they retain their warmth, and met with in the greatest numbers in the southern hemisphere at those points where the equatorial meet the polar currents, eddies being formed in which no doubt the squid collects. I am not aware that the Blackfish preys upon anything but squid; it is essentially gregarious, countless hordes being met with where food is abundant. Length 12 to 15 feet; diameter 3 to 4 feet. Weight two to three tons, the former about the average. Oil, the only kind that will mix with sperm."—*W. L. Crowther, P. Z. S.* 1864.

Mr. Flower has since received two skulls of the genus *Globiocephalus*, probably two distinct species, under the name of "Blackfish," so that the above description may refer to them. See *Flower, P. Z. S.* 1865.

## 9. GRAMPUS.

Head rounded, forehead rather convex. Teeth conical, of upper jaw early deciduous, only in the front half of the lower jaw. Dorsal distinct, low, rather behind the middle of the back. Pectorals ovate, rather elongate.

Skull depressed; intermaxillaries dilated, covering great part of the maxilla above, rather swollen behind in front of the blowers, the hinder wing of the maxilla horizontal and rather thickened and bent up over the orbit, and slightly dilated and reflexed just in front of the notch.

*Grampus (pars), Gray, Spic. Zool.* 2, 1828.

*Grampus, Gray, Zool. E. & T.* 30, 1847; *Cat. Cetac. B. M.* 1850, 82; *P. Z. S.* 1864, 245.

*Cetus, sp. (Aries), Wagler, N. S. Amph.* 33.

*Phocæna, sp., Wagler, N. S. Amph.* 34.

\* *Triangle in front of the blowers elongate, produced in front over the vomer.*

### 1. *Grampus Cuvieri.* *Cuvier's Grampus.*

Bluish black; beneath dirty white, passing into the black on the sides. Nose of the skull broad at the base, narrow in front, and con-

cave on the sides, not quite half the entire length of the skull; lower jaw with two truncated teeth on each side in front.

*Phocæna grisea*, Lesson, *Man.* 413; *Wagler, N. S. Amph.* 34.

*Grampus griseus*, Gray, *Spic. Zool.* 2, 1828.

? *Grampus*, Hunter, *Phil. Trans.* 1787, t. 17.

? *Delphinus ventricosus*, Lacép. *Cét.* 311. t. 15. f. 3; *Schreb. Säugeth.* t. 341, both copied from *Hunter*, t. 17.

? *Phocæna ventricosa*, Lesson, *Man.* 415, from *Hunter*.

*Delphinus globiceps*, var., Nilsson, *Skand. Fauna*, 608.

*Grampus Cuvieri*, Gray, *Ann. N. H.* 1846; *Cat. Osteol. B. M.* 36; *Zool. Erebus & Terror*, 31; *Cat. Cetac. B. M.* 83, 1850; *Proc. Zool. Soc.* 1864.

*Delphinus griseus*, *Cuv. R. A.* i. 290; *Ann. Mus.* xix. t. 1. f. 1 (not good), cop. *Schreb.* t. 345. f. 1; *Oss. Foss.* v. 284, 306, t. 22. f. 1, 2; *F. Cuvier, Cétac.* 182. t. 12. f. 2; *Desm. Mamm.* 518; *Fischer, Syn. Mamm.* 512; *Gervais, Zool. et Paléont. Franç.* 149. t. 37. f. 5 (from Brest); *Schlegel, Abhandl.* 33.

Marsouin, *Duhamel, Péch.* iv. t. 9. f. 5.

Inhab. North Sea. Coast of France: Brest, Rochelle (*D'Orbigny*), 1822. Isle of Wight, Hampshire (*Rev. C. Bury*), 1845.

a. Skull. Isle of Wight. Presented by the Rev. C. Bury.

The measurements of *D'Orbigny's* (first) old and (second) young specimens:—

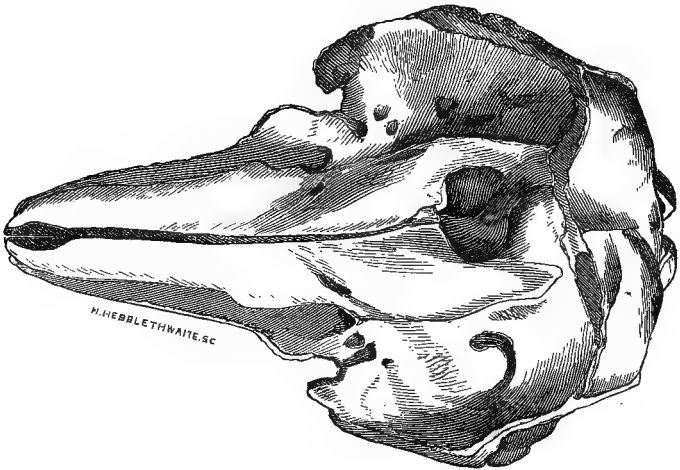
	ft.	in.	
Length, entire . . . . .	10	0	(7 feet.)
Length to blowers . . . . .	2	6	
Length to pectoral fin . . . . .	3	6	
Length of pectorals . . . . .	3	0	
Length of dorsal . . . . .	5	0?	
Width of tail . . . . .			
Height of dorsal . . . . .	1	2	
Skull: Length, entire . . . . .	17	6	
Length of nose . . . . .	8	0	
Length of teeth-series, lower jaw . .	2	3	
Length of lower jaw . . . . .	12	0	
Width at notch . . . . .	7	0	
Width at orbit . . . . .	11	0	
Width at middle of nose . . . . .	3	10	
Width of intermaxillary . . . . .	3	3	
Height at occiput . . . . .	9	0	

The cervical are earliest anchylosed, as in the *Delphinus Delphis*. Dorsal vertebræ 12. Ribs 12. 12; six of the ribs are articulated between the bodies of the vertebræ. Lumbar and caudal vertebræ 42. The spinous processes are suddenly enlarged at the commencement of the loins; the articular apophysis of the ninth dorsal ceases to enclose the preceding vertebra. The first finger of 2 joints, the second of 8 joints, the third of 7 joints, the fourth of 2 joints, and the fifth of 1 joint. The first bone of the sternum is not perforated, but the last is rather notched. The bladebone has the outline of *D. Tursio* and the apophyses of *D. Delphis*.—*Cuv. Oss. Foss.* v. 306.

This species loses its upper teeth at an early period, and preserves only a few of its lower ones. The dorsal fin is lower and further back than in *D. Orca*.—*Cuv. R. A.* i. 290.

M. F. Cuvier (Cétac. 193) has referred the *Marsouin* of Duhamel (Péch. iv. t. 9. f. 5) to *D. globiceps*; but M. Duhamel particularly observes that the pectoral and dorsal were nearly equidistant from the head, and that the underside is paler than the back, golden green, not white, which does not agree with *D. melas*. In both these points it suits better with this species.

Fig. 60.

Skull of *Grampus Cuvieri*, Cuv. t. 22. f. 1.

This species was first described from a skeleton and drawing sent from Brest to Paris. The bad colouring of the drawing induced M. Cuvier to call it *D. griseus*; but it is black and not grey; so that the first specific name cannot be used, as giving a wrong impression of the animal. M. F. Cuvier regards it as distinct from *D. Aries* of Risso, which his brother thought was the same. (*F. Cuv. Cétac.* 184.)

“The skull of the Brest specimen has the general characters of *D. Rissoanus*; the teeth are truncated; the cervical vertebræ ankylosed; and there are 12 dorsal vertebræ.”—*Gervais, Zool. et Paléont. Franç.* t. 37. f. 5.

In D’Orbigny’s specimens the dorsal was injured, and in two of them nearly destroyed. The young, 7 feet long, had eight, conical, acute teeth. The older, two males and one female, 10 feet long, had only six or seven, blunt, carious teeth. The upper jaw longest (4 inches), without any indication of teeth, even in the young one, but with a slight groove for the reception of the edge of the lower jaw.

M. d’Orbigny says that this species has “most affinity in its

external form to the *Grampus* of Hunter, t. 17, which Lacépède called *D. ventricosus*, but differs essentially in the total absence of teeth in the upper, and by the number in the lower jaw." Hunter does not figure any teeth in the upper, and only a few in the lower jaw.

## 2. *Grampus Rissoanus*. *Risso's Grampus*.

Bluish white, with irregular, brown-edged, scratch-like lines in all directions. Females uniform brown, with similar scratches. Lower jaw conical, acute; teeth on each side in front.

*Delphinus Rissoanus*, *Laur.*; *F. Cuv. Mamm. Lithog.* t.; *Cétac.* 196. t. 12. f. 1; *Schlegel, Abhandl.* 33; *Fischer, Syn. Mamm.* 512; *Desm. Mamm.* 519.

*Delphinus de Risso*, *Cuv. Ann. Mus.* xix. 12. f. 4, cop. *Schreb.* t. 345. f. 4; *Risso, Ann. Mus. H. N.* xix. t. 1, 2; *Europ. Mérid.* 23.

*Delphinus Rissoi* (*D. Rissoanus*), *Gervais, Zool. et Paléont. Franç.* 149. t. 37. f. 1, 2 (skull, from Nice).

*Delphinus Aries*, *Risso, Cuv. Ann. Mus.* xix. 12. t. 1. f. 4.

*Grampus Rissii*, *Jardine, Nat. Lib.* vi. 219. t. 18.

*Cetus* (? —), *Wagler, N. Syst. Amph.* 33.

*Phocæna Rissoanus*, *Lesson, Man.* 416.

*Grampus Rissoanus*, *Gray, Zool. Erebus & Terror*, 31; *Cat. Cétac. B. M.* 1850, 84.

Var. 1. Dorsal, pectoral, tail, and hinder part of the body below varied with black.—*F. Cuv. l. c.* t. 13. f. 1 (male).

Inhab. Nice (*Risso, Laurillard*).

M. Laurillard observes, the teeth are conical, early deciduous, especially of the upper jaw. He gives the following measurements:—

	ft.	in.
Length, entire . . . . .	9	0
Length of head . . . . .	1	6½
Height of dorsal . . . . .	0	9

Lesson refers this species to the genus *Globiocephalus*; but the position of the dorsal and the form of the pectoral, as well as the description of the teeth, make me believe it rather belongs to this genus. M. Cuvier observes that his *D. griseus* is only described from a bad drawing of this species; but M. F. Cuvier, who had a new description, and M. Laurillard, consider them distinct.—*Règ. Anim.* i. 290; *F. Cuv. Cétac.* 184.

In the Paris Museum there is a skull from Rochelle, sent by M. d'Orbigny, and a second from Nice, brought by M. Laurillard, which greatly resemble one another.

Gervais observes, "The maxillaries are visible below. The frontal region is rather flattened. Cervical vertebræ soldered together; dorsal 12, lumbar 7, caudal 49=68. The chevron bones commence at the forty-fifth of the series. Inhab. Nice. Length about 10 feet (3 metres)."

G. Cuvier described *Grampus Rissoanus*, which is very nearly allied to his *D. griseus*; but the former lives in the Mediterranean, and the latter on the coast of Brittany. The cranium of this species

presents characters which are easily recognized. The Museum of Paris possesses two skulls, from specimens taken at Nice by Risso and Laurillard. There is another in the Museum of Marseilles, obtained from one of a shoal which came ashore into Carry, Bouches du Rhône, in 1862.—*Gervais, Comptes Rendus*, 28 Nov. 1864, 876; *Ann. & Mag. N. H.* 1865, xv. 76.

\*\* *The triangle short, broad.*

### 3. *Grampus Richardsonii*.

Lower jaw straight, regularly diverging, scarcely bulging on the side behind, united by a rather long, wide symphysis in front; obliquely truncated in front, with a rather prominent, tuberos gonyx. Teeth 4. 4, rather large, far apart, conical, tapering at the tip, but subcylindrical at the base.

*Grampus*, n. s., *Gray, Zool. Erebus & Terror*, 31.

*Grampus Richardsonii*, *Gray, Cat. Cetac. B. M.* 1850, 85; *Proc. Zool. Soc.* 1865.

Inhab. Cape of Good Hope. Kalk's Bay, Simon's Bay (*Layard*).

a. Lower jaw. Presented by the Haslar Hospital Museum.

This lower jaw appears to differ from the lower jaw of *G. Cuvieri* in being much thicker at the symphysis, very obliquely truncated in front, and rather projecting below. Teeth 4. 4, large, conical, rather acute and recurved; the upper edge behind the teeth round, with many minute holes on the edge. It measures as follows:—

	inches.
Length, entire . . . . .	16
Length, front truncation . . . . .	2
Length of teeth-series . . . . .	2
Width near condyle . . . . .	4
Width in front . . . . .	1
Width at condyle . . . . .	11½

Mr. Layard has sent me for examination a skull of a *Grampus* taken from the shores of Table Bay, Cape of Good Hope, which is contained in the South African Museum. It is a typical *Grampus*, like *G. Rissoanus*, with four teeth on each side of the front of the lower jaw. It chiefly differs from *G. Rissoanus* in the shortness of the triangle in front of the blowers, which is not continued over the vomer. The lower jaw agrees so completely with the lower jaw of *G. Richardsonii*, that I believe it belongs to this species, which was probably received from the Cape.—See *Gray, P. Z. S.* 1865.

The skull in the Cape Museum resembles in most particulars that of *Grampus Cuvieri*, and may be considered that of a typical species of the genus. It agrees with *Beluga* in the convexity of the triangle in front of the blowers and in the general form; but it differs from that genus in the elevation of the margins of the maxillæ over the orbits, and on the side of the hinder part of the beak in front of the notch, showing that the genus is intermediate in form.

between *Beluga* and *Orca*. *Grampus* and *Beluga* are peculiar for having teeth only in the front part of the lower jaw, as in *Globiocephalus*; but the teeth of *Grampus* are permanent, while those of *Beluga* are early deciduous.

The lower jaw from the Cape Seas only differs from the lower jaw of the typical specimen of *G. Richardsonii* in being rather more slender in front, just behind the gonyx and the end of the teeth-line, and in the teeth being apparently rather shorter and more slender; but the bases of the teeth of the typical specimen are entirely exposed, and in the one from the South-African Museum they are still imbedded in the dried gums; so that the difference is more apparent than real.

The upper edge of the orbit is raised into a decided marginal ridge. The maxillary bones in front of the notch are rather expanded and well bent up on the edge.

The triangular space in front of the blowers is convex, evenly rounded, and with a well-marked oblique groove on each side in front.

The intermaxillary bones are very broad, with a hard, shining, smooth, rather convex upper surface; they cover fully two-thirds of the upper part of the hinder portion, and much more, or at least four-fifths, of the front part of the beak. The palate is flat in front and rather convex behind. The upper jaw is rather bent down at the tip, and is destitute of teeth; but has a submarginal line with a few small pits. The lower jaw has four conical teeth on each side in front, placed over the gonyx.

Length of the skull 18, of beak from the notch  $10\frac{1}{2}$ , of lower jaw  $14\frac{1}{2}$  inches; width of the brain-case at the centre of the orbit 11, of beak at the notch  $7\frac{3}{4}$  inches.

The triangle in front of the blowers in the skulls of the European species is much elongated, the slender front part being produced between the intermaxillaries nearly to the end of the beak.

(1) *G. griseus*, of Brest, has only 2.2 teeth in the front of the lower jaw (Gervais, *l. c.* t. 57. f. 5).

(2) *G. Rissoi*, of Nice, has 5.5 teeth in the front of the lower jaw (Gervais, *Zool. et Paléont. Frang.* t. 57. f. 1, 2).

In the Cape species the triangle is shorter and much broader compared with its length, the front side-margins being more transverse.

(3) *G. Richardsonii*.

In *G. Rissoi* the outer edges of the intermaxillaries are sinuous and rather contracted to nearly the middle of their length. In *G. Richardsonii* the outer edges are rather slightly arched and bent out; the bones are widest in the middle of their length; the nostrils are bent to the left side, the right side of the skull being most developed.

#### 4. *Grampus affinis*.

The teeth are 12.12, small, conical, curved, very acute. Nose rather concave on the sides. Intermaxillaries nearly as wide as the jaws. Lower jaw obliquely truncated in front. Length, entire, 24

inches, of nose 12, of tooth-line 7, of lower jaw 19. Width at notch 9, of middle of beak  $6\frac{1}{2}$ , at orbits  $15\frac{1}{2}$  inches.

In the Museum of the College of Surgeons is a skull (no. 1138, Hunterian) apparently belonging to another species of this genus.

#### 5. *Grampus Sakamata*. *The Sakamata*.

*Delphinus Orca*, Schlegel, *Fauna Japon*. 25.

*Grampus Sakamata*, Gray, *Zool. Ereb. & Terr.* 31; *Cat. Cetac. B. M.* 1850, 85.

Inhab. Japan.

M. Schlegel (*Faun. Japon.* 25) described a dolphin found on the coast of Japan, and called *Sakamata kuzira*. It is said to have a high dorsal, and to be black, with white spots on the belly, back, and sides near the pectoral fins; the eyelids and lips pale purple, the latter often white-spotted. The head is rounded; the upper jaw pointed and toothless; the lower short and narrow, and toothed.

Schlegel, who refers this species to *D. Orca*, says the wanting teeth in the upper jaw is a mistake; but it is probably a *Grampus*, which often wants them in that jaw. I do not see why one part of the description should be relied on and not the other.

\*\* *The lateral wings of the maxilla shelving down over the orbit.*

† *Teeth permanent, compressed, sharp-edged.*

### 10. PHOCÆNA.

Dorsal fin in the middle of the body. Skull-nose depressed, broad; the hinder part of the maxilla slightly shelving downwards over the orbits. The intermaxillaries and vomer form part of the palate. Teeth numerous, spathulate, compressed, extending nearly the whole length of the jaw.

*Phocæna*, *Rondel. Pisc.* 474; *Gray, Spic. Zool.* 2, 1828; *Zool. Ereb. & Terr.* 30; *Cat. Cetac. B. M.* 81, 1850; *Proc. Zool. Soc.* 1864, 245.

*Phocæna*, sp., *Cuvier*; *F. Cuvier*; *Wagler, N. S. Amph.* 34.

*Delphinus*, sp., *Linn.*; *Illiger, Prod.* 143, 1811.

The fetus of *Phocæna* has two bristles on each side of the nose; as the animal grows, these bristles fall out, and each leaves a small pit on the side of the nose, which Klein (*Hist. Piscium*, i. 24) mistook for the nostrils, as has been well observed by Professor Eschricht, 250.

When the mouth is closed the upper lip overlaps the under one evenly all round. The part of the under lip that is covered by the upper one is flat, and shelving inwards. It is of a paler colour than the upper lip and the lower part of the lower one.

The cervicals are thin, soldered. Ribs 13. 13, of which seven are articulated to the borders of the vertebræ. Vertebræ about 40; the last very small, incrustated in the tail. The spinous processes commence with the sixth lumbar, and do not embrace the caudal vertebræ. The bladebone is narrow, and the coracoid is more equal to the acromion than is that of *D. Delphis*. The first bone of the sternum

is pierced and without lateral angles. There are only 5 pairs of true ribs.—*Cuv. Oss. Foss.* v. 306.

The skeleton in the Museum of the College of Surgeons, no. 2509.—“All the cervical vertebræ are ankylosed; the head of the first rib rests upon their coalesced bodies. There are 56 other vertebræ, twelve of which support moveable ribs, but the thirteenth pair seems to have been lost.”—*Owen, l. c.* p. 455.

Professor Rapp (*Cetac.* t. 5) figures the skeleton of *Delphinus Phocæna*. “The scapula with a broad, dilated coracoid process. Fingers five, short; the first longest, the third scarcely shorter, the second shorter, the fourth and fifth very short, the fifth slender. Spinous processes of the dorsal and lumbar vertebræ with a distinct subcentral anterior process on each side. The lateral processes of the lumbar vertebræ short and broad.”—*Rapp, l. c.*

Mr. F. Knox gives many details of the anatomy of this species in his ‘Catalogue of Preparations relative to Whales,’ 1838, p. 32.

M. G. Breschet describes and figures the organ of hearing of the Porpoise (*Ann. Sci. Nat.* 1838, x. 221. t. 5).

\* *Dorsal fin in middle of back, without any spines on its upper edge.*  
*Teeth all compressed, truncated.*

### 1. *Phocæna communis.* Common Porpoise.

Black.

*Phocæna, Rondel. Pisc.* 473; *Gesner, Aquat.* 837. fig.; *Aldrov. Pisc.* 719. fig.

*Phocæna Rondeletii, Willughb. Pisc.* 31. t. A. 1. f. 2.

*Tursio Marsouin, Belon, Aquat.* 16. fig.

*Tursio, Plinii H. N.* ix. 9.

*Phocæna communis, Brookes, Cat. Mus.* 39; *Lesson, Man.* 413; *F. Cuv. Cétac.* 172; *Gray, List Mamm. B. M.* 104; *Spic. Zool.* 2, 1828; *Zool. Erebus & Terror*, 30; *Cat. Cetac. B. M.* 1850, 81; *Proc. Zool. Soc.* 1864, 245; *Malmgren, Arch. Nat.* 1864, 90.

*Delphinus Phocæna, Linn. Faun. Suec.* 17; *S. N.* i. 108; *Schreb. Säugeth.* t. 342; *Bonnat. Cét.* 18. t. 1. t. 10. f. 1; *Desm. Mamm.* 516; *Fischer, Syn.* 510; *Cuv. Oss. Foss.* v. 286. t. 21. f. 1, 2 (skull); *Bell, Brit. Mam.* 473, 476. fig.; *Rapp, Cetac.* t. 5 (skeleton); *Schlegel, Abhandl.* 31; *Dieren*, 89. t. 15; *Turton, B. Fauna*, 17; *Fleming, B. A.* 33; *Phil. Zool.* ii. 209. t. 1. f. 4; *Jenyns, Man.* 41; *Nilsson, Skand. Fauna*, 616.

*Marsouin commun, Cuvier, Ménag. Mus.* t.; *Règ. Anim.* i. 279.

*Porpesse, Shaw, Zool.* ii. 504. t. 229, 230, 231; *Borlase, Cornw.* 264. t. 27. f. 2; *Monro, Phys. Fishes*, 45. t. 35.

*ANAT. Knox, Cat. Prep. Whales*, 1838, 37; *Rapp, Cetac.* t. 5; *Sibson, Trans. Roy. Soc.* 1848; *Bonnat. Cét.* t.; *Lacép. Cét.* t. 20. f. 2 (skeleton); *Jacob, Dublin Phil. Journ.* 1825, t. 2. f. 5.

Inhab. North Sea. Near shore, in all seasons, and ascends rivers. Called Marsouins, Herring Hogs, Neessock, Pellock, and Bucker.—*Fleming, B. A.* 34.

a. *Thames.* Presented by Mr. Leadbeater.

b. *Skull.* From Dr. Mantell's Collection.

c, d, e. *Stuffed.* Thames. Presented by Messrs. J. & C. Grove.

f. *Skeleton.* English coast.



Mr. Knox (Cat. Prep. Whales, p. 32, 1838) gives the particulars of two skeletons of female specimens:—1. Of a gravid female taken in the Firth of Forth, 56 inches long and 34 inches in circumference. Teeth  $\frac{26}{5}$ .  $\frac{26}{5}$ . Vertebrae 65: cervical 7, dorsal and ribs 13, posterior 45. V-shaped bones commencing between the thirty-fourth and thirty-fifth vertebrae. Length of base of cranium 11, of spinal column 42 inches=53. Weight of cranium 1 lb. 1 oz., of trunk and extremities 2 lb. 15 oz.=4 lb.

2. Of a female, 74 inches long, killed in the Thames: has coracoid clavicles. It also differs from the preceding in the following particulars:—There are only twelve ribs on each side (24); the vertebrae towards the caudal extremity are much more slender and delicate, while the transverse and spinous processes of the dorsal and lumbar vertebrae are much broader and stronger. The cranium is considerably smaller and narrower; the elevation of the occipital bone less, but more rounded; condyles of the occipital bone greatly less. Yet the weight of both skeletons is nearly equal. There are only 64 vertebrae, but the last is evidently wanting, and has been lost (*Knox*, p. 32). A foetus was taken from the uterus of the female porpoise whose skeleton, from the Firth of Forth, No. 1, is above referred to; it measured, from snout to centre of tail, 26 inches; circumference 16 inches. Its great bulk, considering the size of the parent porpoise (56 inches), is remarkable, and renders the supposition that the porpoise does not suckle her young extremely probable.—*Knox*, p. 34, n. 104.

In the former edition of this Catalogue I observed, which has now been proved to be the case, “This difference in the skeleton shows the probability of there being two species confounded on our shores, or else that there are great variations in the bones of this animal even of the same sex.”

In the figure of the skull in Bell’s ‘British Mammalia,’ p. 476, the teeth are represented as conical and acute, instead of broad, truncate, and compressed at the tips.

“A porpoise was taken by some fishermen in Cornwall and placed in a pond at a farm, where it lived a month.”—*Couch*.

“The *Sniffer* of the Cornish fishermen. It is sometimes caught in drift-nets; and I have known it take a bait, though it commonly proves too strong for the line. Rarely more than a pair is seen together.”—*Couch, Cornish Fauna*, 4.

“The rolling motion of this and some other of the smaller Cetacea is caused by the situation of the nostrils on the anterior part of the top of the head, to breathe through which the body must be placed in a somewhat erect posture, from which to descend it passes through a considerable portion of a circle.”—*Couch, Cornish Fauna*, 10.

“The Porpoise enters the Baltic by the Sound in large numbers in the spring, in pursuit of the herrings, and leaves it by the Little Belt in December and January.”—*Eschricht*.

“A season seldom passes without their appearance at Greenwich and Deptford, and they occasionally pass much higher up” (*C. Col-lingwood*, 1858); Battersea (*Gray*, 1815).

\*\* *Dorsal fin in middle of back, with a series of spines on its upper edge. Teeth all compressed, truncated.*

## 2. *Phocæna tuberculifera*.

The dorsal fin with a series of spines on the upper portion of the upper edge. Body and upper parts of the pectoral and caudal fins black, chin and beneath whiter.

Marsouin, *Camper, Planches de Cétacés*, t. 45-51.

*Phocæna communis*, *Jackson, Boston Journ. N. H.* 1845, v. 167. t. (anatomy).

*Phocæna tuberculifera*, *Gray, Proc. Zool. Soc.* 1865, 320.

Inhab. Margate. North Sea. Coast of North America: Boston (*Jackson*).

a. Skin in spirits. Margate. The animal described *P. Z. S.* 1865.

b. Skeleton of above.

When I described this species from a specimen caught at Margate, which lived a few days in the Zoological Gardens, Regent's Park, I was not aware that it had been noticed by Pliny, figured and described by Camper, or that Dr. Jackson had mentioned the tubercles on the dorsal fin in the specimen which he described. Mr. Flower kindly pointed out to me the two references.

This explains why Dr. Jackson did not find his anatomy to agree with Cuvier's. They were evidently made on two different species.

It is not flattering to the accuracy of our research that two kinds of porpoises should be found to inhabit the English seas and be overlooked until now.

Camper, at p. 142, observes, "La fausse nageoire est placée sur le milieu du dos, son bord antérieur est armé de petites aspérités dentelées, qu'on n'observe pas dans le Dauphin vulgaire. Pline en a parlé sous le nom de *spina cultellata*."

Dr. Jackson observes, "Dorsal fin emarginated; back of the tip and at the upper part anteriorly is exhibited quite a number of small tubercles or dentations."

Camper figures the male fœtus and the sexual organs of a female fœtus. He states that the outer auditory opening was closed in the female and open in the male; he also says there were two small apertures on one side of the nose and three on the other in the male fœtus (*l. c.* p. 213).

Camper figures the female and its anatomy (*l. c.* tab. 45-49).

\*\*\* *Dorsal fin rather posterior; back, in front of the dorsal fin, with a single, and upper edge of the dorsal fin with three series of oblong keeled tubercles. Front teeth rather conical. Acanthodelphis.*

## 3. *Phocæna spinipinnis*.

Lead-coloured. Teeth  $\frac{16}{17} \cdot \frac{16}{17}$ .

*Phocæna spinipinnis*, *Burmeister, Proc. Zool. Soc.* 1865, 228. f. 1-4.

Inhab. Rio de la Plata, near the mouth. Mus. Buenos Ayres (*Burmeister*).

A very young specimen. Length from end of nose to nick in the tail 162 centimetres; circumference in middle, the largest part, 102 centimetres. Uniform black colour.

The central series of spines commences in the middle of the back; nearer the front edge of the dorsal fin it has a series on each side of it; and on the rounded edge of the fin there is another series on the outer side of the preceding, making five in all. The spines are only elevations of the skin, of an elongated oval form, and each is surrounded by a ridge. Vent surrounded by radiating ridges. Pectoral fin falcate.

#### Consult

*Phocæna pectoralis*, Peale, *Zool. Expl. Exped. Mamm.* 32, ed. 1, 1848 (transcribed)—

*Delphinus pectoralis*, Cassin, *U. S. Expl. Exped. Mamm.* 28 (1858), t. 5, f. 2—

“Colour blue-black, a white spot on each side of the breast in front of the pectoral fins; a frontal band of light slate-colour extends a short distance behind the eyes; vent and abdomen light reddish white; lips margined with reddish white.

“Total length 8 feet 8 inches; greatest diameter 21 inches; dorsal fin, measured along the front edge, 14 inches; pectoral fin 16 inches; tail  $25\frac{1}{2}$  inches in diameter; from the end of the snout to the corner of the mouth  $11\frac{1}{2}$  inches; eye from the end of the snout 13 inches.

“Dental formula:  $\frac{23P \cdot 23P}{23 \cdot 23} = 92?$

“Sixty of these animals were driven on shore by the natives at Hilo Bay, Island of Hawaii, at one time. They were considered dainty food, and yielded a valuable stock of oil. Only one lower jaw was saved as a specimen. It is more rounded than usual at the extremity; the teeth are stout, project outwards, and are worn nearly even with the gums, showing that our specimen was an old animal, and probably of the maximum size.”

“This species appears to be related to both *D. obscurus* and *D. Heavisidii*, Gray, and belongs to the same subgeneric group, if not specifically identical with one or the other. It more strongly resembles the latter; but we have failed to recognize it as a described species from the lower jaw above alluded to.”

What are *?Phocæna latirostris* (J. Brookes's Cat. 39), *?Phocæna Grayii* (J. Brookes's Cat. 39), and *Phocæna*, n. s. (Macgillivray, Voy. Rattlesnake, i. 48), “not allowed to be killed by the natives of Moreton Bay, Australia”?

Dr. J. R. Foster mentions *Phocæna* as being found in the Pacific Ocean (*Descr. Anim.* 156, 210); Cape of Good Hope (*l. c.* 316).

## 11. NEOMERIS.

Dorsal fin none. Nose of skull short, rounded at the end, flat, shelving above. Teeth numerous, compressed, nicked, acute, extending nearly the whole length of the jaw.

Neomeris, Gray, *Zool. Erebus & Terror*, 30, 1846.

Delphinus, sp., Cuvier, *R. A.* i. 291.

Delphinapterus, sp., Temm. *Faun. Japon.* 7.

**Neomeris Phocænoides.** *The Neomeris.*

Black. Teeth  $\frac{1}{8}$  or  $\frac{2}{9}$ . Length 4 feet.

Delphinus Phocænoides, Dussumier, *MS.*; *Cuv. Règ. Anim.* i. 291.

Delphinus melas, Temm. *Faun. Japon.* t. 25, t. 26 (animal, skull, and teeth).

?Globiocephalus Indicus, Blyth, *Journ. Asiatic Soc. Bengal*, 1860, 449.

Delphinapterus melas, Temm. *Faun. Japon.* 7.

Neomeris Phocænoides, Gray, *Zool. E. & T.* 30; *Cat. Cetac. B. M.* 1850, 80; Pucheran, *Rev. et Mag. Zool.* 1856, 545.

ANAT. *Fauna Japon.* t. 25 (teeth), t. 26 (bones).

Inhab. Indian Ocean, Bay of Bengal (Blyth); Japan (Temm.). "Cape of Good Hope," and "Malabar" (Dussumier).

The figure in the 'Fauna Japonica' is from a drawing made by a Japanese artist under Burger's inspection.

The skull of *Delphinus melas* in the Leyden Museum is more swollen and broader than that of *Phocæna communis*; the nose is shorter, broader, more rounded at the end, and nearly flat, not shelving above; teeth  $\frac{1}{8}$ , larger and stronger; skull one-sixth the entire length (in *Phocæna* one-fifth). *Nameno-juo*, Japan.

The short description of the *D. Phocænoides* of Cuvier, which Dussumier is said to have discovered at the "Cape of Good Hope," agrees with the figure in the 'Fauna Japonica.' A skull in Mus. Paris, marked "*D. Phocænoides*, brought from Malabar by Dussumier in 1837," is broader and shorter than that of *Phocæna communis*; teeth spatulate, rounded, oblique,  $\frac{2}{9}$ ; palatine bones and intermaxillaries broad, as seen in the roof of the beak. Length of this skull 7, of nose  $2\frac{1}{2}$ , width at notch  $2\frac{1}{2}$  inches.

The skulls are much alike, but they may be two species characterized by the number of the teeth.

†† Teeth of upper and lower jaw conical, deciduous. Dorsal none.

## 12. BELUGA.

Head rounded; forehead convex; teeth conical, only in the front half of the jaws, oblique, often truncated, and the upper often deciduous; dorsal fin none; pectoral suboval; tongue oblong, with a simple, slightly raised edge; skull with the nose and the hinder wing of the maxilla bent down on the orbits, making the forehead very convex; lower jaw not so wide as the upper, with the condyle low

down below the middle of the hinder edge.—Gray, *Zool. Erebus & Terror*, t. 29. fig. 3.

*Delphinopterus*, Lacép. *Cét.* 243.

*Delphinapterus*, F. Cuv. *D. S. N.* lix. 517, 1829.

*Beluga*, Rafin. *Anal. Nat.* 60, 1815; Gray, *Spic. Zool.* 2, 1828; *Zool. Erebus & Terror*; *Cat. Cetac. B. M.* 77; *Proc. Zool. Soc.* 1863, 201; 1864, 246; Lesson, *Man.*; Bell, *Brit. Quad.* 1837.

Delphis, Wagler, *N. S. Amph.* 34, 1830.

*Delphinus* (pars), Linn.; Illiger, *Prod.* 143, 1811.

*Catodon* (pars), Artedi, *Gen.* 78; Fleming, *B. A.* 29.

*Cetus* (pars), Brisson, *R. A.* i. 227, 1762.

*Physeter* (pars), Linn. *S. N.*

*Cachalot* (pars), Lacép. *Cét.*

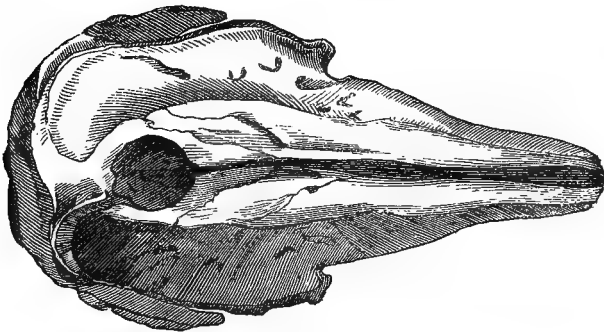
*Phocæna* (pars), F. Cuv. *Cétac.*

There is a great similarity in the general form of the skulls of *Phocæna*, *Beluga*, and *Monoceros*; but, independently of the size and teeth, they differ in the form of the convexity in front of the blower; in *Beluga* the front of the blower is flattish, in *Monoceros* there is a broad, half-oblong convexity, and in *Phocæna* a squarish tuberosity.

The genus *Delphinapterus* was formed by Lacépède to contain this animal (which he before described as a *Catodon*) and the *Delphinus Senedette*, which is probably an imaginary figure of a Sperm Whale made from description, or perhaps of *D. Orca* with the dorsal fin left out. It has been applied by Péron, Cuvier, and others to a very different animal.

Professor Owen observes, the prefrontal bones are large and coalesce with the vomer, and ascend into view at the back part of the nostrils, where they coalesce with the frontals. The nasal bones are wedged into an interspace between them and the frontals, at the summit of the nasal apertures.—*Cat. Osteol. Coll. Surg.* 454. n. 2506.

Fig. 61.



Skull of *Beluga Catodon*, Cuv. t. 22. f. 5.

1. *Beluga Catodon*. *The Northern Beluga*.

White; young black; the nose of the skull in length nearly one-

half the entire length, once and a half its width at the anterior notch; teeth  $\frac{9}{8}$ — $\frac{9}{8}$ .

*Balæna minor* in inferiore maxilla tantum dentata, sine pinna aut spina in dorso, *Sibbald, Phal.* 9; *Raii Syn. Pisc.* 15.

*Cetus bipinnis*, *Brisson, R. A.* 361.

*Catodon fistula* in rostro, *Artedi, Gen.* 78; *Syn.* 108.

*Physeter Catodon*, *Linn. S. N.* 107; *Gmelin, S. N.* i. 226; *Desm. Mamm.* 525, from *Balæna minor*, *Sibbald, Phal.* 9; *Turton, B. Fauna*, 16; *Jenyns, Man.* 45.

? *Cetus minor*, *Brisson, Règ. Anim.* 361.

*Beluga leucas*, *Gray, Spic. Zool.* 2, 1828; *Bell, B. Quad.* 488, 491. fig.

*Physeter macrocephalus*, var. ? *Catodon, Fischer, Syn.* 518.

*Balæna albicans*, *Klein, Miss. Pisc.* ii. 12.

*Delphinus leucas*, *Pallas, Reise*, iii. 92. t. 79; *Gmelin, S. N.* 1232; *Desm. Mamm.* 519; *Pallas, Zoogr. Rosso-Asiat.* t. 32, ♀; *Mem. Wern. Soc.* iii. 17, ♂; *Cuv. Oss. Foss.* v. 287, 297. t. 22. f. 5, 6; *Bell, Brit. Quad.* 491. fig.; *Schlegel, Abhandl.* 34; *Owen, Cat. Osteol. Mus. Coll. Surg.* ii. 454; *Nilsson, Skand. Fauna*, 614.

*Beluga Catodon*, *Gray, Zool. Erebus & Terror*, 29. t.; *Cat. Cetac. B. M.* 1850, 77.

*Catodon Sibbaldii*, *Fleming, B. A.* 29, from *Sibbald*.

Small *Catodon*, *Shaw, Zool.* ii. 501.

Round-headed Cachalot, *Penn.*

*Beluga borealis*, *Lesson.*

*Physeter macrocephalus* β, *Gmelin, S. N.*

*Delphinapterus Beluga*, *Lacép. Cétac.* 243; *Scoresby, Arct. Reg.* i. 500, ii. t. 14.

*Delphinapterus albicans*, *Fleming, B. A.* 36.

*Catodon albicans*, *Lacép. Cétac.* 218.

*Cetus albicans*, *Brisson, Règ. Anim.* 359.

Albus Piscis cetaceus, *Raii Syn. Pisc.* 11.

*Beluga*, *Shaw, Zool.* ii. 515. t. 223.

*Delphinus albicans*, *O. Fabr. Faun. Grænl.* 50; *Bonnat. Cétac.* 24; *Jenyns, Man.* 43.

*Delphinapterus leucas*, *Gerard, Dict. Sci. Nat.* vi. 65; *Lilljeborg; Malmgren, Arch. Nat.* 1864, 90; *Schrenck, Amurlande*, i. 190.

? Figure with a beak added:—

? Dauphin blanc du Canada, *Duham. Pêch.* ii. x. t. 10.

*Delphinus Canadensis*, *Desm. Mamm.* 516, from *Duhamel*.

*Inia*? *Canadensis*, *Gray, Zool. Erebus & Terror*, t. 5. f. 1, from *Duhamel's drawing*.

OSTEOL. *Cuv. Oss. Foss.* v. 287. t. 22. f. 5, 6 (head); *Jacob, Dublin Phil. Journ.* 1825, t. 2. f. 4 (skull, small).

Inhab. North Sea; gregarious, entering large rivers. Greenland. Scotland (*Sibbald*). St. Lawrence.

a. Skeleton. Length 15 feet. Greenland.

b. Skull. Greenland. Length, entire, 20 inches; of beak  $9\frac{1}{2}$ ; width at notch 6, at orbit  $1\frac{1}{4}$  inch.

c. Stuffed specimen. Greenland.

d. A male specimen,  $12\frac{1}{2}$  feet long, 6 feet 8 inches in circumference at the thickest part, called *Keela luak* by the Esquimaux.

e. Skull. Eschscholtz Bay, Behring's Straits. Presented by Captain Kellett, R.N., and Lieut. Wood, R.N.

Length of skull *b*, entire, 21 inches, of nose 10, of tooth-line  $6\frac{1}{4}$ ; width at orbit  $11\frac{1}{2}$ , at notch  $6\frac{3}{4}$  inches.

Skeleton: length 13 feet; head  $\frac{2}{3}$  feet 2 inches. Vertebrae 50 or 51, viz. cervical 7, dorsal 11, lumbar and caudal 32 or 31; ribs 10, sternal ribs 6. The pectoral fins with five fingers, the fourth longest, then the third, then the second, then the first the shortest of all the five; the first of three, the second of three, the third of four, the fourth of six, and the last of two, short, thick phalanges. Ribs affixed to the sternum; sternum elongate, three times as long as broad in front, narrowed behind. The first four ribs attached at nearly equal distances on the sides, the two hinder ones affixed close together on the hinder outer edge of the contracted back margin.

M. Van Beneden observes that he has seen skulls varying from  $\frac{8.8}{8.8}$  to  $\frac{10.10}{10.10}$ , and all intermediate combinations;  $\frac{8}{9}$  seem the most frequent (Nouv. Mém. Acad. Brux. xxxii. 16).

“The Whitefish consumes enormous quantities of *Sepia loligo*, *Gadus aeglefinus*, and large prawns.”—*Eschricht, Ann. & Mag. N. H.* 1852, ix. 289, communicated by Captain Holböll.

Two males were cast ashore on the beach of the Pentland Frith, some miles east of Thurso, in August 1793 (*Colonel Murie*). A specimen was killed near Stirling in June 1815, and described by Dr. Barclay and Mr. Neil in *Wern. Mem.* iii. 371. t. 27.

It commonly ascends the rivers in Canada; and Captain Kellett brought a skull from Behring's Straits. Schrenck records it in his *Zoology of Amurland*, 190.

Duhamel (tab. 10. f. 4) figured the front half of a Dolphin, 12 feet long, under the name of *Dauphin blanc du Canada*, which Desmarest has named *Delphinus Canadensis*. M. de Blainville gave me a tracing of the original drawing from which Duhamel engraved his figure (which is copied in the ‘*Zoology of the Erebus and Terror*,’ t. 5. f. 1). The form of the beak and the absence of a distinct dorsal fin induced me to believe that it might be a species of *Inia*; but from inquiries recently made in Canada, I have very little doubt that Duhamel's animal was the *Beluga* which is common in that country. In the St. Lawrence they rarely exceed 15 feet long.

Professor Eschricht observes on this figure, “I shall hardly be considered too bold if I take the figure to represent simply a *Whitefish* whose short and blunt snout the inexperienced draughtsman had mended a little.”—*Ann. & Mag. N. H.* 1852, ix. 164.

Professor Eschricht says that Cuvier's *Delphinus rostratus* was established on this figure of Duhamel; but M. Cuvier, on the contrary, says that it was described from the specimen that was formerly in the Lisbon Museum, and thence removed to Paris, which is *Inia Geoffroyii*.—See *Ann. & Mag. N. H.* 1852, ix. 163.

## 2. *Beluga Kingii*. *The Australian Beluga*.

Nose of the skull short, not half the entire length, scarcely longer than its width at the notch; teeth  $\frac{10}{9}$ , small, hooked.

*Delphinus* (*Delphinapterus*) *Kingii*, *Gray, Ann. Phil.* 1827, 375; *Fischer, Syn.* 514.

*Beluga Kingii*, Gray, *List Mamm. B. M.* 104; *Zool. Erebus & Terror*, 30. t. 7 (skull).

Inhab. Coast of New Holland (*Capt. P. P. King*).

a. Skull: length, entire,  $13\frac{1}{2}$ , of beak  $5\frac{1}{2}$  inches; width at notch,  $4\frac{1}{2}$ , at orbits 8 inches. New Holland. Presented by Capt. P. P. King, R.N. Specimen described, Gray, *Ann. Phil.* 1827, and *Zool. Erebus and Terror*, t. 7.

This may be the *Jacobite*, or *Tursio corpore argenteo extremitatibus nigricantibus*, Commerson, MS.; *Delphinus Commersonii*, Lacép. 317, from Cape Horn, cited by Cuv. R. A. i. 291 and Oss. Foss. v. 289; but the colour of the Australian *Beluga* has not been recorded.

"A large *White Porpoise* visits Amoy and other southerly harbours from the sea. I have in vain striven to procure specimens."—*R. Swinhoe, Report Asiat. Soc. Bengal*, 1863.

### 13. MONODON.

Head round, and convex in front. Dorsal fin none. Teeth early deciduous. Lower jaw of adult not so wide as the upper, toothless. Upper jaw in the male (and rarely in the female) with a produced spiral tusk.

Cervical vertebræ: first free; second and third united by spinous process, not by the body, thin; rest free, thin.

Monodon, *Artedi, Gen.* 78; *Synon.* 108; *Hill, Anim.* 313. t.; *Linn. S. N.* ed. 6. 17; *Schreb.*; *Gray, Zool. E. & T.* 29; *Cat. Cetac. B. M.* 75; *Proc. Zool. Soc.* 1864, 246 (not Swainson).

Tachynices, *J. Brookes, Cat. Mus.* 40, 1828.

Narwal, *Schonev. Ichth.* 28.

Narwalus, *Lacép. Cét.* 163; *Duméril*; *Rafin. Anal. Nat.* 61, 1815.

Ceratodon, *Brisson, R. A.* i. 231, 1762; *Illiger, Prod.* 142, 1811; *Wagler, N. S. Amph.* 34, 1830.

Diodon (or Diodonta), *Storr, Prod. Mamm.* 42, 1780.

Monoceros, *Charlet. Exerc. Pisc.* 47.

Monoceros piscis, *Willughb. Pisc.* 42. t. A. f. 2, *App.* p. 12.

Oryx, *Oken, Lehrb. Naturg.* 672, 1815.

Tachynicidæ, *J. Brookes, Cat. Mus.* 40, 1828.

Right tusk generally not developed. Female generally without tusk, but sometimes has one.—See *Linn. Trans.* xiii. 620.

In the Museum of the Royal College of Surgeons there are several Hunterian preparations of the skull of this animal, nos. 1147, 1148, 1149, 1150, 1151, showing the two rudimentary teeth enclosed in the cavity in the female, and the single exerted one in the male skulls.

Mr. Knox observes, the female Narwal skulls have two rudimentary teeth in the upper jaw, which are *rarely protruded*. In the foetus, on each side of the upper jaw, in the usual place, are two hollow teeth, obviously the extremities of the spiral permanent teeth of the male; they are completely imbedded in the jaw; and if the animal is a male the left tooth continues to grow, the right after a time fills up, its central cavity containing the pulp disappears, and, after attaining a growth of five or six inches, the jaw elongates to correspond with



the growth of the animal and the other tooth, and the abortive tooth remains imbedded in the jaw for life.—*Trans. R. Soc. Edinb.* ii. 413.

The spike of the female protruded, but shorter than usual in the male.—See Linn. *Trans.* xiii. 620, and Brown, *Proc. Phys. Soc. Edinb.* ii. 447.

### Monodon monoceros. *The Narwhal.*

Black; when old, whitish-marbled.

*Monodon monoceros*, Linn. *Faun. Suec.* 2. 16; *Syst. Nat.* i. 105; *Schreb. Säugeh.* t. 330; *Desm. Mamm.* 523; *Fischer, Syn.* 516; *Scoresby, Arct. Reg.* i. 486, iii. t. 12. f. 1, 2; *Fleming, Mem. Wern. Soc.* i. 146. fig.; *Gray, Zool. E. & T.* 29; *Cat. Cetac. B. M.* 1850, 75; *P. Z. S.* 1864, 247; *Rousseau, Mag. Zool.* 1856, 206; *Malmgren, Arch. Nat.* 1864, 91; *Sow. Brit. Misc. t.*; *Turton, B. Fauna*, 15; *Fleming, B. A.* 37; *Jenyns, Man.* 43; *Bell, B. Quad.* 500. fig., 505. fig.; *Nilsson, Skand. Fauna*, 619.

Sea Unicorn, *Sow. Brit. Misc.* t. 9.

*M. unicornu*, Linn. *Mus. Adolph.* i. 52.

*M. Narwhal*, *Blumenb. Handb.* 137; *Abbild.* t. 44.

*M. microcephalus*, *Desm. Mamm.* 789; *Fleming, Wern. Mem.* i. t.

*M. Andersonianus*, *Desm. Mamm.* 789.

*Narwalus Andersonianus*, *Lacép. Cét.* 163; *Desm. N. D. H. N.* 217.

*N. microcephalus*, *Lacép. Cét.* 163. t. 5. f. 2.

*N. vulgaris*, *Lacép. Cét.* 142. t. 4. f. 3, from Klein.

*Narwhal*, *Klein, Miss. Pisc.* ii. 18. t. 2. f. c, cop. *Lacép.* t. 4. f. 3; *Anderson, Iceland*, 225. fig.; *Schlegel, Abhandl.* 35; *Cuvier, Oss. Foss.* v. 311. t. 22. f. 1.

Unicorn Narwhal, *Shaw, Zool.* ii. 473. t. 225.

*Unicornu Marmum*, *Wern. Mus.* 282, 283.

*Einhorn*, *Martin, Spitzb.* 94.

*Tachynices megacephalus*, *J. Brookes, Cat. Mus.* 40, 1828.

*Narwhale*, *Jacob, Dublin Phil. Journ.* 1825, 70. t. 2. f. 2.

*Narwall's Teeth*, *Berthold; Müller, Arch. f. Anat.* v. 386. t. 10. f. 7, 8.

*OSTEOL. Camper, Cét.* t. 29, 31 (skull); *Albers, Icon.* t. 2, 3; *Home, Lectures Comp. Anat.* t. 42. f. 1; *Cuv. Oss. Foss.* v. t. 22. f. 7; *Anton, Osteol.* ix. t. 6; *Jacob, Dublin Phil. Journ.* 1825, t. 2. f. 2.

Inhab. North Ocean, Scotland.

a. The tooth.

b. Skeleton. Greenland.

c. Skull, female, not in a good state.

The following are the measurements, 1st, of a skull in the Royal College of Surgeons, and, 2nd, the female skull (c.) in the British Museum, in inches and lines:—

	in.	l.	in.	l.
Skull: Length, entire . . . . .	21	6	20	6
Length of nose . . . . .	9	9	9	3
Width of orbit . . . . .	14	6	14	0
Width of notch . . . . .	8	0	7	9
Width of intermaxillaries . .	3	0	3	6

The skeleton in Mus. Hull. Cervical vertebræ: first and second separate, large; rest very thin, separate, rudimentary. Skull: length, entire, 19 inches, of beak  $8\frac{1}{2}$ ; breadth at notch 7 inches.

The skeleton in the Museum of the Royal College of Surgeons, no. 2521, is thus remarked on by Professor Owen:—"Besides the 7 cervical, which are here ankylosed, there are 56 vertebræ, 12 of which support moveable ribs, and 6 of these join the sternum. The 26th vertebra begins to have hæmapophyses attached to its centrum."—*Cat. Osteol. Series*, p. 436.

In the skull of the female, no. 2522, "the rudimentary tusks, two in number, are exposed in their formative cavities, from which they do not emerge in this sex." In the skull of a large male, no. 2523, the left tusk is developed: the abortive right tusk is displayed in its alveolus. In no. 2525 it is the left tusk that is abortive.

Professor G. Vrolik describes and figures the skull of a Narwhal with two horns.—*Bijdragen tot de Dierk.* iii. 21. t.

Dr. Fleming gives a description of a male specimen found entangled among the rocks at the entrance of the Sound of Weesdale, in Zetland, on the 27th Sept. 1808. "It was 12 feet long. The head is about one-seventh of the total length; the forehead rose suddenly and then proceeded nearly in a horizontal direction for a few inches, when it became slightly elevated. The fore part of the head is rounded, and when viewed from before resembled that of a bull. The head was separated from the body by a slight depression. The body was thickest a few inches beyond the pectoral fins. There is a slight elevation on the back immediately above the *genitalia*, which continued to within a few inches of the division of the tail. On the belly is a ridge extending from the anus to the tail; on both sides of the body there were like ridges, similar to those on the back and belly, which give the end of the body a quadrangular form. The mouth pointed in front, the upper lip extending a little beyond the under. The eyes behind the angle of the mouth, nearly under the blowhole, pupil black, iris chestnut, sclerotic coat white. Pectoral fins 30 inches from the snout, 15 inches long and 6 broad. There was one tooth on the left side of the upper jaw, pointing a little downwards; the tooth was 27 inches long, and base inserted in socket 12 inches. The animal was dusky black, above variegated with still darker not very apparent spots; the belly white; the sides with numerous oblong horizontal spots. The skin smooth and glossy. The blubber or *spick* was about  $1\frac{1}{2}$  inch thick. There was a mass of fat like a cushion which rested on the forehead, as if calculated to defend the animal from bruises on that part."—*Mem. Wern. Soc.* 1811, i. 139.

First recorded as found in Britain by Vulpinus (Obs. Med. 376. t. 18), near the Island of May (insulam Mayam), in June 1648. One was observed on the 15th of February 1800, near Boston, Lincolnshire (see Lacépède, Hist. Nat. Cét. 159. t. 5. f. 2, and Mem. Wern. Soc. i. 147; Fleming, B. A. 37).

Scoresby gives a very good account of this animal (Arct. Reg. i. 131). The best figures are those of Scoresby, t. 15; then Sowerby, Brit. Misc.; but this has a second horn erroneously added, which was not in the original drawing. Bonnaterre's figure is far too ven-

tricose; it has been copied by Lacép. t. 4. f. 3, Blumenbach, t. 44, and others. Duhamel's Pêch. iii. t. 26. f. 1, is, on the other hand, too slender, and with too small a head.

1. *Narwalus microcephalus*, Lacép. t. 5. f. 2, from a drawing of Mr. W. Brand, appears to be only a bad representation of this species.

2. *Narwalus Andersonianus*, Lacép. Cétac. 163, from Anderson, Iceland, 225, described from the specimen drawn by Mr. Brand, is figured by Lacép. t. 4. f. 2.

Female bearing two fetuses.—*Whatton*, *Linn. Trans.* xv. 620.

## Family 7. GLOBIOCEPHALIDÆ.

Head blunt, very much swollen. Nostrils united into a transverse blower on the crown of the head. Body elongate; back rounded. Dorsal fin distinct. Pectoral fins falcate, elongate, low down, near together on the chest; fingers five, each formed of many phalanges. Skull short. Nose scarcely so long as the brain-case, broad. Intermaxillary bones very wide, covering the maxilla above; side of the maxilla expanded horizontally. Teeth conical, in the front of the edge of the maxilla.

Delphinidæ Globiocephalina, *Gray*, *P. Z. S.* 1863, 201; 1864, 243.

### SYNOPSIS OF THE GENERA.

1. GLOBIOCEPHALUS. Palate flat.
2. SPHÆROCEPHALUS. Palate convex, shelving up on the sides.

#### 1. GLOBIOCEPHALUS.

Head round, forehead very prominent. Teeth conical, large, only in the front half of the jaws; early deciduous. Upper jaw largest? Pectoral narrow, linear-ovate, low down. Dorsal falcate, about the middle of the back.

Skull flattened, and concave in front of the blower; rostrum broad, flattened, rugose above; intermaxillary bones very broad, covering the greater part of the upper surface of the upper jaws; the hinder wing of the jaw-bone horizontal and bent up at the edge over the orbits, and slightly expanded and reflexed just in front of the notch. Palate flat, rather concave in the middle.

*Globiocephalus* § 1, *Gray*, *Cat. Cétac. B. M.* 1850, 86; *P. Z. S.* 1861, 331; 1863, 201; 1864, 243.

*Globiocephalus*, *Lesson*; *Gray*, *Zool. Ereb. & Terr.* 32, 1846.

*Globiocephala*, *Lesson*, *N. Tab. R. A.* 200, 1842.

*Physeter*, sp., *Risso*.

*Grampus* (pars), *Gray*, *Spic. Zool.* 2, 1828.

*Cetus*, sp., *Wagler*, *N. S. Amph.* 33, 1830.

*Delphinus*, sp., *Cuvier*.

The skull of the young has no bony tentorium, though in the old specimens it is well marked.—*Jackson*, *Bost. Journ. N. H.* v. 167.

The sucking young have no visible teeth; the adults have teeth in each jaw, but the aged individuals have generally lost them in both.—*Fleming*.

- a. Body black, with a white line and rays beneath.
- b. Body nearly uniform black.

a. *Black, with a white streak beneath.*

### 1. *Globiocephalus Svineval*. *The Pilot Whale*.

Black, streak from throat to vent (sometimes dilated into a cross band) white; teeth  $\frac{2\frac{2}{2}}$  to  $\frac{2\frac{4}{4}}$ , rarely  $\frac{2\frac{3}{8}}$ .—*Fleming*. The upper surface of the maxillaries and intermaxillaries rugose in front; intermaxillaries form a triangular patch in front of the palate. Second and third cervical vertebræ co-ossified.

Petit Cachalot, *Daub. Acad. Sci.* 1782, t. 1, cop. *Bonnat. Cétol.* t.

Cachalot Svineval, *Lacép. Cét.* 216, not syn. *Sibbald*.

Narwal édenté, *Camper, Cétac.* t. 33, 34.

Grampus globiceps, *Gray, Spic. Zool.* 2, 1828.

Ca'ing Whale, *Neill, Orkney and Shetland*, 1836, 221.

Delphinus melas, *Traill, Nichol. Journ.* xxii. 1809, 21. t.; *Owen, Cat. Osteol. Mus. Coll. Surg.* 455; *Fleming, B. Anim.* 341; *Jenyns, Man.* 43; *Schlegel, Dieren*, 92. t. 16.

Delphinus deductor, "*Traill*," *Scoresby, Arct. Reg.* i. 496. t. 13. f. 1, 1820, cop. *Jardine, Whales*, t. 17; *Bell, Brit. Quad.* 483. fig.

Delphinus globiceps, *Cuv. Ann. Mus.* xix. t. 1. f. 2, ♀, 1812 (cop. *Schreb.* t. 345. f. 2, 3); *Oss. Foss.* v. 285. t. 21. f. 11, 13, 297. t. 22. f. 3, 4, 305; *Schreb. Säugeth.* t. 345; *Blainville, Journ. Phys.* 1817, 74. t. 6; *Desm. Mamm.* 819; *Fischer, Syn. Mamm.* 512; *Nilsson, Skand. Fauna*, 608; *Schlegel, Abhandl.* 33.

Phocæna globiceps, *Lesson, Man.* 416.

Phocæna melas, *Couch, Ann. & Mag. N. H.* 1842, ix. 371. t. 6; *Bell, Brit. Quad.* 483. fig.

Delphinus Grampus, *Cat. Mus. Coll. Surg.* n. 1137.

Globiocephalus Svineval, *Gray, Zool. Ereb. & Terr.* 32; *Cat. Cetac. B. M.* 1850, 87.

ANAT. *Daubenton, Mém. Acad. Sci.* 1782, t. 4, cop. *Lacép. Cét.* t. 9. f. 2; *Bonnat. Cét.* t. 6. f. 2.

Black Whale, Howling Whale, Social Whale, Bottlehead, *Sailors*.

Inhab. North Sea.

- a. Skull. Orkneys. Presented by Professor Traill.
- b. Lower jaw, half-grown — ?
- c. Adult, stuffed. English Coast.

Dr. Fleming gives the following measurements:—

	in.	lin.
Length of animal, entire . . . . .	19	6
Length to pectoral . . . . .	3	6
Length to dorsal . . . . .	2	3
Width of pectoral . . . . .	1	6
Width of tail . . . . .	5	0
Height of dorsal . . . . .	1	3
Circumference . . . . .	10	0

The following are the measurements of three skulls, in inches and lines; 1. is in the British Museum, 2. Mus. Coll. Surg. n. 1137, and 3. n. 1138 of the same collection:—

	1.		2.		3.	
	in.	lin.	in.	lin.	in.	lin.
Skull: Length of, entire . . . . .	28	0	29	0	24	0
Length of nose . . . . .	15	0	15	0	12	0
Length of teeth-series ..	9	0	8	6	7	0
Length of lower jaw . . . . .					19	0
Width at notch . . . . .	11	6	11	0	9	0
Width at orbit . . . . .	19	6	19	6	15	6
Width of intermaxillary	9	0	7	0		
Width of middle of nose . . . . .			9	6	6	6
Height at occiput . . . . .	15	0				

Female suckling, with the young 4 feet 6 inches long in December (*Watson*), and 7 feet long in January.

Vertebræ 55: 7 cervical, first free, second and third united by body and partly by lateral process, rest free; 11 dorsal, and 37 posterior.

The vertebræ anchylose soon. Dorsal vertebræ 12. Ribs 12. 12, the first six only attached to the vertebræ. The other vertebræ 37, of which seven are united; the pelvis bones attached under the seventh, eighth, and ninth caudal. The first bone of the sternum pierced, and in the young deeply notched and with slightly marked lateral angles. The bladebone less curved near the spine, its front angle more acute, and its acromion shorter and more square than that of *D. Delphis*. The pectoral is elongate, the articulations of the fingers more numerous—the first of 4, the second, which is the largest, of 12, the third of 9, the fourth of 2, and the fifth of a single joint. They are all terminated by a cartilaginous tip.—*Cuv. Oss. Foss.* v. 306.

The pelvis bone elongate, subcylindrical, slender, slightly curved, very like that of the adult *D. Orca*; in size and form but a little stouter.

“‘The Ca’ing Whale.’ Though it moves uniformly forward, its motion is slow, and when it comes up to blow it remains several minutes on the surface. It is easily controlled in its motions; so that a whole herd is frequently driven ashore at once. If one individual be wounded and take to the ground, the others will speedily take the same course, whence the origin of the name. Externally it has a single spiracle; in aged animals some of the teeth are deficient, and in the suckling none are visible. Sand-eels have been found in its stomach.”—*Fleming, B. A.* 34.

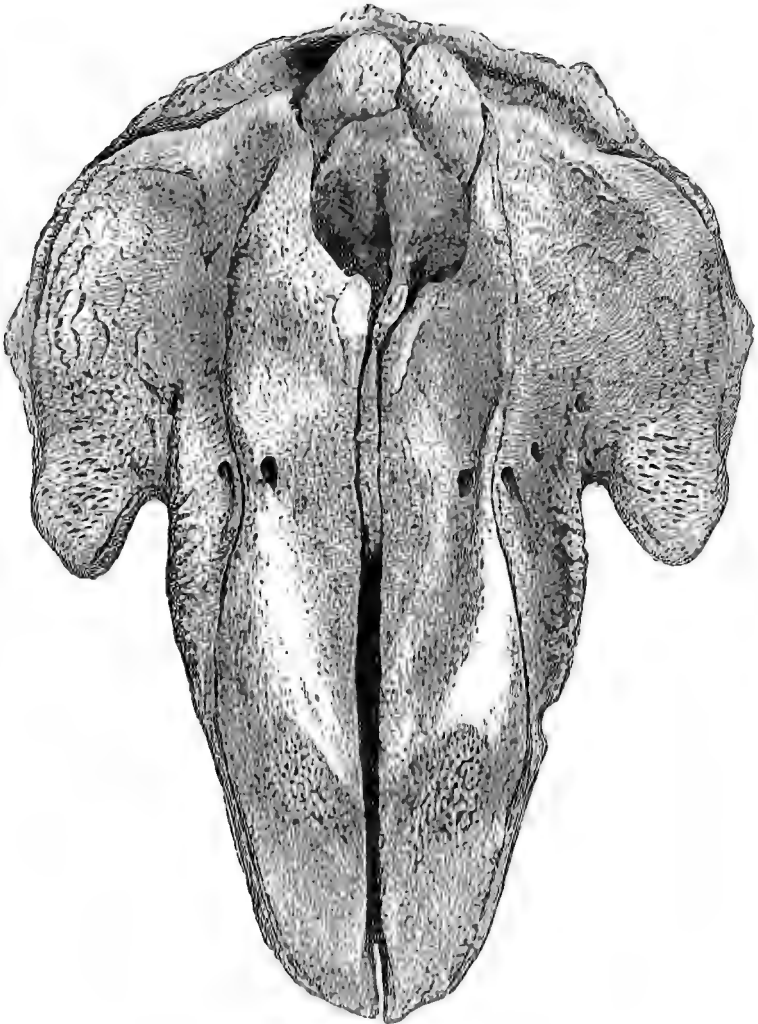
Very common at the Faroe Islands, and called *Grindewal*. Very many are taken annually on their passage from the Polar Seas to the Atlantic.—*Eschricht*.

The Rev. Dr. Barclay observes that the favourite food of the *Delphinus melas* seems to be cuttlefish, of which quantities are generally found in the stomach.—*Bell, Brit. Quad.* 485.

“This species goes in herds; different companies display consider-

able variety of appearance. The Leading Whale is of a very dark colour; but a whole herd is sometimes seen of a cream-colour, and single specimens of a light tint are not unfrequent. These cannot be the *D. Beluga* or White Whale, as the latter is without the dorsal fin."—*Couch, Corn. Fauna*, 10.

Fig. 62.

Upper surface of the skull of *Globiocephalus Srineral*. B. M.

Van Beneden (*N. Mém. Acad. Brux.* xxxii. 5) states that a female was got at Huyst, in Belgium, Nov. 1859, 20 feet long, with foetus 5 feet long. He states, the foetus was coloured exactly like the adult.

Eschricht observes that a foetus only a foot long has the pectoral fins of the shape so characteristic of the genus. The teeth were present, but had not cut the gums; they were  $\frac{1}{10}$ , and they are evidently permanent, and not replaced.

“Number of alveoli 10.10. The upper jaw is less obtusely rounded than in the preceding specimen (no. 2519). The teeth are relatively smaller and more pointed. The outer margin of the sub-orbital arch is flatter, and joins the upper surface at a right angle, being separated from it by a ridge; in the preceding specimen the outer margin of the orbit is convex, and passes by a gradual curve into the upper surface,—the whole upper surface of the beak being formed by the premaxillaries; in the present specimen the maxillaries slope down more gradually, and therefore appear in the upper view of the skull.”—*Cat. Osteol. Series*, p. 456.

Var. 1? *Delphinus globiceps*, *Risso*, *Europ. Mérid.* iii. t. 1. f. 1; *F. Cuv.* 223.

Black, with a grey band on each side from the throat to the vent; head large, round, swollen; jaws equal; teeth  $\frac{2}{2}$ , round, conical, curved.

Inhab. Nice (*Risso*).

Is probably the same as *D. Svineval*, but M. F. Cuvier regards it as distinct.

The genus *Globiceps* has been recognized by M. Gervais in some *Delphinidæ* of 14 to 17 feet long, of which a shoal of about fifteen ran on shore near Barcarès, Pyrénées orientales, in February 1864. Four of these reached M. Gervais, and he compared the skeleton of one of them with different skeletons of *G. melas* in the Museum of Paris. The only differences that can be pointed out reside in the curvature of the incisive bones and in the somewhat more obtuse appearance of the teeth; but equivalent differences also occur between the specimens of *Globiceps* from other seas, when carefully compared, so as to a certain extent to justify the supposed species which have been admitted in this genus by authors. The Mediterranean *Globiceps* thus appears to constitute a new race, if not a new species. Like the Cetacea of this genus which live in the ocean, it has a head much inflated and the muzzle short; and its colour is black, except beneath, where it presents a large median band, commencing in the form of a heart near the throat, and extending to the anus.—*Gervais*, *Comptes Rendus*, Nov. 28, 1864; *Ann. & Mag. N. H.* 1865, xv. 76.

## 2. *Globiocephalus affinis*. *Smaller Pilot Whale*.

Teeth  $\frac{1}{2}$ , small, conical, curved, very acute; nose exactly half as long as the head, rather tapering, and rather concave on the sides;

intermaxillary nearly as wide as the jaw; lower jaw obliquely truncated in front; palate fiat in front.

*Delphinus Grampus*, *Cat. Mus. Coll. Surg.* n. 1138; *Hunterian Coll.* n. 686.

*Delphinus melas*, *Owen, British Fossil Mammalia*; *Cat. Osteol. Mus. Coll. Surg.* n. 2518.

*Globiocephalus affinis*, *Gray, Zool. Ereb. & Terr.* 32; *Cat. Cetac. B. M.* 1850, 89; *P. Z. S.* 1864, 242.

Inhab. North Sea.	<i>Mus. Coll. Surg.</i>	in.	lin.
Skull: Length, entire	.....	24	0
Length of nose	.....	12	3
Length of teeth-line	.....	7	0
Length of lower jaw	.....	19	0
Width of nose at notch	.....	9	0
Width of middle of nose	.....	6	6
Width at orbits	.....	15	6

This is probably a young specimen of *Globiocephalus Svineval*. The skull differs in being rather slenderer in front, and in the intermaxillary not being rugose in front. In the Catalogue of the *Mus. Coll. Surg.* 165. n. 1138, it is called "the skull of a small Grampus," Hunterian, and n. 1136, "the skull of a large Grampus," Hunterian. It appears to be the skull which Prof. Owen gives the measurements of, under the name of *D. melas*, in his account of *Phocæna crassidens*, in the work on British Fossil Mammalia.

The skull of the Black Grampus (*Delphinus melas*), which formed part of the Hunterian Collection in the Museum of the College of Surgeons (see *Cat. p.* 456, n. 2518), is thus described—

"Number of alveoli  $\frac{12 \cdot 12}{12 \cdot 12} = 46$ . The teeth are moderately small, conical, subincurved, decreasing to the two extremes of the series. The fourth to the tenth inclusive are subequal. The symphysis of the lower jaw is subtriangular, and curves from below upwards at its extremity."

### 3. *Globiocephalus intermedius*. *Blackfish*.

Teeth  $\frac{9 \cdot 9}{3 \cdot 3}$ , several being quite loose. Skin uniform dull slate-colour; belly with an ill-defined, narrow, clouded white streak extending from beneath the jaw to about the anus, being much broader and whiter in some parts than in others, and most so beneath the jaw.

*Delphinus intermedius*, *Harlan, Journ. Acad. Sci. Philad.* vi. 51. t. 1.

*Delphinus Harlani*, *Fischer, Syn. Mamm.* 656; *Schinz*.

*Globiocephalus melas*, *Dekay, Zool. New York*, t.

*Phocæna globiceps*, *Sampson, Silliman Amer. Journ. Sci.* iii. 301. fig.

*Delphinus globiceps*, *Jackson, Boston Journ. N. H.* v. 160. t. 15. f. 1.

*Globiocephalus Svineval*, var.?, *Gray, Zool. Ereb. & Terr.* 32.

*Globiocephalus intermedius*, *Gray, Cat. Cetac. B. M.* 1850, 88.

*Blackfish*, *American Sailors, Neuwied, Voy. Amér. Nord*, iii. 232.

ANAT. *Jackson, Boston Journ. N. H.* v. 160. t. 15. f. 2 (stomach).

Inhab. Coast of North America.



Weight estimated at 255 lbs. Length, from nose to end of tail, 86 inches, to pectoral fin 20, to dorsal 30, to blow-hole  $9\frac{1}{4}$ , to eye  $9\frac{1}{2}$ , to penis 49, to anus 56 inches; span of tail 21; pectoral fin  $5\frac{1}{2}$  across the base, 21 inches along the anterior edge, and 6 inches along the posterior; circumference in front of dorsal fin 46; blowhole concave anteriorly and  $1\frac{1}{2}$  inch across from tip to tip; eyes  $\frac{1}{5}$ ths of an inch. Vertebrae 58; bodies of six of the cervical co-ossified; 11 dorsal, and posterior to them were 40.—*Jackson, l. c.*

It has been thought that the European and American specimens were the same; but the anatomical descriptions show the following differences:—

1. *American.* Vertebrae 58; cervical 7 (bodies of first six co-ossified); dorsal 11; posterior 40.—*Jackson, l. c.* 166.

2. *European.* Vertebrae 55; cervical 7 (bodies of second and third co-ossified); dorsal 11; posterior 37.—*Cuv. Oss. Foss. v.*

Above shining black, side of the abdomen and neck marked with the continuation of the white colour of the abdomen and throat; beneath varied with white. Tail compressed, terminating in a deep constriction before the caudal fin. Colour uniform black above, with a white patch beneath the throat, becoming a narrow longitudinal stripe on the breast between the fins, and a broad longitudinal band on the abdomen. Teeth about twenty in each jaw, small, prismatic, slightly reflected, and projecting half an inch above the gums. Head blunt, cylindrical, and anteriorly subglobose. Body slightly compressed. Tail strongly compressed, almost carinated, and much constricted just before the caudal fins. Length  $16\frac{1}{2}$ , girth in largest part 10, length of pectorals 3 feet 11 inches, gape of mouth 9. Pectoral fins one-fourth, dorsal fin one-thirteenth of the total length.

“Inhab. New England. A female.

“Distinguished from *D. Grampus*, Hunter, and *D. globiceps*, Cuvier, by the caudal constriction, as well as in its form, proportions, and markings.

“A specimen harpooned at Craigie’s Bridge, 16th June, 1842, looked quite thin. It was a uniform dark slate-colour, except the belly, where was an ill-defined, narrow, clouded, white streak, extending from beneath the jaw to almost the anus, being much broader in some parts than others, and most so beneath the jaw.

“Vertebrae 58; bodies of the six cervical co-ossified. It was a male, 7 feet long, and weighed about 255 lbs. Teeth  $\frac{9 \cdot 9}{8 \cdot 8}$ .—See anatomy.”—*Jackson, Boston Journal Nat. Hist.* 1845, v. 160. t. 15. f. 1.

The cranium agreed pretty well with Cuvier’s figure of that of *D. globiceps*, but not so well as an old cranium in the same museum. The upper surface of the maxillary bones in both specimens was less broad and flatter than he represents them.

In the Paris Museum there is a skull of this genus from Guadeloupe, named *D. globiceps*. The middle of the intermaxillaries is as wide as the maxillae. Skull: length, entire,  $23\frac{1}{2}$  inches, of nose  $11\frac{1}{2}$ ; width at notch  $8\frac{1}{2}$ , at middle of beak  $8\frac{3}{4}$  inches.

4. *Globiocephalus Edwardsii*.

“Head large and clumsy, rounded on the upper surface, and terminating in front by a short, pointed snout. Teeth  $\frac{12 \cdot 12}{12 \cdot 12}$ . Eyes situated a little above the angle of the mouth. Dorsal fin long, pointed, slightly curved backwards, and situated nearly midway between head and tail. Pectoral fins narrow, pointed; caudal fin deeply and widely notched, opposite termination of vertebral column. Colour black; sides, throat, and upper part of the body towards the tail black; belly and sides white. Length, entire,  $12\frac{1}{2}$ ; circumference in front of dorsal  $6\frac{3}{4}$ ; tail, wide,  $2\frac{3}{8}$  feet.

*Phocæna Edwardsii*, *A. Smith, African Zoology*, 127.

“Inhab. Seas about the Cape of Good Hope.”

Sir Andrew Smith observes, “For the description and a drawing of this species I am indebted to M. E. Verreaux, who some time ago had a good opportunity of examining a specimen which had been cast ashore near Slangkop.” Sir Andrew Smith has kindly given me this drawing; it is very like *Globiocephalus Suineval* of the European seas.

See also “*Phocæna globiceps*,” *A. Smith, African Zool.* 126.

Inhab. South-east coast of Africa (*A. Smith*).

“I am unable to state the number of teeth, as the specimen I possess is young.”—*A. Smith, l. c.* 127.

What is

*Delphinus Victorini*, *Grill (Svenska Vetensk. Hand. 1860; Arch. Naturg. xxvii. 1861, 114) ?*

Blow-hole crescent-shaped. Black above, white below, both colours being separated by an arched line running from the angle of the mouth to the pectoral fin, and thence approaching the median line, so that the lines of both sides are distant from each other only 1 to 2 feet in the region of the navel; they are confluent at an acute angle behind the vent. The lower surface of the caudal fin white; a white stripe, 3 feet long and 4 to 5 inches broad, commences a few inches above the eyes. Length 19 feet (Swedish).

Inhab. Cape of Good Hope. Discovered by Victorin.

b. *Black, or only rather paler beneath.*

5. *Globiocephalus macrorhynchus*. *The South-Sea Blackfish.*

Uniform black. Nose of skull short and broad, rounded in front, nearly as broad in the middle as at the preorbital notch. Teeth subcylindrical,  $\frac{8}{8}$ . Lower jaw rounded in front. Length 16, rarely 20 feet.

*Globiocephalus macrorhynchus*, *Gray, Zool. Ereb. & Terror*, 33; *Cat. Cetac. B. M.* 1850, 90.

Killer or Blackfish, *J. Bennett, MS. Mus. Coll. Surg.*

Blackfish of South Sea Whalers (*Phocæna*, sp.), *Bennett, Whaling Voyage*, ii. 233. fig.

Blackfish (*Phocæna nigra*), *Clarke in Nunn, Narrat. of Wreck of Favourite*, 184, fig. (1850, 8vo) ?  
 Blackfish, *Colnett, Voy. S. Pacific?*

Inhab. South Seas.

a. Skull, imperfect. Presented by Dr. Milligan.

Skull, Mus. Coll. Surg. Presented by J. Bennett, Esq. Called a "Killer or Blackfish":—

	in.	lin.
Length, entire . . . . .	24	0
Length of nose . . . . .	11	6
Length from tip of nose to back of palate . . . . .	14	6
Length of teeth-line . . . . .	5	6
Length of lower jaw . . . . .	16	6
Breadth at preorbital notch . . . . .	9	6
Breadth at middle of nose . . . . .	9	0
Breadth at temple . . . . .	17	0
Breadth of intermaxillary . . . . .	6	0

Head thick, square, and short; the snout blunt and but little prominent. The angles of the lips are curved upwards, giving the physiognomy an innocent smiling expression. Body clumsy, round and broad, and the termination of the trunk in the tail-fin rather abrupt.—*Bennett, l. c.* 233.

Colnett (*Voy. S. Pacific*) speaks of innumerable shoals of Blackfish on the shores of California.

The contents of the stomach were chiefly cuttlefish.

The Blackfish roam about the ocean in very large troops (a solitary individual is occasionally seen), are active and watchful, but betray little concern at ships or boats. They appear to inhabit the greater portion of the aqueous globe, uninfluenced by the remoteness or vicinity of land. We observed examples in many parallels of latitude between the equator and 50° N. and 53° S., in the central part of the Atlantic and Pacific Oceans, as well as off the coast of California and in the Indian Archipelago.

Sperm-whalers often attack this species with their boats in order to obtain a supply of oil for ship consumption; some risk, however, attends their capture, for when harpooned they will sometimes leap into a boat. A Blackfish of average size will produce from 30 to 35 gallons of oil, which in its most recent state has a dark colour and an unpleasant odour.—*Bennett, 235.*

It is probable that Mr. Bennett in the above range confounded together under the name of *Blackfish* more than one species. There can be no doubt of this being the case, as Mr. Flower has received skulls of two genera, viz. *Pseudorca meridionalis* and two species of *Globiocephalus*, sent as the "Blackfish" from a whaler in Australia.

I am not sure that the skull described is that of the animal called the "Blackfish;" at least, if it is, there must be more than one genus of whales so called.

There is a skull of this species in the Museum of the Royal College of Surgeons, called the skull of the Round-headed Grampus (*Del-*

*phinus globiceps*), which was presented by Fred. D. Bennett, Esq., F.Z.S. It is thus described by Professor Owen:—

“Number of alveoli  $\frac{7 \cdot 7}{8 \cdot 8} = 30$ . The skull corresponds closely with that of the *Delphinus globiceps* of Cuvier, figured in ‘Ossemens Fossiles,’ tom. v. part 1. t. 21. f. 11–13. It differs in the closer proximity of the occipital condyles to each other below, and the end of the flattened upper jaw is rather more obtusely rounded.”

In the same collection there is a second skull of the Round-headed Grampus (*Delphinus globiceps*), wanting the lower jaw, presented by Lieut. Colquhoun.

“The Blackfish of Desolation, near Kerguelen’s Land, is about 11 feet long. Head longish, with a rounded nose; both jaws with numerous small teeth. Dorsal fin near the middle of the back, not arched backwards. Body small, entirely black. Spout not perceptible. This whale is often thrown ashore in the bays of the islands.”—*Nunn’s Narrative*.

### 6. *Globiocephalus Indicus*.

*Globiocephalus Indicus*, *Blyth, Journ. Asiatic Soc.* xix. 425; xxi. 358 (1852); xxviii. 490.

Blackfish of the Bay of Bengal, *Blyth, Journ. Asiatic Soc. Bengal*, xix. 426.

The “Blackfish” of the seamen of the Bay of Bengal. It is found in the Bay of Bengal, occasionally ascending, in or about July, the Gangetic rivers. There is the skeleton of an adult male and a mounted skeleton of a female from a great shoal, “schule” or “school,” which found their way into the salt-water lake near, and the skeleton of a newly-born female, procured in the Calcutta fish-market in 1850, in the Museum at Calcutta. There is in the same museum a stuffed specimen of a young animal,  $6\frac{1}{2}$  feet in length, which was procured in the Hugli, near Serampore.

A shoal of several dozen was seen floundering about in the shallow water and groaning painfully. The natives towed them ashore into the river as they died, having no notion of extracting oil from their carcases. The weather was terrifically hot.—*Journ. Asiat. Soc.* xix. 426.

Mr. Blyth observes, “The species is well distinguished from *Gl. deductor* of the Atlantic, of which we have a fine skull of an old animal for comparison. The intermaxillaries of the Indian species are shorter and one-fourth broader, and the teeth are considerably stouter. Colour of the animal uniform leaden black, slightly paler underneath. Length of an adult male 14 feet 2 inches, flippers 2 feet 6 inches in greatest breadth. Length of the dorsal fin  $2\frac{1}{2}$  feet, and height 11 inches, breadth of the tail-flukes 3 feet, and from vent to cleft of the tail 4 feet 10 inches. Adult female rather small. The skeleton of the female set up in our museum has a series of 49 vertebræ: in addition to the united cervical, there are 11 dorsal or costal, 12 lumbar without the articulated V-bones, 16 with the latter, and 10 small caudal within the tail-flukes.”

Perhaps a *Neomeris*.

7. *Globiocephalus Sieboldii*. *The Naiso-gota*.

*Delphinus globiceps*, *Temm. Fauna Japon. Mamm. t. 27* (young).

*Globiocephalus Sieboldii*, *Gray, Zool. Ereb. & Terror, 32; Cat. Cetac. B. M. 1850, 90.*

ANAT. *Fauna Japon. t. 27* (skull, &c.).

Inhab. Japan.

M. Siebold brought with him a figure of a very young specimen, 5 feet 6 inches long, of this species, made by M. Villeneuve, which is copied in the 'Fauna Japonica,' and a complete skeleton.

M. Temminck regards it as undoubtedly the same as the European, but yet allows that there are some differences between it and the adult specimen observed on the European shores. The forehead is less swollen, and the pectoral fins are rather larger than in *G. Svineval* of Europe. This species is called in Japan *Naiso-gota*.

The Japanese distinguish two other species:—1. *Sibo golo*, which is purple, with a white spot behind the dorsal fin, and the lower jaw furnished with many plaits. 2. *Ohanan golo*, black, with a larger muzzle and more spacious mouth; the dorsal one-third from head, back-edge before the middle; pectoral one-fourth from head; pectoral one-sixth of the total length; length of skull 15 inches; beak 6·9; width at notch 4·9.

The *Delphinus globiceps* (Grant, *Proc. Zool. Soc. 1833, 65*), brought by Capt. Delvitte from the North Pacific, which Schlegel thought might be this species, is a species of *Orca*.

8. *Globiocephalus Chinensis*.

"*Globiocephalus*, n. s., the Chinese *Globiocephalus*," *Blyth, Rep. Asiatic Soc. 11.*

*Globiocephalus Rissii*, *Anon. Chinese Repository, Jan. 1833, 411.*

Colour black above, lighter on the belly. Length  $9\frac{3}{4}$  feet. "Head 18 inches long, and average circumference 3 feet. The dorsal fin triangular, and almost immovable, 15 inches long; pectoral 14 inches, and all remarkable for their firmness and strength."

Inhab. China seas, near Leuchen. A male. (Jan. 1833.)

"This species does not spout a jet, though their breathing is distinctly heard at a short distance. They swim near the surface, and we had several opportunities of observing their habits during the voyage. The sailors term them *Cowfish*."

Mr. Blyth says that details of the anatomy are given in the paper in the 'Chinese Repository' above quoted.

## 2. SPHÆROCEPHALUS.

Palate convex, shelving on the sides. The rostrum of the skull oblong, nearly of the same width for the greater part of the length, and regularly rounded in front. Otherwise like *Globiocephalus*.

*Globiocephalus* § *Sphærocephalus*, *Gray, Proc. Zool. Soc. 1864, 244.*

**Sphærocephalus incrassatus.** *Thick-palated Pilot Whale.*

Teeth  $\frac{9 \cdot 9}{0}$  or  $\frac{10 \cdot 10}{0}$ ; the nose of the skull attenuated, the sides nearly parallel, and regularly rounded in front; the palate very convex, especially in front; the upper surface of the intermaxillaries rugose in front.

Fig. 63.

Upper surface of the skull of *Sphærocephalus incrassatus*. B. M.

*Globiocephalus incrassatus*, Gray, *Proc. Zool. Soc.* 1861, 309; 1864, 243; *Arch. Naturg.* 1862, 154.

Inhab. British Seas, Bridport (*Rev. J. Beecham*, 1853).

a. Skull: Bridport. Presented by Rev. J. Beecham, 1853.

Fig. 64.



a. Side view of skull of *Sphærocephalus incrassatus*. B. M.  
b. Diagram of the cross-section of the palate of *S. incrassatus*.

	inches.
Length of the skull . . . . .	28
Length of the nose . . . . .	14
Length of the teeth . . . . .	8? imperfect, worn at the end.
Width of nose at the bridge . .	10
Width of nose at the notch . .	9½
Width of skull at orbits . . . . .	17

The back of the skull is higher and much narrower than that of *G. Svineval*.

This species does not appear to have been observed before as British, and I do not find any indication of its having been described as an exotic species. But it is so distinct both in the form of the nose of the skull, in the width of the intermaxillary bones, and more especially in the thickness and convexity of the palate of the front part of the skull, from the species which have hitherto been described, and the differences are so visible, that Mr. Edward Gerrard selected it as a distinct species as soon as he saw it.

It has been suggested that this may perhaps be the other sex of the common Pilot Whale (*Globiocephalus Svineval*); but I can scarcely think this probable, as I have seen many skulls of the latter, and they have been all nearly similar and very unlike the one under consideration; and I can scarcely believe that all I have seen could have been of the same sex; for it is a whale that comes on the coast in great shoals, and hence one of its names is the "Social Whale," and specimens of both sexes have been recorded as caught on the British coast. At the present moment there is an inclination to regard some of the whales which have been considered species as mere sexes of the same species, simply because the specimen described in one case happens to be a male and in the other a female. Thus *Delphinus micropterus* is said to be the female of *Ziphius Sowerbiensis* for the above reason; but I have not heard that any new specimen has been discovered, or any fact elicited, to prove the truth of this suggestion, and it may be only an instance of accidental coincidence—a case the opinion formed may be disproved by the next discovery of either animal.

### Family 8. ZIPHIIDÆ.

Head beaked. Blower linear, transverse, arched in the middle and bent back at the ends. The upper jaw toothless; the lower jaw with a few teeth on the sides or in the front, which are sometimes not exposed or soon deciduous. Body elongate. Dorsal fin falcate. The pectoral fins small, low down, and rather close together in the middle of the chest; fingers 5, of four or five phalanges.

- Delphinidæ, Hyperodontina, et Ziphiina, *Gray, Zool. Ereb. & Terror*, 24; *Cat. Cetac. B. M.* 59, 61; *Proc. Zool. Soc.* 1863, 201.  
 Diodonea (pars), *Rafin. Anal. Nat.* 60, 1815.  
 Heterodontes, *Duvernoy, Ann. Sci. Nat.* 1851, 23.  
 Rhyinchocete, *Eschricht, Nord. Wallth.* 21.



I should have preferred *Hyperoodontidæ* for the name of this family, as *Hyperoodon* is the oldest genus; but it conveys a false impression, caused by a slip of the pen in describing the teeth in the manuscript (or an error of the press in the work) of Otho Fabricius.

#### SYNOPSIS OF THE GENERA.

- A. *Teeth 2 or 4, in front end of the lower jaw, conical. Beak of skull with a high crest on each side, formed by the elevation of the maxillary bones.* Hyperoodontina.
1. HYPEROODON. Beak of the skull straight; crest of the beak sharp-edged above, as high as the occiput.
  2. LAGENOCETUS. Beak of the skull ascending; crest of the beak flat-topped, higher than the occipital.
- B. *Teeth 2 or 4, in front end of the lower jaw, conical or cylindrical. Beak of skull simple; intermaxillaries enlarged behind, forming a more or less deep cavity round the blowers.* Epiodontina.
3. EPIODON. Vomer simple, smaller; intermaxillaries elevated, and forming a moderately deep, well-marked basin round the blowers.
  4. PETORHYNCHUS. Vomer swollen, forming a large, elongated tubercle between the callous intermaxillaries; intermaxillaries forming a deep basin round the blowers.
- C. *Teeth in the side of the lower jaw, compressed. Beak of skull simple; intermaxillaries linear, rather swollen on side of blowers.* Ziphiina.
5. BERARDIUS. Teeth in the front of the side of the lower jaw; lower jaw simple, tapering.
  6. ZIPHIUS. Teeth in the middle of the side of the lower jaw; lower jaw simple, tapering.
  7. DIOPLODON. Teeth in the middle of the side of the lower jaw. Lower jaw broad behind, suddenly contracted in front.
- A. *Teeth 2 or 4, in the front end of the lower jaw, or often hidden in the gums. Beak of skull with a high crest on each side above, formed by the elevation of the maxillary bones. Eyes close to the gape. Cervical vertebræ all ankylosed.* Hyperoodontina.
- Hyperodontina, Gray, *Proc. Zool. Soc.* 1863.  
 Hyperodontina (pars), Gray, *Zool. Ereb. & Terr.* 24; *Cat. Cetac. B. M.* 1850, ; *Proc. Zool. Soc.* 1864, 239.  
 Diodonea (pars), Rafin. *Anal. Nat.* 60, 1815.  
 Les Hétérodontes, Duvernoy, *Ann. Sci. Nat.* 1851, xv. 23; *Arch. Naturg.* 1852, 21.

## 1. HYPEROODON.

Forehead convex. Blower transverse, slightly convex forward in the middle, and bent back a little at the ends. Gape short, only as long as the short beak. The eyes near and the ears far behind the gape. The crests of the maxillary bones thin and wide apart above. The beak of the skull descending forwards. The hinder edge of the skull as high as the crests. Lower jaw rather curved. Blade-bone triangular, angles very acute; the acromion very broad at the end, directed downwards, and the coracoid upwards, the upper edge with a prominence (see Cuvier, *Oss. Foss.* v. 318. t. 24. f. 23). The bones of the arm short; fingers short (Cuv. 318). Cervical vertebræ united, all anchylosed together.—*Mus. Hull*; *Graves, Edinb. Phil. Journ.* 1830, 59.

1. Hyperodon, *Rafin. Anal. Nat.* 60, 1815; *Gray, P. Z. S.* 1864, 239.  
Hyperoodon, *Lacép.*; *Cuvier, Oss. Foss.* v. 327. t. 24; *Gray, Cat. Cetac. B. M.* 1850, 61; *Duvernoy, Ann. Sci. Nat.* xv. 44, 1851; *Rousseau, Mag. Zool.* 1858, 205.  
*Chenodelphinus, Eschricht, Isis,* 1844, 805.
2. Uranodon, *Illiger, Prodr.* 143, 1811.  
*Nodus (sp.) edentulus, Wagler, N. S. Amph.* 34.  
*Orca, Wagler, N. S. Amph.* 34.  
*Anarnacus, Lacép.*; *Duméril, Z. A.*; *Rafin. Anal. Nat.* 61, 1815; *Gray, Zool. Ereb. & Terror.*  
*Ancylodon, Illiger, Prodr.* 142, 1811; *Oken, Lehrb. Naturg.* 673, 1815.
3. Hypodon, *Haldeman.*  
*Chenocetus, Eschricht, Danish Trans.*  
*Cetodiodon, Jacob, Dublin Phil. Journ.*  
*Diodon, Lesson, Œuvr. Buffon,* i. 124.  
*Monodon spurius, O. Fabr.*  
*Heterodon, sp., Desmarest, Mamm.*  
*Delphinus, sp., Desmarest, Mamm.*
4. ?*Diodypus, Rafin. Anal. Nat.* 60, 1815 (no type or char.).

In the British Museum there is the mass of the cervical vertebræ of a young *Hyperoodon Butzkopf*. It is unfortunately not in a good condition, the edges being worn, and the upper lateral processes of the hinder cervical vertebræ being broken off. It agrees in general shape with the cervical vertebræ of *Lagenocetus*; but the upper cones formed of the united neural arches are not so high, nor keeled in front; the principal difference is in the seventh cervical vertebra and its lateral processes and neural arch being as completely united to the other vertebræ as any of the rest, they all seven forming a single bony mass.

The canal of the spinal marrow is very large, but otherwise like that of *Lagenocetus*; but the hinder part of the canal is higher, being as high as wide above, and its width is rather greater than half the width of the body of the seventh cervical vertebra.

According to Voigt and Thompson the ends of the blowers point forward; Dale, Baussard, Doumet, Bell, and Jenyns describe them as pointing backwards; Desmarest and others assumed the latter as

a generic character; Wesmael describes the aperture as transverse, linear, slightly convex forward in the middle, and slightly bent back at the ends; and this explains, I suspect, the different account that authors have given of this part, some looking at the middle, and others at the ends only.

Professor Owen, in the 'Catalogue of the Osteological Series in the Royal College of Surgeons,' no. 2479, p. 448, has some notes on "the skeleton of the Bident Dolphin, or Bottlenose Whale (*Hyperoodon bidens*)," which was taken in the Thames, near London Bridge, in the year 1783, and is described and figured by John Hunter in the 'Philosophical Transactions' for the year 1787, pl. 19.

There is in the same collection the front portion of the lower jaw of an immature animal, no. 2480, with the teeth, and showing the sockets of other teeth.

The lateral border of each maxillary bone is developed into a broad and lofty vertical crest, and the hinder border of the same bone to the occipital region is developed into an occipital crest (*l. c.* 448).

Mr. Pearson of the Hull Philosophical Society, Mr. Ball of Dublin, and Mr. W. Thompson of Belfast have sent me various detailed drawings of the head of the Hyperoodons taken off the British and Irish coasts, in their possession; they, the skeleton at Liverpool, and the French skeleton which has lately been added to the Anatomical Museum of Paris, appear all to belong to one species, and to be the same as Hunter's specimens in the Royal College of Surgeons, and the skull figured by Camper and Cuvier.

Lacépède called the genus *Hyperoodon*, and Illiger *Uranodon*, because of the teeth on the palate described by Baussard. They have not been observed in other specimens; and Illiger, in his generic character, by mistake, says the two teeth are in the upper jaw (*Gen.* 143). Professor Eschricht proposed the name of *Chenocetus*, instead of *Hyperoodon*, which is founded on an erroneous description. The name *Goose Whale*, or its translation, is applied to this animal by the inhabitants of most part of the seas where it inhabits, and it was early described as the *Goose-beaked Whale* by Pontoppidan (*Nat. Hist. Norway*, chap. v. 123, 124, fig.). Dr. Jacob calls it *Cetodiodon*.

Professor Eschricht, in the 'Danish Transactions,' has given an account of the history of the genus, and of its anatomy, including some admirable details of its brain. He also shows that there are numerous small teeth in the jaws (see figures at pp. 331-335), besides the two large teeth in front.—*Danish Acad. Trans.* ii. 327, 331, 332, 334, 335; *Ann. & Mag. N. H.* 1852, ix. 283.

O. Fabricius described a whale, under the name of *Monodon spurium*, called by the Greenlanders *Anarnak*, as having two small, conical, slightly curved, blunt teeth prominent in front of the upper jaw; the lower jaw toothless. M. Cuvier (*Oss. Foss.*) regards it as a *Hyperoodon*, and he only believed in the existence of one species of the genus. M. F. Cuvier, who misunderstood the description of Chemnitz with respect to the teeth of *Balæna rostrata*, is inclined to unite it to that species, with which it agrees in being all black, but

observes they differ greatly in size (Cétac. 226). It cannot be the young Narwhal, for the back is finned.

Professor Eschricht regards the Anarnak or *Monodon spurius*, O. Fab., on which Lacépède formed the genus *Anarnacus* (Cétac. 164), as the common *Hyperoodon*, in which Fabricius mistook the lower for the upper jaw. The fat of *Hyperoodon* is purgative, which Fabricius describes to be a peculiarity of the *Anarnac*.

Lacépède (Cétac. 164) described it as a genus under the name of *Anarnacus*, and Illiger (Prodr. 142) under that of *Ancylodon*; and in the 'Zoology of the Erebus and Terror,' on the strength of Fabricius's usual accuracy, I adopted the views of this naturalist; but Professor Eschricht's observations have induced me to believe that Cuvier and other naturalists were right in considering it a synonym of *Hyperoodon*.

The error of Fabricius is very pardonable, as Desmarest and Lesson have mistaken the upper for the lower jaw in Chemnitz's description (Desm. Mamm. 520; Lesson, Mamm. 427; Cétac. 120); and M. F. Cuvier has not well understood it, as pointed out by M. Wesmael (*l.c.*); and Illiger makes the same mistake with regard to his species.

*Physeter bidens* (Sowerby) has been referred to this genus; but the form of the head and position of the fins, the teeth, and the form of the skull show it to be a *Ziphius*.

### **Hyperoodon Butzkopf. The Bottlehead.**

Black, beneath lead-coloured.

1. Bottlehead, or Flounder's Head, Dale, *Hist. Harwich*, 411. t. 149 (male 18, female 13 feet long), cop., 1730.  
Beaked Whale, Penn. *Brit. Zool. t.*, 1769.  
Delphinus Butzkopf, *Bonnat*. 25; *Desm. N. Dict.* ix. 176, 1789.
2. Hyperoodon Butzkopf, Lacép. *Cétac.* 319, from Baussard, *Journ. Phys.* xxxiv. 201. t.; copied, *F. Cuv. Cétac.* 241. t. 17. f. 1, t. 11. f. 1; cop., Gray, *Zool. Erebus & Terror*, 20. t. 3. f. 1, 2 (animal), f. 4, 5 (skull); *Cat. Cétac. B. M.* 1850, 61; *P. Z. S.* 1860, 424.  
Delphinus? edentulus, *Schreb. Säugeth.* t. 347, 1802.  
Nodus edentulus, *Wagler, N. S. Amph.* 34.  
Delphinus bidens, *Turton, B. Fauna*, 17.  
D. Hyperoodon, *Desm. Mamm.* 521; *Thompson; Fischer, Syn.* 515, 1822.  
Heterodon Hyperoodon, *Lesson, Man.* 419, 1827.  
Hyperoodon Baussardi, *F. Cuvier; Duvernoy, Ann. Sci. Nat.* xv. 1851.  
D. Honfloriensis, *Desm.*
- ‡3. *Monodon spurius* (Anarnak), *O. Fabr. Faun. Grœnl.* 31; *Bonnat. Cetol.* 11; hence  
Delphinus anarnacus, *Desm. Mamm.* 520.  
D. *spurius*, *Fischer, Syn.* 515.  
Anarnakus Grœnlandicus, *Lacép. Cét.* 164.  
Ancylodon spurius, *Illiger, Prodr.* 142.  
Heterodon anarnacum, *Lesson, Man.* 418.
4. Hyperoodon, *Longchamps, Mém. Soc. Linn. Norm.* vii. 19. t. 1.
5. *Balœna rostrata*, *Chemnitz, Berlin Besch.* iv. 183, 1778; hence  
Delphinus Chemnitzianus, *Blainv. in Desm. N. Dict.* ix. 175, 1822.  
Heterodon Chemnitzianum, *Lesson, Man.* 418, 1827.

6. Bottlenose Whale of Dale, *Hunter, Phil. Trans.* 1787, lxxvii. t. 19; cop. *Bonnat. Cétac.* t. 11. f. 3, and *Bell, Brit. Quad.* 292. f. *Delphinus Hunteri, Desm. Mamm.* 520, 1822, from *Hunter*.  
*D. diodon, Lacép. Cétac.* 309. t. 13. f. 3; *Gérard, Dict. S. Nat.* vi. 78.  
*D. bidentatus, Bonnat. Cétac.* t. 11. f. 3, 1789; *Desm. N. Dict.* ix. 175, from *Hunter*.  
*Hyperoodon bidens, Flem. B. A.* 36; *Jenyns, Man.* 44.
7. B. à museau pointu, *Camper, Cétac.* 78. t. 13–16.  
*Hyperoodon, Cuv. Oss. Foss.* v. 321. t. 24. f. 19, 21, copied from *Camper*, t. 13.  
*Hyperoodon, "Voigt's Mem. t.,"* 1801; *F. Cuv. Cétac.* 245 (skull, *Kiel Bot. Gard.*).
8. *Cetodiodon Hunteri, Jacob, Dublin Phil. Journ.* 1825, t.  
*Hyperoodon Hunteri, Gray, Ann. & Mag. N. H.*
9. *Hyperoodon Honfloriensis, Thompson, Mag. N. Hist.* 1838, ii. 221.  
*H. bidens, Thompson, Ann. & Mag. N. Hist.* 1854, xiv. 347.
10. *Hyperoodon Butskopf, Jacob, Proc. Dublin Assoc.* 1, 4 (Belfast, 20½ ft.).
11. *Uperodon Butskof, Gervais, Zool. & Pal. Franç.* t. 38 (skull, good).
12. *H. Butzkopf, W. Thompson, Ann. & Mag. N. Hist.* 1846, xvii. 150. t. 4. f. 1; *Gray, Cat. Cétac. B. M.* 1850, 62; *P. Z. S.* 1862; *Bell, Brit. Quad.* 492, 493, fig.  
*Cenocetus rostratus, Malmgren, Arch. Nat.* 1864, 92.
13. *Hyperoodon rostratum, Wesmael, N. Mém. Acad. Roy. Brux.* 1840, xii. t. 1, 2 (good); *Gray, Cat. Cétac. B. M.* 1850, 64.  
*Nebhvalen, Eschricht, K. Dansk. Vid. Selsk.* xi. 327, 328, fig.  
*Delphinus Hyperoodon, Schlegel, De Dieren,* 94; *Abhandl.* 28.  
*Hyperoodon borealis, Nilsson, Skand. Fauna,* 622.  
*Hyperoodon rostratus, Lilljeborg.*

Inhab. North Sea, ascending rivers: Thames (*Hunter*); Humber (*Thompson*). Harwich (*Dale*).

a. Teeth. Liverpool.

b, c. Skulls. Whitstable.

The animal is one of the most generally caught whales on our coast. The following habitats have been verified from the examination of specimens:—Harwich (*Dale*). Thames, above London Bridge, 1783 (*Hunter*); skeleton, Mus. Coll. Surgeons. Whitstable (*Beardsworth*); skull and bones in British Museum. The Humber, near Hull, 1837 (*Thompson*); skeleton in Mus. Hull Phil. Soc. Mouth of the Dee; skeleton, Mus. Royal Institution, Liverpool. Dublin (*Jacob*); skeleton, Mus. Coll. Surgeons; skull, Royal Dublin Society and Museum School of Anatomy. Belfast Lough, 29th Oct. 1845; skeleton in Belfast Museum of male 20 feet long (*Ann. & Mag. N. H.* 1846, xvii. 150), with four teeth in lower jaw. Firth of Forth, 29th Oct. 1839; skeleton in Edinb. University Museum: female 28½ feet long, in company with young suckling female 9 feet long.

In Fischer's 'Synopsis Mammalium,' p. 514, this species occurs under three names—*D. Dalei*, *D. Hyperoodon*, and *D.? spurius*.

In the previous edition of this Catalogue I regarded the Bottle-head or Flounder's-head of Dale (the *Hyperoodon Butzkopf* of Lacépède) as distinct from the Bottlenose Whale of Hunter, the *Balæna*

*rostrata* of Chemnitz, and the *Hyperoodon rostratum* of Wesmael, because in the former, according to the figure, the dorsal fin is more in the middle of the back than in the latter; but I now feel convinced that this must have originated from an error of the artist. At the same time there are such differences in the descriptions of the animal given by various authors, that I think it not unlikely that there may be more than one species, but I have not been able to find any specimen to establish the fact.

Mr. W. Thompson has given, in the *Ann. & Mag. Nat. Hist.* 1846, xvii. 150. t. 4. f. 1, the following description of a recently caught specimen (he calls it *H. Butzkopf*):—

“Blackish lead hue, merely a lighter shade beneath, and not white. Teeth, two on each side, in front loosely covered by the gums; the front pair smaller; blowers slightly crescentic, pointed directly towards the head, and the eyes on the same vertical plane; eyes round; a male:” and the following measurements—

	ft.	in.
Length, entire, straight . . . . .	20	4
Length, entire, over curve . . . . .	23	4
Length of nose . . . . .	0	11
Length of gape . . . . .	1	7
Length to eye . . . . .	3	1
Length to pectoral fins . . . . .	5	11
Length of pectoral fins . . . . .	2	2
Length to dorsal fin . . . . .	10	9
Length of dorsal at base . . . . .	1	7
Girth, greatest . . . . .	11	6
Width of pectorals . . . . .	0	7
Width of caudal . . . . .	5	6
Length of dorsal . . . . .	1	0

The entire skeleton is preserved in the Belfast Museum.

The skeleton in Mus. Roy. Institution, Liverpool, has the skull 60 inches long, 18 inches from top of crest to palate; the intermaxillaries are convex, and distinctly to be seen to the front of the blowers; orbital crest erect, scarcely as high as the process at the back of the blowers; the nuchal vertebræ anchylosed, the first three into one mass, with a long conical lateral process; the dorsal process of the two hinder separate.

*Heterodon Dalei* (Lesson) is not from Dale's description of this whale, but from Blainville's account of *Delphinorhynchus micropterus*.

Lacépède placed this species as the type of his *Hyperoodon*, and refers *Delphinus bidentatus* to *Delphinus*!

Dr. Jacob, in his description of *Cetodiodon Hunteri* (Dublin Phil. Journ. 1825), which was stranded at Killiney, near Dublin, Sept. 1824, observes that there are no teeth in the palate. He believes that the three skulls in Dublin, viz. of the skeleton in Mus. Coll. Surg. Dublin, a skull in Mus. Royal Dublin Society, and a skull in the Museum of the School of Anatomy, Peter's Street, Dublin, belong to one species, similar to that figured by Cuvier (Oss. Foss.): they

all have two teeth in the lower jaw, hidden in the gums. In the 'Zoology of the Erebus and Terror,' t. 3. figs. 4 & 5, is a representation of one of the skulls of this species in the Dublin Museum, from a drawing kindly communicated by R. Ball, Esq.

By the kindness of Mr. S. Stutchbury I was enabled, in the 'Zoology of the Erebus and Terror,' t. 3. f. 1 (animal), f. 2 (tail), f. 3 (blowers), to give a new figure of this species, from a drawing made by Mr. W. H. Baily of a specimen taken at Aust Passage, Oct. 1840. The measurements, on the drawing taken at the time, are as follows:—

	ft.	in.
Length, entire, along the back . . . . .	22	2
Length, entire, in straight line . . . . .	21	0
Girth on widest part . . . . .	12	6
Girth of part posterior to vertical fins . . . . .	11	2
Girth over the eyes to centre of blowhole . . . . .	8	9
Girth at highest part of head . . . . .	6	6
Girth at base of tail . . . . .	2	11
Length of upper part of upper jaw . . . . .	1	1
Length of lower jaw . . . . .	1	8
Length of upper part of lower jaw . . . . .	1	9
Length of lower jaw to eye . . . . .	3	3
Length from tip of lower jaw to anterior part of flipper . . . . .	5	3
Length of flipper . . . . .	2	3
Width of flipper . . . . .	0	8
Length from anterior part of flipper to vent . . . . .	8	0
Length from end of tail to anterior part of dorsal fin . . . . .	9	8
Length from end of tail to posterior part of dorsal fin . . . . .	7	0
Breadth of dorsal fin . . . . .	1	6
Length of dorsal fin . . . . .	1	2
Breadth of tail . . . . .	6	4
Depth of tail . . . . .	1	8
Length of orifice of vent . . . . .	1	8

The skeleton of this specimen is preserved in the Bristol Institution.

One stranded upon East Hoyle Bank, 1850; cut up at Holylake. The blubber yielded 140 gallons of oil. Stomach contained a great number of the horny beaks of some species of cuttle. In this instance the beaks were inserted one within another, so as to ride regularly imbricated in rows of ten, fifteen, or twenty together. Another captured at the Little Moel, 1852. August 25, 1853, a male was stranded upon East Hoyle Bank: length 21 feet; from angle of the mouth to the tip of the snout 20 inches, from tip of snout to the eye 42 inches, eye to spiracle 27 inches (!). The pectoral fins were 21 inches long and 9 inches broad. Tail or propeller 66 inches broad and 24 inches long. The dorsal fin about 10 or 11 feet from the tail. The vent to the tail 7 feet 6 inches. Orifice of urethra to anal opening 22 inches. Length of the snout 15 inches. The

stomach contained many hundred cuttle-beaks placed one within the other, as in the other specimen. Another specimen, probably his female mate, was seen swimming about the same locality for three weeks, but floundered off.—*Byerley*.

Mr. Thomas Thompson (*Mag. Nat. Hist.* 1838, ii. 221) describes, under the name of *Hyperoodon honfloriensis*, a specimen stranded near Hull in 1837; it has two strong, robust teeth at the extremity of the lower jaw, covered and entirely concealed by the gums. The skull corresponds in its general form with the figures in Cuvier; but the rise of the back part of the head is larger in proportion to the anterior rise than in that figure. The skull measures from the snout to the base of the front rise 9 inches; thence across the rise to the base of the second rise 1 foot; thence across the hinder rise to the neck 1 foot 11 inches. The length of the skeleton is 17 feet 6 inches; vertebræ 39, viz. 7 cervical, 9 dorsal (with ribs), 20 lumbar, and 3 caudal. The skeleton is in the Museum of the Hull Philosophical Society. It agrees in all particulars with Hunter's specimen in the Royal College of Surgeons. Mr. Thompson considers Hunter's and Baussard's cetaceans identical, and Dale's the male of the same species.

Mr. Crotch has furnished me with the following measurements of the *female* specimen taken at Weston-super-Mare, which was exhibited at Bristol:—

	ft.	in.
Total length . . . . .	26	0
From posterior origin of dorsal fin to insertion of tail . . . . .	6	0
Dorsal in width at base . . . . .	1	11
Dorsal in height . . . . .	1	5
Tail in diameter . . . . .	7	0
Tail in depth . . . . .	2	0
Cloaca to insertion of tail . . . . .	5	3
Length of cloacal fold . . . . .	2	0
From anterior of cloaca to pectoral . . . . .	8	6
Length of pectoral . . . . .	2	0
Height of pectoral . . . . .	0	9
Height of body at anterior end of dorsal . . . . .	4	0
Height of body at origin of tail . . . . .	1	4
From gape to muzzle . . . . .	2	0
Vertical height of forehead from gape . . . . .	1	8
Vertical height from insertion of upper jaw . . . . .	0	10
From eye to gape . . . . .	2	0
From eye to spiracle . . . . .	2	0
Girth at the dorsal . . . . .	11	0
From middle of cloaca to middle of navel . . . . .	5	0
From pectoral to pectoral beneath . . . . .	1	8

M. Wesmael examined the palate of the *female Hyperoodon* stranded at Borgsluis near Ziercczee, in Holland, and found the surface of it quite smooth and without any appearance of the small, hard, acute points mentioned by Baussard. The upper jaw was without any



teeth. The lower jaw, on the elevation of the gum, showed two conical teeth, hidden in the gum, free from all attachment. These teeth were hollow from the base to the summit and slightly curved at the end, and the surface was traversed by three irregularly festooned zones and a fourth zone near the tip. The blower was crescent-shaped, concave in front, convex behind, with the tip slightly recurved. The body was entirely shining black, like varnished leather. Vertebrae 46: cervical 7, soldered together; 9 dorsal, the first soldered by its body to the cervical; 11 lumbar; 19 caudal. The upper spinose apophysis is partly wanting on the eleventh caudal vertebra, and the transverse apophysis is partly wanting on the eighth. There are 8 chevron bones; the two branches of the first are not united. The tail is crescent-shaped, without any notch in the centre.

Length, entire . . . . .	6.70 mètres.
Length to blowers . . . . .	1.24 mètre.
Length to eye . . . . .	1.06 „
Length to point of dorsal . . . . .	4.40 mètres.
Length of pectoral . . . . .	0.70 mètre.
Length to vent. . . . .	5.17 mètres.
Breadth of pectoral . . . . .	1.40 mètre.
Breadth of face . . . . .	0.86 „
Circumference . . . . .	3.76 mètres.

M. Wesmael observes that five persons have described this animal from personal inspection, viz. Dale, Chemnitz, Hunter, Baussard, and Voigt; and the principal points on which they differ are the following:—

1. *The presence or absence of teeth in the lower jaw.* Dale and Voigt do not mention them; Chemnitz, Hunter, and Baussard indicate two.
2. The presence of small, hard, acute points in the palate is mentioned by Baussard alone.
3. The form of the blower. Dale and Baussard describe it as crescent-shaped, with the points directed backwards. Voigt says it is concave, with the points directed forwards. Chemnitz and Hunter are silent on this point.
4. The colour. Dale, Hunter, Baussard, and Voigt describe the belly as paler than the back; and Chemnitz describes the body as entirely black.
5. The number of the vertebrae. The specimen of Hunter, according to M. G. Cuvier, was 21 feet long, and had 45 vertebrae, viz. 7 cervical (soldered together), 9 dorsal, 12 lumbar, and 17 caudal.

	BAUSSARD.		DALE.	
	Adult.	Young.	Female.	Male.
	ft.	in.	ft.	ft.
Length, entire . . . . .	23	6	12	6
Length of beak . . . . .			0	5
Length to blower . . . . .	4	4	1	11

	BAUSSARD.			
	Adult.		Young.	
	ft.	in.	ft.	in.
Length of head . . . . .	1	4		
Length of pectoral . . . . .	2	0	1	0
Length to dorsal fin . . . . .	13	6	7	8
Length of dorsal fin . . . . .	2	0	1	0
Length to vent . . . . .			7	10
Width of pectoral . . . . .	1	3	0	7
Width of caudal . . . . .	6	10	3	2
Circumference . . . . .	15	7	8	0
Circumference of head . . . . .	8	7		
Height of dorsal . . . . .	1	3	0	7

The three Hyperoodons recorded to have occurred on the English coast appeared singly. Two, described by M. Baussard, taken at Honfleur, consisted of a mother, 23, and her young, 12 feet long. Of several captured on the Irish coast, they, on two occasions, appeared in pairs. In one of the three instances, two of these whales were secured at the same time. It would therefore appear that the species was not gregarious.—*Thompson, Ann. & Mag. Nat. Hist.* 1846, xvii.

A specimen was captured in Ballyholm Bay, near Bangor, county Down, on the 16th September, which was 24 feet long and 18 or 20 feet in girth at the thickest part. The entire upper surface was blackish grey, the under parts rather paler. The stomach contained the remains of shells and what were called "the feet of fowls," which Mr. Thompson thought might be the beaks of cuttlefish.

Dr. Jacob says that the oval cavity into which the œsophagus opened "contained a large quantity of the beaks of cuttlefish, perhaps two quarts."—*P. Z. S.* 1860.

A female 'whale' and its young was caught near Whitstable, Kent, and was well figured in the 'Illustrated News' for 18th November 1860, from a drawing by the Rev. G. Beardsworth, who procured for the museum a complete skeleton of the older and part of the skeleton of the younger specimen, and also a portion of the food found in the stomach. There was more than a half bushel of the beaks of a cuttlefish, probably of the *Octopus* or sea-spider, and nothing else. An immense number of *Octopi* must have been eaten to furnish such a quantity; for they are small and were packed close, often one within the other.—See *Gray, P. Z. S.* 1860, 422.

## 2. LAGENOCETUS.

The crests of the maxillary bones very thick and close together, especially above, where they are flat-topped. The beak of the skull horizontal. The hinder edge of the skull lower than the tops of the crests. Lower jaw straight.

*Lagenocetus*, *Gray, P. Z. S.* 1863, 200; 1864, 241.

*Hyperoodon*, sp., *Gray, Cat. Cetac.* 69.

The cervical vertebræ of *Lagenocetus latifrons*, as in *Hyperoodon*, are united into a single mass by the union of the bodies of the vertebræ, the neural arches, and the lateral processes.

The united neural arches of the first cervicals are produced, and form a large cone nearly as high as the height of the bodies of the vertebræ, which shelves down before and behind to the upper part of the neural canal, and on the side to the base of the mass, or the end of the large lateral process of the second vertebra, the upper part of the sides being marked with the long deep grooves through which the nerves come out.

The atlas appears to have no distinct lateral processes, or, what there are, so united to the very large, high, broad, single lateral process of the second vertebra as not to be distinguished from it, except by the existence of the first groove for the exit of the nerves for the upper parts of the body. The lateral process of the second vertebra is massive, conical, and much produced below, on a level with the lower edge of the articular cavity, giving the mass, when viewed in front, an irregular triangular shape.

The third cervical has a broad, short upper lateral process, which is only free from the mass at the end; and this projection is the first appearance of a distinct upper lateral process. The lower process is like, but smaller than, the lower process of the second vertebra, and united to the back part of it, making part of the large inferior lateral prominence.

The fourth and fifth have each an upper lateral process similar to the preceding, but of a much smaller size, being, as well as that of the sixth vertebra, very small—only small bony plates. These vertebræ have no distinct or marked inferior lateral process.

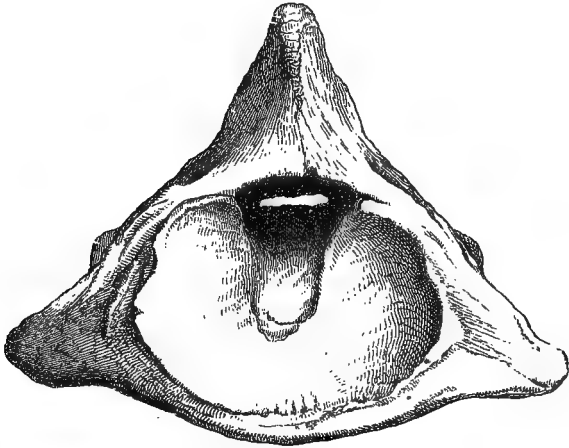
The seventh cervical, though united to the general mass by the body of the vertebra, is yet well defined from the rest of the mass, and retains the usual form of the separate vertebræ of the animals. The neural arch is of the same form as those of the other cervical vertebræ, but much smaller, and not so high; it is separate from the large conical mass which they constitute, forming a pointed, rather projecting arch at the hinder side of the mass. The upper lateral process is similar in form to the upper lateral process of the two or three cervical vertebræ that precede it; but it is much larger than these, and bent forwards at the end to unite with the ends of them.

The lower lateral process is very thick and large, forming a large, short tuberosity on the under part of the mass, but quite separate from it. The articulating surface of this vertebra is oblong, erect, rather higher than wide, with a deep suture from the centre to the middle of the upper margin.

The front of the canal of the spinal marrow is triangular, about as high as wide, with the angles rounded, the upper side being transverse, and the lower ones converging. The hinder part of the canal, on the contrary, is trigonal with the upper sides converging, the lower side being rather wider than the height of the

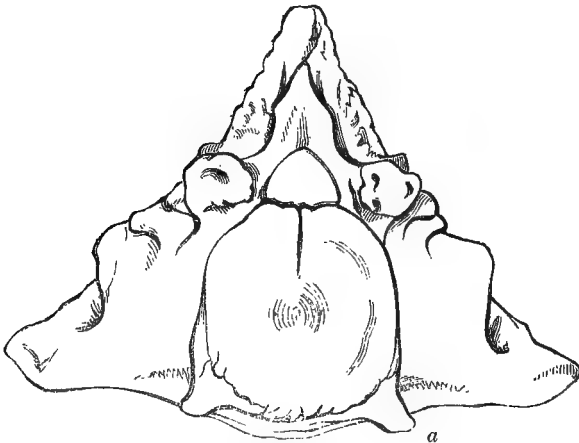
canal, and about two-fifths of the width of the body of the seventh cervical vertebra.

Fig. 65.



Front view of the cervical vertebrae of *Lagenocetus latifrons*.

Fig. 66.



Back view of the cervical vertebrae of *Lagenocetus latifrons*.  
*a.* The seventh vertebra.

**Lagenocetus latifrons.**

Skull large, heavy, solid; the reflexed part of the maxillary bones very much thickened internally so as nearly to touch each other in front of the blower, much higher than the hinder part of the skull; lower jaw rather curved up at the tip; teeth 2, solid, conical, acute, rather compressed.

Hyperoodon latifrons, *Gray, Zool. Erebus, & Terror*, 27. t. 4 (skull); *P. Z. S.* 1860, 424, 425; 1861, 313.

Hyperoodon (adult), *Gervais, Zool. et Paléont. Franç.* t. 38. f. 6, cop. *Gray, Zool. Erebus & Terr.*

Hyperoodon Butzkopf (male), *Erichson, Ann. & Mag. N. H.* 1852.

Lagenocetus latifrons, *Gray, P. Z. S.* 1864, 241.

Inhab. North Sea. Coast of Lancashire; Orkneys; Greenland.

a. Skull imperfect. Orkneys. From Mr. Warwick's collection.—

The skull figured in 'Voyage of the Erebus and Terror,' t. 4.

Length of skull (wanting the end) . . 62 inches.

Height of skull behind . . . . . 42 „

A skull from Greenland, presented by Captain Wareham, is in the Newcastle Museum. Height of occiput 25, of ridge 32; length of skull 92, to front of ridge 54, of beak 26 inches.

A skeleton with the skull, from the Firth of Forth, 29th October, 1839, is in the College Museum, Edinburgh. The skull is 68 inches long; the crests very thick, far apart, and erect internally and rounded externally. This is the skull of a female, 28½ feet long, accompanied by a young male.—See *Thompson, Ann. & Mag. N. H.* 1846, xvii. 153.

A very imperfect skull of this species in a garden on the borders of Lancaster Bay, taken in Morecomb Bay.

“Professor Eschricht considers that *Lagenocetus* is founded on the skull of an adult male of the common species (which he calls *Hyperoodon Butzkopf*), because the specimen of the animal with this kind of skull which he received from Faroe was of that sex” (*Gray, Proc. Zool. Soc.* 1860, 424); “and he exhibits them side by side, as the same animal, in his museum (see *Ann. & Mag. N. H.* 1852, ix. 281). This is an evident mistake, from mistaking an accidental coincidence for an established fact.”—*Gray, Proc. Zool. Soc.* 1861, 313.

“The following facts I think will dispel such an idea:—first, I think I can prove that males and females have been seen and preserved of both species; and secondly, the structure and form of the two skulls is so different, that it is much more likely that they should be referable to two very distinct genera than to species of the same genus.

“I may state that I have examined four skulls of the *Lagenocetus latifrons*, and Professor Eschricht has another.

“There is a skeleton with the skull of an adult animal of this species in the College Museum at Edinburgh, which was obtained from the Frith of Forth on the 29th of October, 1839. Mr. William Thompson (*Ann. & Mag. Nat. Hist.* 1846, vol. xvii. p. 153) informs us that this specimen was a female 28½ feet long, accompanied by a

young male. So there can be little doubt that there are females of *Hyperoodon latifrons* as well as males.

"It appears to be a northern species. As I have seen specimens from Greenland, the Orkneys, and the coast of Lanarkshire, this is the most southern example that has yet occurred to me. It is also probably a much larger species than *Hyperoodon rostratum*, as the skull from Greenland in the Newcastle Museum is 92 inches long, while the largest skull of *H. rostratum* that has come under my observation does not exceed 60 or 65 inches.

"It is only necessary to examine the figure of the two skulls of *Hyperoodon rostratum* and *H. latifrons* in the Plates to the 'Voyage of the Erebus and Terror,' to see how exceedingly different they are from each other, not only in the form of the skull, but also in the form of the lower jaw. The skull of *H. latifrons* not only differs from that of *H. rostratum* in the thickness and solidity of the frontal crest of the maxillary bones, but in the crest being much higher than the hinder part of the skull; while in all the skulls of *H. rostratum* I have seen, the crest is of the same height with the frontal ridge.

"As regards *Hyperoodon rostratum*, Mr. Beardsworth states his specimens to be a female and a young female. The specimen which was shot at Weston-super-Mare, Mr. Crotch informs me, is a female. I may also observe that the specimen of this species described by Mr. William Thompson in the Annals and Mag. of Nat. Hist. 1846, vol. xvii. p. 150, is said to be a male: its skeleton is now in the Belfast Museum. So there are certainly male and female of this species also known."—Gray, *Proc. Zool. Soc.* 1860, 424, 425.

M. Gervais (*Zool. et Paléont. Franç.* t. 38. f. 6) believes that *Lagenocetus latifrons* is established on the skull of a very aged animal, and he thinks that the crest thickens with age. He does not seem to have observed the form of the hinder part of the skull. He gives a reduced copy of the figure in the 'Zoology of the Erebus and Terror,' instead of figuring a skull in the intermediate state of crest, which would have proved that such a specimen existed and had been seen by him.

B. *Teeth in front of the lower jaw, cylindrical, fusiform, or conical. Beak of skull conical. The intermaxillaries enlarged behind, forming a more or less large cavity round the blowers. Epiodontina.*

### 3. EPIODON.

Head tapering, lower jaw rather bent up. Dorsal fin falcate, three-fourths of the entire length from the nose. The beak of the skull depressed, tapering. The vomer forming a sunken groove. Intermaxillaries forming a moderately high basin round the blowers. Upper jaw toothless. The lower jaw elongate, tapering, rather bent up and truncated at the end, with two conical teeth, and with a sunken groove on the edge just behind them. "Cervical vertebrae anchylosed."—Gervais.

*Ziphius, Duvernoy, Ann. Sci. Nat.* xv. 65.

*Ziphius, sp., Cuvier, Oss. Foss.* v.

Diodon (part), *Lesson*.

Aliama (part), *Gray*, *P. Z. S.* 1864, 242.

Epiodon, *Rafinesque*, *Précis Somiol.* 13 (1814); *Anal. Nat.* (no char.); *Bonaparte*; *Gray*, *P. Z. S.* 1865.

Cuvier remarks, describing the head of *Z. cavirostris* (Oss. Foss. v. 350. t. 27. f. 3), that "cette tête a, comme on voit, de grands rapports avec le Cachalot, et encore de plus grands avec l'Hyperoodon. Elle ne diffère de ce dernier que parce que les maxillaires ne se dressent point sur les côtés du museau en cloisons verticales, et que l'espèce de mur derrière les narines ne se borne pas à s'élever verticalement, mais qu'il se recourbe pour former un demi-dôme au-dessus de ces cavités."—*Oss. Foss.* v. 352. t. 27. f. 3.

### Epiodon Desmarestii.

Grey, white-streaked. Length 13 feet.

Epiodon Urganantus, *Rafinesque*, *Précis Somiol.* 13, 1814 (no character).

Delphinus Epiodon, *Desm. Mamm.* 521; *Fischer*, *Syn.* 516.

Heterodon Epiodon, *Lesson*, *Man.* 420.

Ziphius cavirostris, *Cuv. Oss. Foss.* v. 350. t. 27. f. 3; *Duvernoy*, *Ann. Sci. Nat.* 1850, xv.; *Arch. Naturg.* 1852, 62; *Gervais*, *Ann. Sci. Nat.* xiv.; *Zool. et Paléont. Franç.* t. 38. f. 1 (Hérait), f. 2 (Martigue), t. 39. f. 1-5 (head).

Ziphius (Dioplon?) cavirostris, *Gervais*, *Compt. Rendus*, xxxi. 510, xxxii. 358; *Ann. Sci. Nat.* xiv. 5; *Arch. Naturg.* 1852, 34.

Delphinus Desmarestii, *Risso*, *Eur. Mérid.* iii. 24. t. 2. f. 3; *F. Cuv. Cétac.* 159.

Hyperoodon de Corse, *Doumet*, *Bull. Soc. Cuvier.* 1842, 207. t. 1. f. 2.

Delphinus Philippii, *Cocco*, *Erichson*, *Arch. Nat.* 1846, 204. t. 6. f. 6.

Hyperoodon Doumetii, *Gray*, *Cat. Cétac. B. M.* 68.

Hyperoodon Gervaisii, *Duvernoy*, *Ann. Sci. Nat.* 1851, xv. 67.

Epiodon Desmarestii, *Bonap. Faun. Ital.*?; *Gray*, *P. Z. S.* 1865.

(Diodon) Le Diodon de Desmarest, *Lesson*, *Buffon*, i. 124. t. 2. f. 2.

Orca (Desmarestii), *Wagler*, *N. S. Amph.* 34.

Hyperoodon Desmarestii, *Gray*, *Cat. Cétac. B. M.* 69.

Aliama Desmarestii, *Gray*, *Proc. Zool. Soc.* 1864, 242.

Hyperoodon, *Gervais*, *Comptes Rendus*, 1850 (7th Oct.), xxxi. 510, xxxii. 358.

Inhab. Mediterranean. Coast of Frontignan, département de l'Hérault, May 1850 (*Gervais*). Messina (*Cocco*). Nice (*Risso*). Sicily (*Rafinesque*).

"Steel-grey, with numerous, irregular, white streaks; beneath white. Body thicker in the middle; tail slender, long, keeled; rounded on the belly; head not swollen, ending in a long nose; upper jaw short, toothless, lower much longer, bent up, and with two large conical teeth at the end; teeth nicked near the tip; the eyes small, oval; blowers large, semilunar; pectoral fins short; dorsal rather beyond the middle of the back, nearly above the vent; the caudal fin broad, festooned. Length nearly 16 feet. It differs from *D. Diodon* of Hunter in the forehead not being swollen, and in the lower jaw being produced and bent up, the pectoral being pointed, the dorsal more obtuse, and the body being white-streaked." Inhab.

Nice: common, March and September.—*Risso, Europ. Mèrid.* iii. 24. t. 2. f. 3; *F. Cuv. Cétac.* 159.

“Jaws toothless, but paved with small, long and acute tubercular granulations; lower jaw with two rather longish, acute, slightly arched and longitudinally grooved teeth in front; larynx with a kind of funnel at the base of the tongue, like the beak of a duck, or rather of a spoonbill,  $5\frac{3}{4}$  inches long; gape small; beak conical; eyes small, near middle of head; blowers lunate, with the points directed backwards; pectoral fin .19 inches long,  $6\frac{3}{4}$  wide; dorsal nearly 8 inches high,  $49\frac{1}{2}$  inches from the tail; the tail is broad, lobes equal.” Inhab, Corsica.—*Doumet, Bul. Soc. Cuvier.* 1842, 207. t. 1. f. 2.

According to Doumet's description, the dorsal fin of this species must be further back than in any of the Dolphins, and the pavement of the jaws is quite peculiar. It agrees with Dale and Bausard's descriptions in the form of the blowers, but differs from them in the position of the dorsal fin.

This animal is only known by the above account extracted from Risso. F. Cuvier placed it in the restricted genus *Delphinus*. Risso appears more correctly to have compared it with *Hyperoodon*; but it differs from that genus in several particulars, especially in the form of the forehead and of the dorsal fin.

Lesson (Tab. R. A. 200) forms of this species and the *Physeter bidens*, Sowerby, the subgenus *Diodon*!

*Ziphius cavirostris*, Cuvier, has long been regarded as fossil. It really exists in the Mediterranean. The skull described by Cuvier (Oss. Foss. v. t. 27. f. 3) was found by the fishermen of the Gulf of Bouc. Others have since been obtained, and each of them has been described as a new species.

#### 4. PETRORHYNCHUS.

Skull subtrigonal, truncated behind, with a large concavity formed by the intermaxillaries round the blowers. Beak of the skull elongate, tapering, conical, higher than broad, with the vomer swollen, callous, forming an elongated, fusiform callosity between the callous intermaxillaries, which is truncated behind. Lower jaw slender, tapering in form, without any teeth, or with two small teeth early deciduous.

*Petrorhynchus*, *Gray, P. Z. S.* 1865, 524.

The skull beaked; the brain-case hemispherical, margined behind and on the sides by the prominent edges of the maxillæ, occipital, and other bones, with a large oblong concavity under the prominent enlarged nasal bones, in front of the deeply seated blowers; the inner surface of the concavity lined on the sides by the expanded hinder ends of the intermaxillaries, and edged on the sides by the raised edges of these bones and the inner margins of the hinder parts of the maxillæ, the confines of the concavity being separated from the side margins of the brain-case by a deep impression. The beak



elongate, slender, compressed on the sides, fringed on the upper part of the sides by the edges of the enlarged callous intermaxillaries, which contain between them a much-enlarged callous vomer, which tapers in front into the end of the beak, and is truncated behind, filling up the narrowed front part of the frontal concavity.

The upper jaw toothless. The lower jaw slender, produced in front, toothless; it may have had two teeth in front in the young state, as there are obscure indications of two pits.

The skull is much more like the usual form of the skull of the Delphinoid Whales than that of *Catodon* or *Kogia*, and somewhat like that of an *Hyperoodon* without the elevated ridges of the maxillæ on the sides of the beak.

The peculiarity of the genus is the great development of the intermaxillaries and the large size and callous state of the upper surface of the vomer.

The intermaxillary bones which fringe the upper part of the sides of the beak are thick, hard, and shining, forming with the enlarged vomer the upper part of the beak; they are expanded behind so as to form the large hemispherical cavity in the crown, with nostrils and blowers at the base of its hinder part. The sides of this cavity are lined internally with the expansion of the intermaxillaries, which are supported on each outer side by a wall formed by the elevation of the inner edge of the hinder part of the maxilla. The wall of the cavity is separated from the outer margin of the maxilla, which forms the inner part of the outer edge of the brain-case, by a deep concavity.

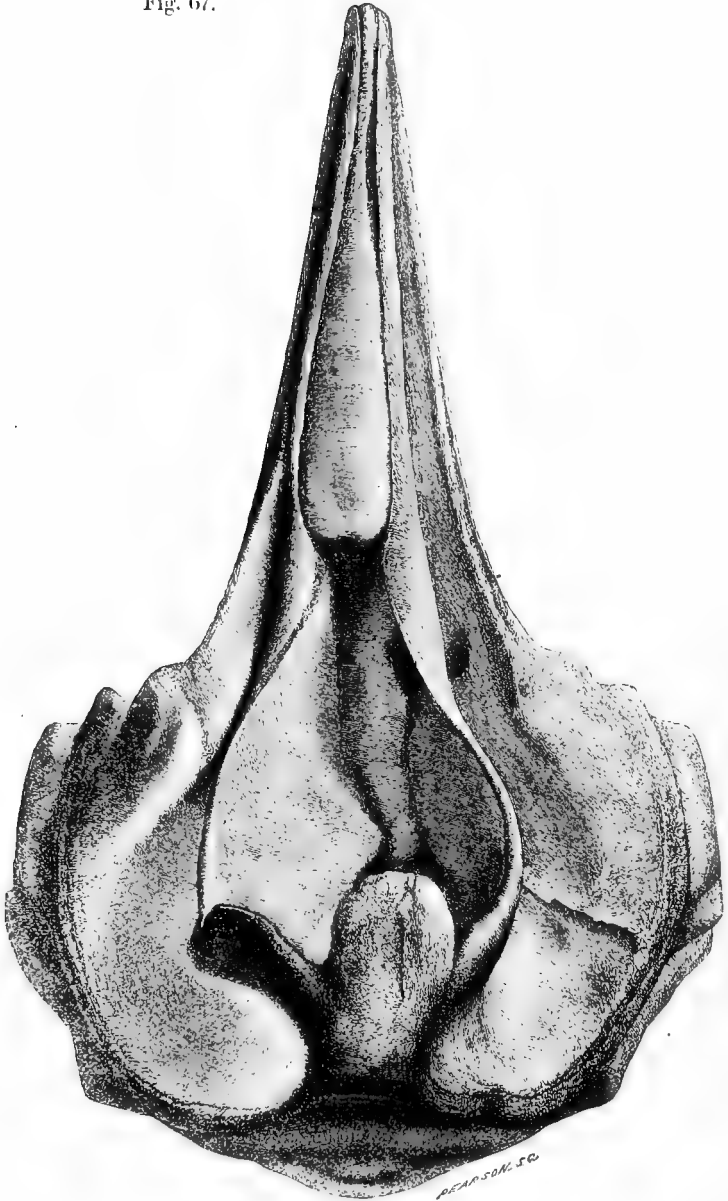
The upper part of the spermaceti-concavity is arched over by the thickened prominent nasal bones, and by the dilatation of the thick hinder edge of the walls.

From the inspection of the drawing by Mr. Trimen of this skull, I was inclined to regard it as a new species of *Hyperoodon*, forming a peculiar section of the genus, and which I had provisionally named *Hyperoodon Capensis* (Proc. Zool. Soc. 1865, p. 359); but it proved on examination to be an entirely new form, which appears to be intermediate in structure and form between *Hyperoodon* and *Catodon*. It agrees with *Catodon* and *Kogia* in having a large concavity on the crown of the skull, to contain the spermaceti or "head-matter," as it is called by the whalers, above the blowers, and with *Hyperoodon* in having an elongated beak, with thick prominent nasal bones over the blowers, and in having none or only two or four deciduous teeth in the front of the lower jaw.

What I believed, in the small drawing made by Mr. Trimen, were the slightly developed lateral expansions of the maxillaries, which are characteristic of the genus *Hyperoodon*, prove on examination of the skull to have represented the much thickened intermaxillaries and the very large callous prominent vomer which is between them on the upper surface of the beak. The skull, as is generally the case in the Cetacea, is considerably distorted, the left side being much the smallest and least developed.

In *Catodon* and the allied genus *Kogia* the spermaceti-cavity occupies the whole upper surface of the skull, and is surrounded by

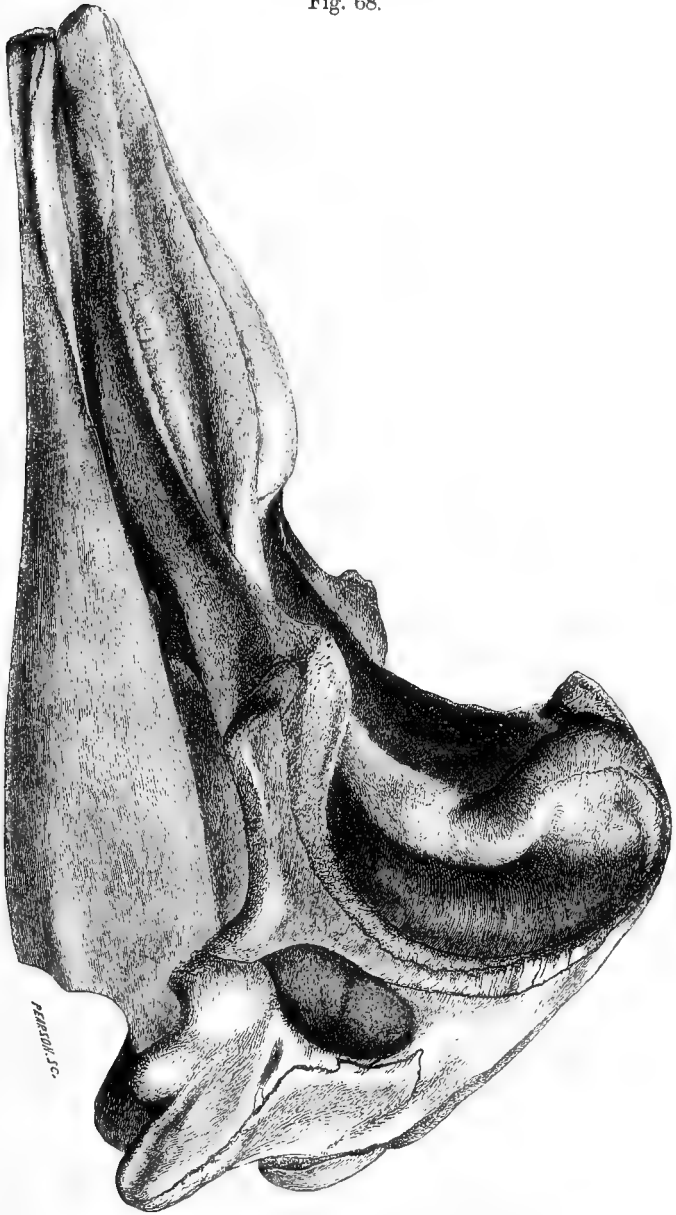
Fig. 67.



Skull of *Petrorhynchus Capensis*.

(By a mistake of the artist, the sides of the skull in the figure are reversed.)

Fig. 68.



Skull of *Petrorhynchus Capensis* (side view).

(By a mistake of the artist, the sides of the skull in the figure are reversed.)

an erect wall formed by the elevated hinder and lateral edges of the maxillæ. It is continued in front to the end of the broad expanded beak of the skull. The blowers are in the base of the hinder part of this concavity.

The intermaxillary bones are narrow, elongate, with the linear vomer forming a sunken ridge between them on the upper surface of the beak. In *Catodon* the hinder part of the intermaxillaries is only slightly dilated, and forms but a small part of the base of the crown-concavity, as shown in Cuvier's figure (*Oss. Foss. v. t. 22. f. 1-3*); and from Mr. MacLeay's description they seem to form a smaller part of the surface of the concavity in *Kogia*.

The skull of this genus resembles in several particulars the skull of *Ziphius cavirostris*, figured by Gervais (*Zool. et Paléont. Franç. t. 39*); but the cavity on the crown of that species is only slightly developed, though it is apparently rather more developed in the other specimens figured on the plate t. 38 (f. 1, 2) of that work; and the vomer is sunk in a groove as in the other Ziphioid genera, except in the specimen figured at t. 38. f. 2, which has the most developed frontal cavity; and in this there is an appearance of the vomer being larger.

### 1. *Petrorhynchus Capensis*.

*Hyperoodon Capensis*, Gray, *P. Z. S.* 1865, p. 359.

*Petrorhynchus Capensis*, Gray, *P. Z. S.* 1865, 528 & figs. at 526, 527.

Inhab. Cape Seas.

### 2. *Petrorhynchus Indicus*.

*Ziphius Indicus*, Van Beneden, *Mémoires Couronnés et autres Mémoires Acad. Royale de Belgique*, xvi. t. 1 (skull).

*Aliaia Indica*, Gray, *P. Z. S.* 1865, 528.

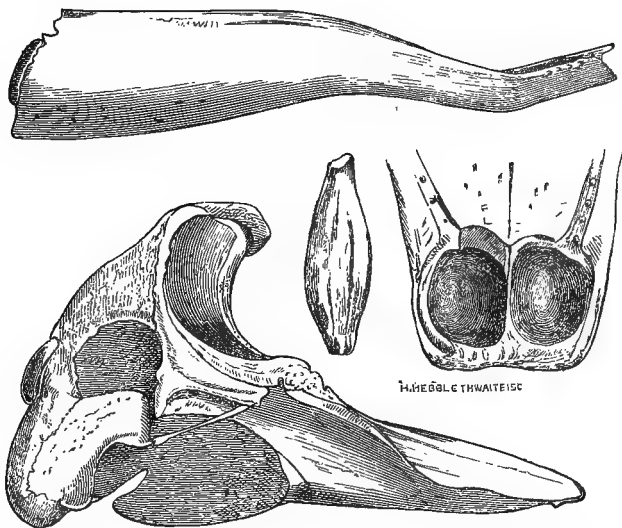
Inhab. Indian Ocean. Skull in Mus. Louvain.

The skull of an aged animal, with the bones coalesced. "Le crâne est de forme triangulaire, assez semblable à un casque, tronqué en avant, et le rostre est fort et proportionnellement court, au-devant des narines une large excavation est formée par les intermaxillaires, et les os propres du nez surplombent les fosses nasales à ce point que les narines, lorsqu'on regarde la tête de haut en bas, sont en grande partie cachées. Les os maxillaires forment une fosse large et profonde au-dessus des orbites et, à la base du crâne, les os ptérygoïdiens s'étalent comme des ailes véritables montrant toute leur surface externe creuse à la manière de certaines coquilles.

"La tête vue par sa face postérieure est fort large à la base, étroite et même pointue au sommet; les occipitaux descendent fort bas de chaque côté, de manière que les condyles articulaires s'élèvent à une certaine hauteur. Le rostre est fort massif et est un peu plus haut que large, et les intermaxillaires forment seuls tout le bout. En haut le rostre, au lieu d'être creusé par une gouttière, montre tout le cartilage vomérien ossifié et on distingue seulement des traces de la partie de l'intermaxillaire qui forme la voûte. Le vomer est visible sur la ligne médiane du palais depuis les os palatins jusqu'à la pointe des maxillaires.

“La mâchoire inférieure est assez haute en arrière, fortement bombée sur le côté, étroite en avant. La peau des gencives est noire, toute la surface est couverte de petites losanges en saillie, qui la rendent raboteuse. Les dents sont en forme de fuseaux; chaque dent a six centimètres et demi de longueur sur deux centimètres et demi de largeur ou d'épaisseur, mais toute la dent est, pour ainsi dire, racine.”—*Van Beneden, l. c.*

Fig. 69.

Skull and tooth of *Petrorhynchus Indicus*, from Van Beneden.

Misled by M. Van Beneden's description and figure, which are here reproduced, in my paper in the 'Proceedings of the Zoological Society,' 1865, p. 522, I was induced to form *Ziphius Indicus* into a genus distinct from the Mediterranean and the Cape Whales. Since that paper was prepared M. Van Beneden has visited England and seen the Cape skull, and considers it the same as or very nearly allied to the one he described, and on his return he most kindly sent to the British Museum and the College of Surgeons a cast of the beak and the front end of the lower jaw of his specimen; and there can be no doubt that they are very nearly allied, if not specimens of different ages of the same species. For the present it is as well to keep them separate, pointing out the distinction between them. In *Ziphius Indicus* the very largely developed vomer gradually tapers off behind towards the blowers; in the *P. Capensis* it continues nearly of the same thickness to the hinder end, and is there suddenly and perpendicularly truncated. It is only necessary to compare the two figures to explain how I came to consider them distinct forms.

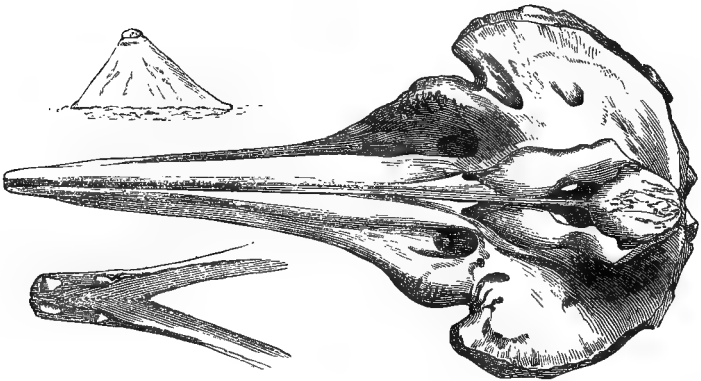
C'. *Teeth in the side of the lower jaw, compressed. Beak of skull subcylindrical, slender. Intermaxillaries linear, slender, rather swollen on the sides of the blowers. Ziphiina.*

### 5. BERARDIUS.

Dorsal fin large, with a larger boss in front of it. The skull like a Dolphin's, with frontal portion elevated. Teeth 2.2, strong, triangular, compressed, vertically implanted at the extremity of the lower jaw; the two teeth of the same form as in *Ziphius*, but rather smaller; behind them a dental groove extends on the upper surface of each mandibular branch. The maxillaries have the commencement of the prominences which are found so large in the genus *Hyperoodon*.

Berardius, *Duvernoy, Ann. Sci. Nat.* 1851, 51. t.; *Arch. Naturg.* 1852, 62.

Fig. 70.



Skull of *Berardius Arnuxii*, from Duvernoy.

### *Berardius Arnuxii*.

Black, greyish near the genital organs.

*Berardius Arnuxii*, *Duvernoy, Ann. Sci. Nat.* 1851, 51. t. (skull); *Arch. Naturg.* 1852, 62.

Inhab. New Zealand, Port of Akaroa, 1846. Length 32 feet. Skull in Mus. Paris, length 4 feet.

### 6. ZIPHIUS.

Head contracted behind; nose produced, not separate from the forehead; eyes moderate; blowers on crown, lunate; teeth in the middle of the lower jaw of male, two, large, compressed; of female two or three, small, subcylindrical; throat with two diverging furrows; body elongate; pectoral fins small, low down, oval, tapering; dorsal falcate, behind the middle of the body. Skull with nose elongated, produced, keeled on each side; skull-cavity small; forehead

high; hinder wing of the maxilla expanded, horizontal; palate smooth; lower jaw broad behind, narrowed and bent in front of the lateral teeth. Tympanic bones large, very thick, free edge open and much twisted (see Van Beneden, *Mém. Acad. Brux.* 8vo, xvi. fig. at p. 41; and Dumortier, *Mém.*).

- Ziphius*, Gray, *P. Z. S.* 1864, 341.  
 ♂. *Ziphius*, Cuvier, *Oss. Foss.* v. 350; Gray, *Zool. Erebus & Terror*, 27; *Cat. Cetac. B. M.* 1850, 70; *P. Z. S.* 1864.  
*Diodon* (pars), Lesson, *Tab. R. A.*; Bell, *Brit. Quad.* 499.  
*Anodon* (pars), Lesson, *Tab. R. A.*  
*Heterodon* (sp.), Lesson, *Man. Mamm.*  
*Delphinorhynchus* (sp.), Gray, *Ann. & Mag. N. H.* 1846.  
*Physeter* (sp.), *Sow. Brit. Misc.* 1.  
*Mesiodon*, Duvernoy, *Ann. Sci. Nat.* 1851, xv.  
*Diplodon* (part), Gervais, *Zool. et Paléont. Franç.*  
 ♀. *Nodus* (sp.), Wagler, *N. S. Amph.* 34, 1830.  
*Delphinorhynchus*, Blainv.; Rapp, *Cetac.*; Gray, *Zool. Erebus & Terror*; *Cat. Cetac. B. M.* 1850, 73.  
*Delphinorhynchus* (sp.), F. Cuvier, *Cétac.* 114.  
*Aodon*, Lesson, *Ouvr. Buffon.*  
*Heterodon* (sp.), Blainville; Lesson, *Man.*  
*Delphinus* (sp.), Blainville; Desm. *Mamm.*

M. Dumortier considers the dentation on the skin of the upper jaw to be representative of the horny protuberances on the membrane of the palate of *Hyperoodon*.—*Mém. Ac. Brux.* xiii. p. 8.

The lower jaw of the young female taken at Ostend had no appearance of teeth; but when the lower jawbone was examined it exhibited, near its middle, a large alveolar groove, as if giving origin to some teeth; the larger specimen found at Havre had rudimentary teeth at the base of the alveolar of the lower jaw, which is placed in the same relative situation as in the Ostend specimen.

Cuvier (*Règne Anim.* ed. 2, 288) says that these animals lose their teeth early. M. Dumortier thinks this is a mistake, and that, on the contrary, the teeth are not cut through the gums until they acquire their full size.

The skeleton of the female is described and figured by M. Van Beneden, *Mém. Acad. Bruxelles*, 8vo, xvi. 1863.

The skull (as remarked by M. Cuvier, see Van Beneden) much more resembles that of *Delphinus* than *Hyperoodon*. The animal is at once known from the latter genus by the head not being convex and rounded in front, and by the teeth being in the middle and not at the end of the jaws.

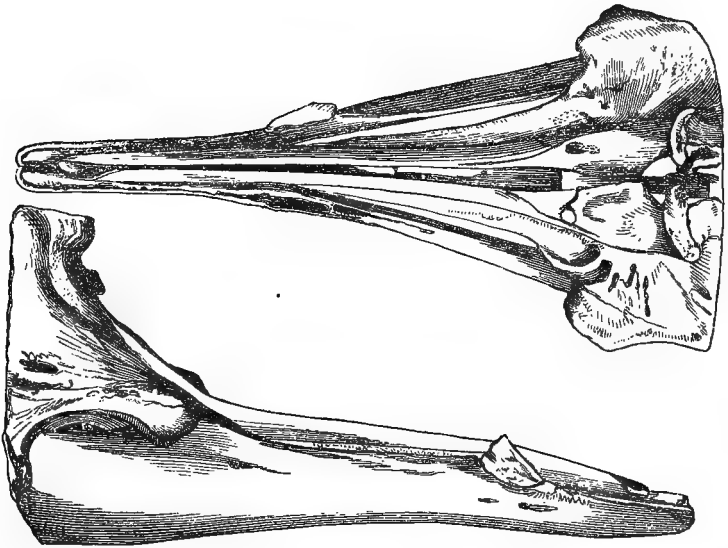
Blainville, when he first saw the animal on the coast of France, considered it the same as Dale's *Hyperoodon*, and F. Cuvier follows him; but M. Cuvier pointed out, in the 'Règne Animal,' the difference in the form of the skull of the French animal.

This genus is very like *Delphinorhynchus*, but is easily known by the teeth being in the middle of each side, and the peculiar form of the lower jaw.

Mr. Bell, following Lesson in adopting his heterogeneous genus *Diodon*, has considered Sowerby's whale a distinct genus from

*Hyperoodon*, but he observes, "whether the generic distinction of the two be correct appears very doubtful."—*Brit. Quad.* 499.

Fig. 71.



Skull of *Ziphius Sowerbiensis*, ♂. Back of head cut off.

\* Teeth of male short, truncated at the end. *Ziphius*.

### 1. *Ziphius Sowerbiensis*.

Black, grey beneath. Teeth obliquely truncated at the end.

*Ziphius Sowerbiensis*, Gray, *Proc. Zool. Soc.* 1864, 241 (♂ & ♀).

♂. *Physeter bidens*, Sowerby, *Brit. Misc.* t. 1, 1806, and icon ined. in *Mus. Brit.* (a male).

*Diodon bidens*, Bell, *Brit. Quad.* 497, fig. cop. Sowerby.

*Delphinus Sowerbii*, Jardine, *Nat. Lib.* t. 12, cop. Sowerby.

*Micropteron* (male), Eschricht, *Ann. & Mag. H. N.* 1852.

*D. Sowerbiensis*, Blainv. in *Desm. Nouv. Dict. H. N.* ix. 177.

*D. Sowerbyi*, *Desm. Mamm.* 521.

*Delphinorhynchus bidens*, Gray, *Ann. & Mag. N. H.* 1846.

*Heterodon Sowerbyi*, Lesson, *Man. Mamm.* 419.

*Ziphius Sowerbiensis*, Gray, *Zool. Erebus & Terror*, t. 5. f. 3, 4, from Blainv. drawing, p. 53, of skull.

*Diodon Sowerbæi*, Bell, *Brit. Quad.* 497.

*Diodon Sowerbi*, Jardine, *Whales*, 192. f. 13.

*Mesodiodon Sowerbyi*, Duvernoy, *Ann. Sci. Nat.* 1851, xv. 55. t. 2. f. 22 (skull).

*Mesoplodon Sowerbiensis*, Gervais, *Zool. et Pal. Franç.* t. 40. f. 1, t. 38. f. 3 (lower jaw); Van Beneden, *Mém. Acad. Brux.* xvi. t. 4; *Mém. Acad. Belg.* xxxii. 1860, 34.



Dauphin de Dale, *Blainv. N. Bull. Soc. Phil.* 1825, 139. t. at p. 125, 1826; *F. Cuv. Mamm. Lith.* t. (bad). ♀.

♀. *Delphinus Sowerbyensis* (female), *Eschricht, Ann. & Mag. N. H.* 1852. *Mesoplodon Sowerbiensis* (female), *Van Beneden.*

*Nodus Dalei*, *Wagler, N. S. Amph.* 34, 1830.

*Delphinorhynchus micropterus*, *Dumortier, Mém. Acad. Brux.* 1839, xii. t. 1-3 (good); *F. Cuv. Cétac.* 114. t. 9. f. 1 (not good), t. 7 (skull); *Gray, Cat. Cétac. B. M.* 73.

*Delphinus micropterus*; *Cuv. Règ. Anim.* i. 288.

*Mesodiodon micropterus*, *Duvernoy, Ann. Sci. Nat.* xv. 1851, t. 3. (head).

*Heterodon Dalei*, *Lesson, Man. Mamm.* 419, from *Blainv.*

*Aodon Dalei*, *Lesson, Œuvr. Buffon*, i. 155. t. 3. f. 1.

*Dioplon Sowerbiensis*, *Gervais, Zool. et Paléont. Franç.* t. 40. f. 1 (head from Havre).

Inhab. Coasts of Europe. North Sea; Elginshire, 1800 (*Brodie*); Havre, 1825 (*Blainv.*); Ostend, 1835 (*Dumortier*).

a. Cast of skull from Mr. Sowerby's specimen in the Anatomical Museum, Oxford. Presented by Dr. Acland.

Besides the beautiful figure of the male which was thrown ashore on Elginshire in 1800, engraved in Sowerby's 'British Miscellany,' there is a drawing of the head as sent by Mr. Brodie, made by Mr. Sowerby, exhibited by him at one of Sir Joseph Banks's Sunday-evening parties, and now preserved in the Banksian collection in the British Museum. The skull was preserved in Mr. Sowerby's museum in Mead's Place, Lambeth, and when distributed at his death it was purchased by the Rev. Dr. Buckland, the Dean of Westminster, and sent to the Anatomical Museum in Oxford, whence Dr. Acland kindly sent it to me for examination.

While in Mr. Sowerby's possession, M. de Blainville, when on a visit to England, made a slight sketch of the skull (engraved in 'Zool. Erebus and Terror,' t. 5), and, under the name of *D. Sowerbiensis*, gives the following description of it:—"Tête osseuse, la mâchoire supérieure est plus courte et infiniment plus étroite que l'inférieure qui la reçoit; en outre cette mâchoire inférieure est armée de chaque côté et au milieu de son bord d'un seul dent très fort comprimée et dirigée obliquement en arrière. L'orifice de l'évent est en croissant dont les cornes sont tournées en avant."—*Blainv. Desm. Dict. H. N.* ix. 177.

The above description and Blainville's sketch show that it belonged to the genus *Ziphius* of Cuvier, before only known in the fossil state; and the examination of the skull has proved the accuracy of these determinations.

Before discovering the drawing of the skull, I was induced, from the lateral position of the teeth and small size of the fins, to consider this species the same as the *Delphinorhynchus micropterus* of the coast of France and Belgium (see *Ann. & Mag. N. H.* 1846), believing the difference in the size of the teeth (which Mr. James Sowerby's description appears to indicate) to be only a peculiarity produced probably by the age of the specimen; and further study has induced me to return to that opinion.

In my paper "On the British Cetacea," in the 'Annals of Nat. Hist.' xvii. 82, 1846, I proposed to unite *Physeter bidens* of Sowerby with *Delphinus micropterus* of Cuvier. The French naturalists have since almost universally come to the same conclusion. The difference in the size of the teeth, which they believe to be sexual, at one time made me revise my first opinion. I now think it probable that they are the same; at any rate it is a subject that wants further examination, for at present only one male and four females of the two presumed species have been observed by naturalists.—*P. Z. S.* 1864, 242.

The male was found near Brodie House, Elginshire, by James Brodie, who sent a figure and the skull to Mr. Sowerby, who figured it in the 'British Miscellany' under the above name. It was 16 feet long.

Dr. Fleming and Mr. Jenyns have confounded it with the Bottle-head of Dale (*Hyperoodon bidens*) (see Brit. Anim. p. 36, and Manual B. V. A. p. 44).

The female caught at Havre on 22nd August, 1828, was about 11 feet long; it lived two days out of the water, but it could not be prevailed on to eat anything. They offered it soaked bread and other alimentary substances. It emitted a low cavernous sound like the lowing of a cow. It was a female, and, from the state of the ossification of the bones, evidently a young animal. The teeth had not as yet pierced the gums. When living, the body was brownish lead-colour, with the exception of the belly, which was bluish and ash. The body was fusiform, attenuated at each end, the greatest thickness being behind the pectoral fins, in the middle of the distance between them and the dorsal. The head is much higher than broad, and separated from the body by a sensible contraction; the forehead much swollen and narrowed gradually, and ending in a beak with a flat and rounded tip. The upper jaw is much shorter and narrower than the lower one. The blowers are on the top of the head, in advance of the orbit, transverse, slightly curved, with the ends directed towards the front, and not towards the tail, as in the genus *Hyperoodon*. The mouth very broad, entirely deprived of teeth. The tongue is adherent to the lower jaw and toothed on the edge; a similar dentition exists also on the skin of the lower jaw. The eyes large, black, convex, edged with a gelatinous border, in the middle of the side of the head. Earholes very small. The pectoral fin towards the lower part of the chest, oval, elongate, blunt, small. The dorsal fin elevated, falcate, nearly two-thirds of the entire length, lower than the length of its base. Tail triangular, two-lobed, falcate.

The female from Ostend (1835) had the head attenuated, contracted behind. Nose produced, bald, not separated from the forehead. Eyes moderate. Lower jaw fitting into a groove in the edge of the upper. Teeth few, small or rudimentary, in middle of lower jaw, not developed till late. Throat with four parallel slits beneath. Body elongate, rather swollen behind. Pectoral fin low down the side, oval, narrow, small. Dorsal falcate, behind the middle of the body, about two-thirds from the nose. Blowlers on the crown, in a

curved line, with the concavity in front. Tail with two falcate lobes, flat, without any central prominence. Female sexual organs under middle of dorsal. Skull triangular. Forehead very high in front, and swollen behind. Intermaxillaries curved in front. Nose very long, compressed at the hinder end, very narrow, slightly keeled on each side. Hinder wing of the maxilla expanded horizontally over the orbits. Nasal bones encased in the frontals and intermaxillaries. Temporal pit very small. Palate smooth. Lower jawbones elongate, tapering, slender, nearly straight. The ear-bone is attached by an apophysis to the base of the skull. "Vertebræ 38, viz. 6 cervical separate, 10 costal, 11 lumbar, 11 true caudal. Metacarpal bones cartilaginous."—*Dumortier, Mém. Acad. Brux. xiii. t. 10.*

M. Dumortier found, near the middle of each side of the lower jaw, an alveolus, as if for a tooth. His figure represents the pectoral as situated at two-ninths of the total length, and the dorsal at five-ninths, from the end of the nose. The following are the measurements of the two females that have been described:—

	Blainv. ♀		Dum. ♀
	ft.	in.	mètres.
Length, entire	15	0	3·45
Length of head	2	7 (nose)	0·33
Length to blowers	2	3	0·44
Length to pectoral	3	4	0·91
Length of pectoral	1	6	0·30
Length to dorsal	9	1	2·04
Length of dorsal	0	10	0·27
Length to eye	..	..	0·49
Length to the vulva	..	..	2·21
Circumference	7	6	2·00
Width of pectoral	0	6	0·12
Width of caudal	3	0	0·68
Height of dorsal	0	11	0·27
Breadth of blower	..	..	0·10

The only male hitherto observed was thrown ashore on the coast of Elginshire in 1800. It was 16 feet long and 11 feet in circumference. A female was caught at Calvados in 1826; its skull and vertebral column is in the Museum at Caen. Another was taken at the mouth of the Seine in September 1825; the skull, which was described by De Blainville, is in the Paris Museum. The skeleton of the one taken at Ostend on the 21st of August, 1835, 11 feet long, is in the collection of M. Paret, near that city.

\*\* *Teeth (of male) very long, produced, arched, and truncated, with a conical process in front. Dolichodon.*

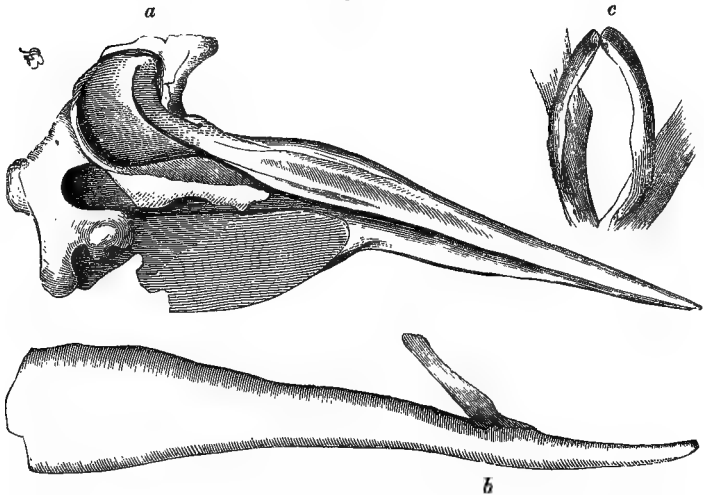
## 2. *Ziphius Layardii.*

*Ziphius Layardii, Gray, P. Z. S. 1865, 358.*

The entire length of the skull, from condyle to top of rostrum, 3 feet 7 inches; of the rostrum, from tip to notch, 2 feet 6 inches;

the width at the widest part of the brain-case 1 foot 6 inches; the length in a straight line, from the tip of the rostrum to the crest over the blower, 2 feet 11 inches; the height of the skull, from the hinder part of the palate to the crest over the blower, 1 foot 2 inches.

Fig. 72.



*a, b.* Skull and lower jaw of *Ziphius Layardii*. *c.* Teeth of lower jaw, from front.

The entire length of the lower jaw 3 feet; the length from the condyle to the hinder edge of the base of the tooth 1 foot 11½ inches; the length of the exposed part of the tooth along the anterior edge, 9½ inches; the width, below the teeth, of the side of the lower jaw, measured from the inner part of their base, 3 inches.

There is a partial hollow, as if it were the cavity of an old tooth that had fallen out, on the margin of the lower jaw, behind the base of the elongated arched tooth.

The skull which I described from the notes of Mr. Layard and the drawing of Mr. Trimen under the name of *Ziphius Layardii* (see Proc. Zool. Soc. 1865, p. 358) proves on examination, as I decided from the notes and drawing, to be a very distinct species of the genus, allied to *Z. micropterus*. The peculiar form of the teeth (which are elongated and arched over the outer surface of the upper jaw, so as to prevent the animal from opening its mouth beyond a very limited extent), it has been suggested to me, may be only an individual peculiarity or a malformation. I scarcely think this is the case; but even if it should be, it will not in the least militate against the distinctness of the species, as the proportion of the beak to the size of the brain-case, and the form of the beak and position and form of the teeth (with a small point near the front edge of the tip),

are sufficient to clearly characterize the species. Unfortunately the last-mentioned peculiarity is scarcely sufficiently indicated in the figure.

The edges of the front lower teeth are absorbed or worn away by the friction of the upper jaw against them, the vomer forming a large fusiform prominence on the upper surface of the base of the beak, in front of the blowers, between the narrowed part of the elongate, slender intermaxillaries, which are enlarged and thickened behind, forming the outer sides of the blowers.

In this respect it agrees with the figure of the skull of *Dioplodon Sechellensis* from the Indian Seas, given by M. Gervais (*Zool. et Paléont. Franç. t. 40. f. 3-6*); but the vomer is more prominent in the Cape species. The Cape species has the slender, elongated, tapering lower jaws, and a very much longer beak to the skull, like that of *D. micropterus* of Hayre (Gervais, *l. c. t. 49. f. 1*).

I was informed, in 1864, that two Dolphins which agreed with M. F. Cuvier's description and figure of *Delphinorhynchus micropterus* had been taken on the coast of South Africa, and that the skulls were then in the possession of a surgeon at the Cape. There is also a third skull, in a semifossil state, in the colony.

## 7. DIOPLODON.

Lower jaw broad behind, suddenly narrowed in front before the teeth. Teeth in the side of the lower jaw (of male?), large, compressed, considerably behind the back edge of the rather short symphysis.

Animal unknown.

*Dioplodon* (part), Gervais, *Zool. et Paléont. Franç.*

*Dioplodon*, Gray, *Proc. Zool. Soc.* 1863, 200.

*Mesiodon* (part), Duvernoy, *Ann. Sci. Nat.* xv. 58. t. 2. f. 4.

### *Dioplodon Sechellensis.* *The Seychelle Ziphius.*

*Ziphius* de Séchelles (*M. le Duc*, 1839), *Mus. Paris.*

*Ziphius Sechellensis*, Gray, *Zool. E. & T.* 28. t. 6. f. 1, 2 (lower jaw).

*Ziphius densirostris*, Blainv. *Mus. Paris.*

*Mesiodon densirostris*, Duvernoy, *Ann. Sci. Nat.* 1851, xv. 58. t. 2. f. 4 (not *D. densirostris*, Desm.).

*Dioplodon densirostris*, Gervais, *Zool. et Paléont. Franç. t. 40. f. 3-6* (skull); Gray, *Proc. Zool. Soc.* 1863, 200.

Inhab. Seychelles. Skull in *Mus. Paris.*

The skull is very like that of *Ziphius*, but the nose-bones are thicker, heavier, and higher. The teeth in the middle of the lower jaw, as in the male *Z. Sowerbiensis*, but larger and compressed. The hinder part of the lower jaw is very broad, the front half much narrower and bent down in an arched manner.

## Suborder II. SIRENIA.

Body rather hairy. Muzzle bristly. Nostrils 2, separate, apical, lunate, valvular. Fore limbs arm-like, clawed; hinder compressed, expanded, tail-like. Teats 2, pectoral. Teeth of two kinds.

Cete II. (pars), *Gray, Ann. Phil.* 1825.

(Natantia) Sirenia, *Illiger, Prodr.* 139, 1811; *Brandt, Symb. Sirenologica*, 132, 1846.

Sirenia, *Gray, Cat. Cetac. B. M.* 138; *P. Z. S.* 1864, 247; *Sélvs-Longchamps*, 1842; *Schinz, Mamm.* 491.

Mammifères amphibies (pars), *Cuvier, Tab. Elém.* 1798; *Dum. Z. Anal.* 1806.

Mammalia amphibia (pars), *Rafin. Anal. Nat.* 60, 1815.

Onguligrades anomaux, *Blainv.* 1816.

Les Cétacés herbivores, *F. Cuv.* 1829.

Cetacea herbivora, *Gray, Lond. Med. Rep.* xv. 309, 1821; *Latr. Fam. Nat.* 1825, 64; *Brandt, Mém. Acad. Pétersb.* 1833, 103.

Cete anomala, *Fischer, Syn. Mamm.* 1828.

Ceti hydræoglossi, § a, *Wagler, N. S. Amph.* 32, 1830.

Heterodonta, Hydraula, ou Sirenix, *Lesson, N. Règ. Anim.* 134, 1842.

Manatina, *Reich. Syn. Mamm. Cetac.* 15.

Tricheche, *Oken, Lehrb. Nat.* 684.

Pachydermata (part), *Agassiz, Proc. Boston Soc. N. H.* iii. 209, 1850; *Kneeland, Proc. Amer. Journ. Agr. and Sci.* 1851, 42.

Gravigrades, *Blainville, Ostéograph.*

Phytophaga seu ex spiraculis, *J. Brookes, Cat. Mus.* 40.

Manatidæ seu Mastothoracea, *J. Brookes, Cat. Mus.* 40.

Amphibies trirèmes, *Duvernoy, Tab. Anim. Vertéb.*

Sirenæ, *Rüppell, Verz. Senck. Samml.* 186, 1845.

Quadrupeda, s. Tetrapoda, Nectopoda, et Pinnipeda (part.), *G. Fischer, Zoognosia*, 15.

## Fam. 9. MANATIDÆ.

Muzzle bristly; lips single; front of upper and lower jaws each covered with a hard, horny, porous, corrugated plate. Cutting-teeth 2 or 4 above, large, conical, and exerted, or small, abortive, and early deciduous. Canine none. Grinders  $\frac{3}{2}$ .  $\frac{3}{2}$  to  $\frac{2}{2}$ .  $\frac{2}{2}$ , tubercular, the front one deciduous. Nostrils 2, separate, lunate, valvular. Eyes small, ears none. Teats 2, pectoral. Stomach divided into four cells, two of them appendaged.

Sirenia, *Illiger, Prodr. Mamm.* 181.

Manatidæ et Dugongidæ, *Gray, L. Med. Rep.* xv. 309, 1821; *Ann. Phil.* 1825.

Trichecus (pars), *Cuv. Tab. Elém.* 1798.

Manatidæ (pars), *Sélvs-Longchamps*, 1842.

Halicoridæ, *Gray, Ann. Phil.* 1825; *List Mamm. B. M.* 106.

Sirenia dentigera seu Halicoræ, et Sirenia edentata seu Rhytiniæ, *Brandt, Symb. Sirenol.* 132, 1846.

Amphibia tetrapia Odobenia, Amphibia Diopia, *Rafin. Anal. Nat.* 60, 1815.

Sirenix (pars), *Lesson, N. Règ. Anim.* 154.

Manatina, *Reichb. Syn. Mam.* 15.  
 Les Lamantins, *Duvernoy, Tab. Anim. Vert.*  
 Trichecus (part), *Artedi, Gen. Pisc.* 79; *Syn.* 109.  
 Halicoreæ, *Brandt, Mém. Acad. Pétersb.* 1833, 103.  
 Rytineæ, *Brandt, l. c.* 1833, 103.

## SYNOPSIS OF THE GENERA.

*Grinders distinct.* Manatina.

1. MANATUS. Tail rounded. Grinders  $\frac{9}{8}$  or  $\frac{8}{8}$ , tubercular; upper cutting-teeth moderate.
2. HALICORE. Tail forked. Grinders  $\frac{8}{8}$ , flat-tipped; upper cutting-teeth produced, tusk-like.

*Grinders none.* Rytinina.

3. RYTINA. Tail forked. Grinders none.

a. *Grinders distinct.* Manatina.

## 1. MANATUS.

Cutting-teeth 2, very small, rudimentary, early deciduous. Canine none. Grinders  $\frac{9}{8}$ .  $\frac{8}{8}$ , with two or three transverse three-tubercled ridges. Lips bristly. Back with scattered hairs. Fins with four rudimentary hoof-like nails. Toes supported with phalanges. Tail rounded or truncated at the end. Pelvic bones deficient (?). Cæcum bifid at the tip. Cervical vertebræ 6, separate, distant.

*Sirenia dentigera* seu *Halicorea*, *Brandt, Sirenologia*, 1847.

*Manatus*, *Rondel. Pisc.* 490; *Storr, Prodr.* 41, 1780; *Cuvier, R. A.*; *Illiger, Prodr.* 140, 1811; *Rafin. Anal. Nat.* 61, 1815; *Gray, Cat. Cetac. B. M.* 139; *P. Z. S.* 1857, 59; 1864, 247; *Rousseau, Mag. Zool.* 1856, 293; *Schlegel, Abh.* 9.

*Trichechus*, sp., *Linn. S. N.* ed. 6. 39, ed. 10, ed. 12; *Erxleb. Mamm.* 599.

*Odobenus* (pars), *Brisson.*

*Trichecus manatus*, *Oken, Lehrb. Nat.* 687, 1815.

? *Nemodermus*, *Rafin. Anal. Nat.* 60, 1815.

*Oxystomus*, *G. Fischer, Zoogn.* 19.

? *Siren*, *Artedi, Gen. Piscium*, 81, from Syrene; *Bartholini Hist. Anat. Rar.*

*Trichechus*, *Artedi.*

The number of grinders varies according to the age or state of the specimens. When complete they are  $\frac{9}{8}$ .  $\frac{8}{8}$ ; but the three front on each side are often deciduous; hence Home (*Phil. Trans.* 1821, 390) describes them as  $\frac{6}{8}$ .  $\frac{6}{8}$ , and Cuvier as  $\frac{8}{8}$ .  $\frac{8}{8}$ .

Dr. Harlan observes:—"Cuvier estimates the teeth at 36, nine on each side; in both my specimens they do not exceed 32, eight on each side."

In the very young skull in the British Museum, which has holes for the rudimentary upper cutting or canine teeth, there are only 24, viz. six on each side; and the two hinder on each side must have been hidden in the gums. In the older skulls some have eight and others nine on each side; but in most of them only six on each side

are perfect, as the anterior one on each side drops out as the new ones are formed behind, and in each of the skulls two hinder on each side are in the process of development. (See also Owen, *Cat. Osteol. Mus. Coll. Surg.* 478.)

All the three skeletons received from Du Chaillu had the cervical vertebræ united in their natural situation. There were in each of them only six cervical vertebræ, and not *seven*, as some authors have stated.

### 1. *Manatus australis*. *The Manatee*.

Grey-black. Nasal bones distinct, imbedded in the skull; front of lower jaw flat, with a central conical prominence near the lower edge. Gonyx of lower jaw compressed, bifid. Ribs very thick, solid, circular at the sternal end.

*Manatus*, *Rondel. Pisc.* 490; *Klein, Pisc.* ii. 32; *Brisson, R. Anim.* 49, 352.

Kleiner Manati (*Manatus minor*?), *Zimmermann, Geog.* ii. 426, 388.

Lamantin, *Condarn. Voy.* 154; *Buffon, H. N.* xiii. 377, 424, t. 57.

Manati, *Aldrov.* 728; *Johnston*, 223; *Charbet, O. Z.* 159.

Manathi, *Clusie, Diss. Philolog.* 8, 9.

Manati seu Vacca marina, *Ray, Quad.* 193 (skeleton).

Taurus marinus, *Ant. Herrera, Nov. Ord.* 12.

*Manatus borealis*, *Fleming, Brit. Anim.* 29.

Mermaid of Shetland Seas, *Edinb. New Phil. Journ.* vi. 57, 1829; *Stewart, Elem. N. Hist.* i. 125.

*Trichechus manatus*, *Linn. S. N.* i. 49; *Gmelin, S. N.* i. 60; *Schreber, Säugeth.* t. 8, cop. *Buffon*.

*Manatus australis*, *Tilesius, Jahrb.* i. 23; *Ozeretskowsky, Nov. Act. Petrop.* xiii. 375. t. 13; *Fischer, Syn. Mamm.* 501; *Reichb. Syn. Mamm.* 16; *Icon. Cetac.* t. 23. f. 72, 73; from *Humboldt, Anat. Cetac.* t. 27, 28, 29; *Gray, Cat. Cetac. B. M.* 1850, 139; *P. Z. S.* 1864, 247; *Ann. & Mag. N. H.* 1865, 134.

*Manatus Atlanticus*, *J. Brookes, Cat. Mus.* 40.

*Manatus* (*Trichechus manatus*) *australis*, *Illiger, Prodr.* 110.

*Manatus Americanus*, *Desm. Mamm.* 507; *N. Dict. N. H.* xvii. 262. t. 96; *Home, Lectures Comp. Anat.* iv. t. 54; *Schomburgh, Reisen Brit. Guiana*, iii. 786; *Castlenau, Reise*, 114; *Schreber, Säugeth.* t. 378, t. 380. f. 1, 2, t. 381. f. 3; *Guérin, Icon. Mamm.* t. 46; *Lesson, Cétac.* 63; *Gosse, Jam.* 346; *Jäger, Nova Acta Acad. Leop.-Carol.* xxvii. 191; *Vrolik, Bijdr. tot der Dierkunde*, 1851, 53.

Manate de l'Orénoque, *Humb.; Wiegman, Arch.* 1838, 1. 18. t. 1, 2 (anatomy).

*Manatus latirostris*, *Harlan, Journ. Acad. N. S. Philad.* 111. 390, 1824; *Favna Amer.* 277; *Fischer, Syn.* 502; *Reichb. Syn. Mamm.* 17; *Icon. Cetac.* t. 23. f. 74; *Anat.* t. 27. f.; *Wagner, in Schreb. Säugeth.* t. 379. t. 381. f. 2, 5.

*Manatus australis* (Surinam), *Schlegel, Abhandl.* t. 5. f. 3 (old), 4, 5, 6 (young).

Lamantin d'Amérique, *Cuvier, Ann. Mus.* xiii. 273. t. 19. f. 1-4; *Oss. Foss.* v. 242. t. 19. f. 2, 3, 9, 10, 11, 14, 15, 16, 17, 18, 19.

Jamaica Manatee, *Home, Phil. Trans.* 1821, 390. t.

Guiana Manate, *Penn. Quad.* ii. 297.

Manate de Surinam, *Kraus, Müller, Arch. f. Anat.* 1858, 390.

Manate Clusii and Oronoko Manate, *Penn. Quad.* ii. 298.



*Manatus fluviatilis*, Illiger; Wagner, in Schreb. *Säugeth.* t. 279 (head and jaws), cop. Reichb. *Icon. Cetac.* t. 23. f. 75.

Peixe boi or Vacca marina, Kidder and Fletcher's *Brazils*, 555, fig.

ANAT. Home, *Lectures*, t. 55; Cuvier, *Oss. Foss.* v. t. 19; Blainv. *Ostéogr.* t. ; Wiegmann, *Arch.* 1838, 18. t. 2.

Inhab. Tropical America. Surinam (*Schlegel*). Cayenne (*Cuvier*). Guiana, West Indies (*Home*). Jamaica (*Sloane*). Florida? Called *Manatee*, that is, *fish ox*, by the Negroes at Jamaica (*Gosse*), *Cojumero* in Guiana, *Peges buey* on the River Amazons.

a. Fœtus, in spirits. Jamaica, Mus. Sloane.

b. Skull. South America?

*Blainv. Ostéogr. Atl. G.* *Manatus* (latirostris), pl. 111.

c. Skull. Jamaica. From Mr. Gosse's Collection.

d. Skeleton. Surinam. From Dr. Kraus.

e. Skull. Cuba. Presented by H. Christy, Esq.

f. Skull. West Indies.

Professor Owen (*Cat. Osteol. Mus. Coll. Surg.* ii. 464) describes the skeleton and the dentition of a young female.

Colour (*above*) uniform bluish black, rough-grained; cuticle peeling in several places, showing the colour. Brighter and clearer beneath. *Underparts* slightly paler; front of muzzle grey. Eyes very small, not nearly so large as a man's; pupil comparatively large, circular, blue; iris very narrow, scarcely a line wide, dull greyish white. Flesh delicious-flavoured, without any oiliness, something between veal and pork.—*Gosse, Jamaica*, 344.

They are found in considerable numbers about the mouths of rivers near the capes of East Florida, lat. 25°. The Indians kill them with harpoons during the summer months. One Indian has been able to capture ten or twelve during a season. They measure from 8 to 10 feet, and are about the weight of a large ox.—*Burrows, Journ. Acad. N. S. Philad.* iii. 392.

They are mentioned in Captain Henderson's account of Honduras, 1809.—*Harlan*.

Feed on a water-plant (*pana brava*) that floats on the borders of the streams. From 8 to 17 feet long.—*Kidder*.

The animal mentioned by Stewart and Fleming is most probably the American Manatee, which may, under extraordinary circumstances, be brought by the Gulf-stream to the coast of Shetland. I have seen no specimens; but the size precludes it being the *Rytina*, to which Fleming refers it.

"The carcase of one of these animals was, in 1785, thrown ashore near Leith: it was much disfigured; and the fishermen extracted its liver and other parts, from which a considerable quantity of oil was obtained."—*Stewart, Elem. N. H.* i. 125.

"*Zeiland Mermaid*. Animal 3 feet long; upper part resembling a Monkey, with short arms and distinct, not webbed, fingers; lower part like a fish; skin smooth, grey, without hairs or scales; breast pectoral." (Laurence Edmonstone, in *Edinb. Magaz.* Sept. 1823, p. 343, copied in Fleming, *Brit. Anim.* 30.)—*Gray, Proc. Zool. Soc.* 1864, 248.

2. *Manatus Senegalensis*. *The Lamantin*.

Nasal bones none attached to the skull; frontal bones thick in front; upper part of front of lower jaw concave, with two small separate processes in front below. Gonyx of lower jaw convex, rounded. Ribs slender, compressed, high, rather compressed at the sternal end.—See *Gray, Ann. & Mag. Nat. Hist.* 1865, xv. 134.

La Douna, *Ant. Zucchelli, Journey in Congo*, 146.

Lamantin, *Adanson, Voy. Seneg.* 143; *Christol, Ann. Sci. Nat.* xv. t. 7. f. 13, 15, 16 (arm-bones).

Lamentyn (female), *Barbot, Guin.* 562. t. 7 (bad).

Lamantin du Sénégal, *Daub. in Buffon, N. H.* xiii. 431 (no figure); *Cuv. Oss. Foss.* v. 254. t. 19. f. 4, 5 (skull); ? *Robert, Compt. Rend. Acad. Sci.* 1836, 363.

*Trichecus Manatus Africanus*, *Oken, Lehrb. Nat.* 688, 1815.

*Manatus Senegalensis*, *Desm. Mamm.* 508; *Lesson, Œuvr. Buffon*, i. 69; *N. Règ. Anim.* 155; *Fischer, Syn.* 502; *Schreb. Säugeth.* t. 381 (skull), t. 380. f. 3, 4; *F. Cuv. Cete*, t.; *Gray, List Mamm. B. M.* 106; *Cat. Cetac. B. M.* 140; *Edin. Journ. Sci.* ii. 186; *Lesson, Cétac.* 69; *Hamilton, Jardine, Nat. Lib.* viii. 298. t. 19. f. 2, 3; *Reichb. Syn. Mamm.* 17; *Anat. Cetac.* t. 28, from *Cuvier*; *A. Smith, African Zool.* 123; *Oliphant, Rep. Brit. Assoc. Glasgow*, 1855, *Trans.* 116, 1856.

Womanfish, *Purchas*, ii. 1446.

Round-tailed Manate, *Penn. Quad.* ii. 296. ? 102.

*Manatus nasutus*, *Perkins, Proc. Boston N. H. S.* ii. 198; *Amer. Journ. Sci.* ix. 13. t.; *Wyman, Proc. Boston N. H. S.* ii. 192, 1850.

*Manatus Owenii*, *Du Chaillu, Proc. Boston N. H. Soc.* 1860; *Gray, Ann. & Mag. N. H.* 1861, 64.

*Manatus Vogelii*, *Owen, Proc. Brit. Assoc.* 1856, 100; *Baikie, P. Z. S.* 1857, 33. t. 51 (skull); *Ann. & Mag. N. H.* 1857, xx. 70; *Edin. New Phil. Journ.* n. s. iv. 1856, 345.

*Manatus Senegalensis*, *Gray, P. Z. S.* 1857, 59; *Ann. & Mag. N. H.* 1857, xx. 312; *Ann. & Mag. N. H.* 1865, xv. 134.

*ANAT. Cuvier, Ann. Mus.* xiii. t. 19. f. 4, 5; *Oss. Foss.* v. t. 17. f. 2, 3 (?skull); *Schreber, Säugeth.* t. 381; *Jardine, Nat. Lib.* viii. t. 19. f. 2, 3; *Reichb. Anat. Cet.* t. 28; *Blainv. Ostéogr.* t.

Inhab. West coast of Africa.

- a. Stuffed. West Coast of Africa. Presented by Messrs. Forster, Smith, and Co.
- b. Skin. West Africa.
- c. Skeleton. West Africa.

## 2. HALICORE.

Cutting-teeth  $\frac{4}{4}$ ; two inner upper and the four lower deciduous; the two outer upper conical, elongate, permanent. Canine none. Grinders  $\frac{3}{3}$ .  $\frac{3}{3}$ , truncate, with two lateral grooves. Lips bristly; fore feet fin-shaped, clawless. Caudal fin lunate, sinuated. Body hairy. Cervical vertebræ 7. Cæcum undivided. Pelvic bones distinct.

Dugungus, *Tiedemann, Zool.* i. 554.

Odobenus, *Rafin. Anal. Nat.* 60, 1815.

Dugong, *Lacép.*

Halicore, *Illiger, Prodr.* 140, 1811; *Oken, Lehrb.* 689, 1818; *Schinz,*

493; *Knox, Cat. Prep. Whale*, 35, 1838; *J. Brookes, Cat. Mus.* 404; *Gray, Cat. Cetac. B. M.*  
*Rosmarus* (pars), *Boddaert*.  
*Trichechus* (pars), *Erzleb*.  
*Trichechus* (part), *Artedi, Gen. Pisc.* 80; *Syn.* 108.  
*Platystomus*, *G. Fischer, Zoogn.* 19.

Cervical vertebræ 7, dorsal 19 (ribs 19), lumbar, sacral, and coccygeal 30, = 56; V-shaped bones commencing between the thirty-second and thirty-third vertebræ. Weight of cranium and lower jaw 7 lbs. 6 ozs., of bones of trunk 20 $\frac{1}{4}$  lbs., of pectoral extremities 3 lbs., = 30 lbs. 10 ozs., the weight of an entire male adult human skeleton being only 12 lbs. The bones are extremely dense and of stony hardness; they contain no medullary cavity, but consist of a texture nearly as close as ivory and capable of being polished.—*Knox, Cat. Prep.* 35, 1838.

The tusks and teeth are “composed of two substances, a cortical and a medullary; the cortical, although holding the situation of enamel, is similar to bone, and possesses none of the qualities of that peculiar substance; the medullary portion is extremely hard, of a dense texture and homogenous appearance.”—*Knox, Cat. Prep.* 36.

“The front portion of the upper and lower jaws is covered in the recent state with a horny covering. The outer surface presents numerous rough-looking elevations, many of them darker around the circumference than in the centre; these are arranged in rows of seven or eight each, running from each side towards the mesial line, but with a slight inclination from behind forward. The whole substance is composed of bristles about one-eighth of an inch in length, arranged vertically, and agglutinated together by a substance of a horny nature. Since examining the Dugong, now seven years ago, from which the preparations nos. 111 and 112 were procured, I have been convinced that Steller was simply describing a similar substance, no doubt on a larger scale, as the animal is said to reach 26 feet. The substance is neither teeth nor analogous to teeth, and we might with the same propriety describe the rough and semi-horny substance covering the osseous palate of the sheep, cow, &c., as a tooth. As a proof that it is not analogous even to teeth, the surface of the lower jaw contains rudimentary teeth imbedded deep in the osseous texture.”—*Knox, Cat. Prep.* 37, 1838.

Cervical vertebræ 7, all free; first and second no lateral process; third to the seventh thin, with small lateral processes.—*Mus. Edinb.* 47.

Dr. Knox suspects there are two species, one with what Sir E. Home calls the permanent, and the other with what he, erroneously, as Dr. Knox suspects, calls the milk tusks.—*Trans. Roy. Soc. Edinb.* ii. 395.

### 1. *Halicore Dugong.* *The Indian Dugong.*

*Halicore australis*, *Owen, Jukes's Voy. H.M.S. Fly*, ii. 225. f. 1. t. 27. f. 3. 328. f. 5; *Macgillivray, Voy. Rattlesnake*, i. 48.  
*H. (Trichechus) Dugong*, *Illiger, Prodr.* 140; *Schreb. Säugeth.* t. 380. f. 5, 6. t. 382, 383; *Reichb. Syn. Mamm.* 16; *Icon. Cetac.* t. 22. f. 70, 71, from *F. Cuvier et Quoy*.

- H. Dugung, *F. Cuv. Mamm. Lith. t.* ; *Guérin, Icon. t. 46* ; *Lesson, N. R. Anim. 154* ; *Fischer, Syn. Mamm. 503* ; *Gray, List Mamm. B. M.* ; *Rousseau, Mag. Zool. 1856, 198* ; *Vollmann, Anat. Anim. t. 9. f. 1* (skeleton).
- H. cetacea, *Illiger, Abhandl. Berl. Akad. 1813.*
- H. Indicus, *Desm. Mamm. 509* ; *Schreb. ii. 267* ; *Quoy et Gaim. Voy. Astrol. t. 27* ; *Owen, Jukes's Voy. Fly, ii. 323, 325, 327.*
- H. Indica, *Rapp, Cetac. 26. t. 1* (fœtus, Mus. Zurich) ; *A. Smith, South African Zool. 122.*
- Halicore Syren, *J. Brookes, Cat. Mus. 40.*
- Trichechus Dugong, *Gmelin, S. N. i. 60* ; *Erxleb. Syst. 599* ; *Zimmermann, Geog. ii. 425* ; *Voy. Pôle Sud, Mamm. t. 20, 21 a, b, c, d.*
- Trichechus Dugong, *Pucheran, Voy. Dumont d'Urville, Mamm. t. 20, 20 a, 20 b, from Banda.*
- Dugungus marinus, *Tiedem. Zool. i. 554.*
- Dugungus Indicus, *Hamilton, Jard. Nat. Lib. viii. 300.*
- Indian Walrus, *Penn. Syn. Quad. 338* ; *Shaw, Zool. i. 239* ; *Quad. ii. 269.*
- Whale-tailed Manatee, *Penn. Quad. ii. 292.*
- Lamantin, *Legnate, Voy.*
- Manati, *Banks, Pennant Quad. 293* ; *Voy. de la Caille, 229.*
- Le Dugong, *Renard, Poissons des Ind. i. t. 34. f. 180* ; *Buffon, H. N. xiii. 374. t. 56* (skull) ; *Camper, iii. 479. t. 7. f. 2, 4* ; *Cuvier, Oss. Foss. v. 252* ; *N. Act. Petrop. xiii. 374* ; *F. Cuvier, Mamm. Lithog. t. 97.*
- Dugong, *Raffles, Linn. Trans. ; Phil. Trans. 1820, 174* ; *Home, Phil. Trans. 1820, 144. t. 12, 14, 314. t. 25, 31* ; *1821, 390* ; *Comp. Anat. t. 52* (young), *t. 53* (skeleton) ; *Knox, Edinb. Journ. Sci. 1829, i. 157* ; *Trans. Roy. Soc. Edinb. i. 389. 1831* ; *Blainville, Comptes Rendus Acad. Sci. 1837, March, 3. fig. (skull)* ; *Owen, P. Z. S. vi. 28, 1838* ; *Christol, Ann. Sci. Nat. xv. t. 7. f. 12, 14, 16* (arm-bones) ; *Bischoff, Müller, Arch. für Anat. 1847, 1.*
- Dugong des Indes, *Quoy et Gaim. Voy. Astrol. Mamm. 143. t. 27* ; *Lesson, Cétac. 80.*
- ANAT. *Daubenton, Buffon, H. N. xiii. t. 56* (skull) ; *Home, Phil. Trans. 1821, t. 20* ; *Pander et Alton, Robben, t. 5* ; *Cuv. Oss. Foss. v. 259. t. 20, t. 19. f. 6, 7* (mutilated) ; *Vollmann, Anat. Anim. i. t. 9. f. 1* ; *Blainv. Compt. Rendus, 1837, 3. f. ; Camper, iii. 479. t. 7. f. 2, 3, 4* ; *Owen, Jukes's Voy. Fly, ii. 323, 325. f. 2, 327. f. 4, 328. f. 6* ; *Reichenb. Icon. Cétac. t. 26, 33, 34, 35, 36.*

Inhab. Indian Ocean. Banda. Mozambique Channel (*A. Smith*).  
North-west coast of Australia, called *Yung-un*.

- a. Animal, stuffed. Malacca.
- b. Skull (adult). India. Presented by Walter Elliot, Esq.
- c, c. Two upper jaws. North-east coast of New Holland. Presented by J. B. Jukes, Esq.
- d. Skull. Presented by J. B. Jukes, Esq. (lower jaw wanting).
- e, f. Two skulls. Moreton Bay. Presented by Capt. Stanley, R.N. Voyage of H.M.S. 'Rattlesnake.'
- g. Skull. Darnley Island, Torres Straits. Presented by the Earl of Derby.

The skeleton of this animal is fully described by Professor Owen in the 'Descriptive Catalogue of the Osteological Series in the Museum of the College of Surgeons,' p. 459, nos. 2543-2631.

After careful study and comparison I have been unable to discover

any external difference, or character in the skull and skeleton, by which I can separate the Indian from the Australian Dugong; the changes in the form of the skull and teeth are common to the specimens of the two localities; therefore I am inclined to believe that the slight changes in the form of the bladebone and teeth which have been observed have arisen from the age or sex of the specimen described.

The skulls do not seem to be so liable to vary in form as the skull of the Manatee of America and Africa.

Legnate mentions the Dugong as inhabiting the shores of the Mascarin Islands "in great numbers. They attain 20 feet in length, and feed like sheep in three or four fathoms of water, making no attempt at escape when approached. Sometimes they were shot at the end of the musket, sometimes laid hold of and forced on shore. Three or four hundred were met with together, and they were so far from shy that they suffered themselves to be handled, and the fattest were thus selected. The larger ones were avoided, not only on account of the trouble they gave in the capture, but because the flesh was not so good as that of the smaller and younger ones."—*Penny Cyclopædia, Whales.*

General Hardwicke's figure of the Malay Dugong, which was taken from life, represents the animal as uniform slaty black; and M. F. Cuvier's figure was a copy of this figure, taken by M. Duvaucelle.

In the 'Voyage of the Astrolabe' the Dugong is figured pale fulvous, with white lower parts, and with fulvous blotches on the side. This was probably from a dry skin.

Sir J. E. Tennant, in his work on Ceylon, gives a woodcut showing the mode in which the female carries her young.

The Dugong is seldom caught at Singapore. About 8 or 9 feet in length; but how much larger they grow is not ascertained, as when they exceed that size their superior strength enables them to make their escape.—*Raffles, Linn. Trans. xiii.*

The Dugong is not numerous at Singapore, still less so to the northward, and has but in few instances been observed in Kurla moda, the mouth of the river which forms the northern boundary of the province of Wellesley. It is called *Duyon* or *Parampuan Laut* by the Malays.—*Cantor, Malay Mamm. 66.*

The Andaman Island is the most northern locality yet ascertained of the Indian Dugong in the Bay of Bengal. It must be scarce there, or the bones would be more frequently found to decorate those rude lairs. They are common in the Gulf of Calpentyn, on the west coast of Ceylon, where the flesh is held in esteem, and they occur in all the salt-water inlets from that gulf to Adambridge. They are also found, and called "the Seal," on the shore and in the salt-water inlet of the Concan, where they feed on the vegetable matter found on the rocks, and bask and sleep in the morning sun. These are most likely the seals mentioned by Forbes, in his 'Oriental Memoirs,' as abounding in the salt water of Travancore. He described their skin as covered with soft, oily hair, and having short ears.

Barchemitz says the males at Moreton Bay are a little larger than

the females. They are often more than 20 feet long. They live upon a green grass which grows upon the bank.

Péron observes, the sailors were alarmed by a terrific howling, which resembled the roaring of a bull, but much stronger, and seemed to come from the neighbouring reeds. And Mr. Fraser, in Captain Stirling's Surveying Voyage, 1826, notices that while attending to the boat on the river, he "distinctly heard the bellowing of some huge animal, similar to that of an ox, from an extensive marsh further up the river." The roars were doubtless from the Dugong.

Dampier observed these animals in Australia, but he mistook them for *Hippopotami*; but he only saw a head, half decomposed by digestion, and the tusk doubtless helped to mislead him.

Péron mentions the existence of a *Dugon* on the Australian coast in his 'Voyage of Discovery to Australia,' published in 1807, but he only saw a few teeth collected by the sailors from a half-decomposed specimen.

The late Dr. Robert Tyler presented a skull and some other bones to the Museum of the Asiatic Society of Calcutta. In 1827 he read a paper on the Dugong or Dayoumy, on the bones of four different individuals which he had picked up at Raffles Bay on the north coast of Australia. (See Mem. of Dr. R. Tyler, Corbyn's Indian Rev. 1838, iii. p. 46, and Blyth, Report Asiatic Soc. 14.)

Known to the colonists in Morton Bay as the "Sea-pig." The skin is thick and smooth, with a few hairs scattered on the surface. Bluish on the back, with a white breast and belly. The adult male does not exceed 18 or 20 feet long. It chiefly feeds on marine vegetables which it finds at the bottom of the inlets in comparatively shallow water, where it is easily captured. The flesh resembles good beef, and is much esteemed. The oil obtained from its fat is peculiarly clear and limpid, and free from any disagreeable smell found in most animal oils. The blacks devour the carcass roasted, after expressing the oil for sale to the colonists.—*Abridged from Sidney's Three Colonies of Australia*, 1852, 337.

The author of 'Ramble at the Antipodes,' 1859, described the flesh of the Dugong, or *Yahgan* of the aborigines, as excellent, having the taste of tender beef, and, when salted, nearly resembling bacon.

The Australian Dugong is met with on the north coast of that island continent within the Great Burrow Reef at Swan River on the western side, at Moreton Bay on the eastern, and in Port Essington and Shasta Bay on the north coast. But it may be doubtful if they are all the same species. Professor Owen's *H. australis* is described from the animal found in Port Essington (see Cat. Osteol. Series Mus. Coll. Surgeons).

## 2. Halicore Tabernaculi.

"Tachas vel Thachusa, *Moses*, in *Exodus*, xxv. 5," *Rüppell*.  
*Halicore tabernaculi*, *Rüppell*, *Mus. Senckenb.* i. 113. t. 6.  
*H. Dugong*, var., *Reichb. Syn. Mamm.* 16.

H. Hemprichii (Nake), *Ehrenb. Symb. Phys.* ii.  
H. Lottum, *Ehrenb. Symb. Phys.* i.

Inhab. Red Sea.

Observed by Dr. Rüppell "swimming among the coral banks on the coast of Abyssinia, near the Dalae Island." The fishermen harpooned a female, which he dissected. It was 10 feet long.

The Arabs stated that they live in pairs or small families; that they have feeble voices, feed on *algæ*, and that in February and March bloody battles take place between the males, which attain to 18 feet, &c.—*Penny Cyclopædia*, art. *Whales*.

This is probably the same as the Dugong from India and Australia; but I have not had the opportunity of comparing the skull and skins as in that species.

b. *Teeth none.* Rytinina.

### 3. RYTINA.

Cutting-teeth, canines, and grinders none. Muzzle blunt, lips double, outer upper bristly. Ears none. Eyes covered with a blinking membrane. Skin covered with a thick, brittle or easily cracking fibrous epidermis. The fore feet with claw-like callosities, not supported by phalanges. The tail horizontal, bifid. Teats two, pectoral. Pelvic bones distinct. Stomach simple.

*Sirenia edentula* seu *Rhytineæ*, Brandt, *Symb. Sireniol.* 1849.

*Manate* seu *Vacca marina*, Steller, *Acad. Petrop. Nov. Comm.* ii. 294. t. 14.

*Rytina*, Illiger, *Prodr.* 141, 1811; Oken, *Lehrb. Nat.* 685; Wagler, 33; Beer, *Mém. Acad. Pétersb.* 1840, 111; *Sirenologia*, 1849.

*Rhytina*, Brandt, *Mém. Acad. Imp. Pétersb.* vii. 1846; *Symb. Sirenologia*, 1846.

*Rityna*, Lesson, *Nouv. Règ. Anim.* 155, 1842 (misprint).

Stellerus, *Desm.*; Cuvier, *R. A.* i. 275.

*Hydrodamalis*, Retzius.

?*Dystomus*, G. Fischer, *Zoogn.* 19.

*Nepus*, Gotth. Fischer von Waldheim.

Stellère, Cuvier, *Règ. Anim.*

Dr. Knox (Cat. Prep. Whales, 37, 1838) shows that the substance in the palate which Steller describes, and which has been mistaken for teeth, is only a horny skin of the bent-down portion of the two jaws, common to this animal and the Dugong. This suggestion has been adopted by F. Cuvier (*Cétac.* 377) and Brandt in his '*Sirenologia*.' The latter figures them, and exhibits their structure under the microscope. This horny substance bears evidently a considerable analogy to the baleen of the common whale.

*Rytina gigas.* *The Morskaja Korova.*

Black.

*Manate* seu *Vacca marina*, Steller, *N. Act. Petrop.* ii. 294.

*Trichecus Manatus*, Müll. *Prodr. Z. Dan.*

*Trichecus (Manatus) borealis*, Gmelin, *S. N.* i. 60; Oken, *Lehrb. Nat.* 685.

Nordische Seekuh (*Rytina*), *Beer, Mém. Acad. Pétersb.* 1840, 111.

*Manatus gigas*, *Zimmerm. Geog.* ii. 426.

*M. borealis*, *Tilesius, Jahrb.* i. 23; *Pallas, Zool. Rosso-Asiat.* i. 272.

*Manatus Stelleri*, *Ozeretskowsky, Nov. Act. Ac. Petrop.* xiii. t. 13. f. (embryo).

*Rytina Stelleri*, *Illiger, Prodr.* 141; *Desm. N. Dict. H. N.* xix. 574;

*Reichb. Syn. Mamm.* 15; *Icon. Cetac.* t. 22. f. 69, from *Steller*;

*Anat. Cetac.* t. 25, from *Brandt*; *Alex. v. Nordmann, Beiträge zur*

*Kenntniss des Knochenbaues der Rhytina Stelleri, Helsingfors* 1861,

33 pp. and 5 tab.; *Act. Soc. Sci. Fenn.* vii.; *Arch. Naturg.* 1862,

153; *Nordmann, Paläontologie Süd-Russland's, Helsingfors* 1859-60,

328.

*Stellerus borealis*, *Desm. Mamm.* 510; *Lesson, Cétac.* 88; *Jardine, Nat. Lib.* viii. 307.

*Rytina borealis*, *F. Cuvier, Cétac.* 41.

*Rytina Stelleri*, *Lesson, N. Règ. Anim.* 155.

*Rhytina borealis*, *Brandt, Mem. Acad. Petrop.* 1846; *Symb. Sirenolog.*

141. t. 1-4 (skull), t. 5 (ideal figure); *Rousseau, Mag. Zool.* 1856, 199.

*Stellère, Cuvier, R. A.* i. 275; *Oss. Foss.* v. 256.

Whale-tailed Manate, *Penn. Quad.* ii. 292.

Inhab. Arctic Ocean. Behring's Straits. Skull (imperfect), Mus. St. Petersburg.

*a, b.* Two ribs from Behring's Straits. Received from the Museum of the Academy of Sciences, St. Petersburg.

Steller, who first discovered the *Rytina* during Behring's second expedition, in 1741, when ten months were passed upon Behring's Island, the only spot where this remarkable animal is known to have existed in recent times, estimated its numbers as then so large as to be sufficient to feed the whole population of Kamtschatka. But the hunters and adventurers following in Steller's track along the chain of the Aleutian Islands, who were in the habit of wintering on Behring's Island, and of provisioning their ships with these animals, made such havoc with them that, as we are informed by Sauer, in his narrative of Behring's third expedition, which remained five years in those seas, from 1789 to 1793, they were at that time totally extinct, the last known individual having been killed in 1768. (*Beer, Mém. Acad. St. Pétersb.* 1840, iii. 53, quoted *Nat. Hist. Rev.* 1865, 15; see also *Owen, Palæont.* 400.)

A skeleton, wanting the hand-bones, some of the caudal vertebræ, and the epiphyses of the shoulderblades, humerus, ulna, and radius, was discovered and dug up by two Aleutians and sent to the National Museum of Helsingfors, where it has been described and figured by Dr. Alexander von Nordmann.

According to Nordmann, there are three skeletons of this animal in Russia,—one at the Academy of Sciences at St. Petersburg, the second at the Museum at Helsingfors, and the third at Moscow. (See *Bull. Acad. Roy. Belgique*, xiii. 341, 1862.)

The Sea-ape, *Penn. Quad.* ii. 301 (*Trichecus Hydropithecus*, *Shaw, Zool.* i. 247; *Manatus Simia*, *Illiger, Abh. Berl. Akad.* 1813; *M.?* *Hydropithecus*, *Fischer, Syn.* 502, all from Steller), is perhaps another animal of this family, if it is not a Seal?



## ADDITIONS AND CORRECTIONS.

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After **Halicyon Richardi** (page 30), add:—

### Halicyon? Californica.

A Seal without ears, with large, pale rings, which are more or less confluent.

Inhab. California.

This Seal is thus described by Hutching.

The Hair Seal (*Phoca jubata*), *Hutching, Scenes of Wonder and Curiosity in California*, 189, fig.

“Inhab. California, near St. Francisco. Tarallone Islands.

“There are several kinds of Seal that pay a short visit to the Tarallone Islands at different seasons of the year, one of the most beautiful of which is the Hair Seal of the Pacific (*P. jubata*). This Seal, with which the coast of California abounds, is by no means rare, as almost all the coasts in high southern and northern latitudes abound with it” (p. 189). It has no affinity to the *Phoca jubata* of the Systematic Catalogue.

### Trichecus Rosmarus (p. 36).

Add to description of Morse:—

The Morse sits with its hind limbs bent forward, resting on its fore limbs with their ends bent outwards. The animal is represented in the proper attitude in old Danish plates, and in Cook's ‘Voyage.’ Buffon, misled probably by some animal-preserved, represents the body much elongated, and with the hind legs extended backward on the sides of the tail, like the general run of earless Seals. (See Hist. Nat. xiii. t. 54.) The Morse, which is an earless Seal, in this respect differs from the rest of the group, sits in the same manner as the eared Seals of the family *Arctocephalina* (p. 44), and in this habit seems to form a link between the two groups of Seals.

### Cystophora Antillarum (page 43).

Seal, *Hill's Jamaica Almanack*, 1843.

The Pedro Seal (*Phoca Wilkianus*), *Gosse, Nat. Sojourn in Jamaica*, 307, 308.

Inhab. Jamaica. Pedro Kays (*Willkie*, 1846).

“Cutting-teeth  $\frac{4}{4}$ , canines  $\frac{1.1}{1.1}$ , grinders  $\frac{5.5}{5.5}=32$ . The molars are five-lobed, and conical. Bristles numerous, strong, very flexible, of a

bluish hue, with transverse bars of grey. The colour of the back is an intense and uniform black. The hair is short and stiff, and extremely and curiously close. The palms of the flippers are bare. The fore paw has much more the form of a foot than of a hand, the first finger; answering to the thumb, being the longest. There are nails only on the fore paw, those of the hinder being rudimentary. The eyes are large, black, and full; the irides crimson, and small." (See Gosse, p. 309.)

"The measurements of this specimen were as follows, in feet and inches:—Total length along the back from the snout to the tail 4' 2", from snout to insertion of fore paw 1' 6", from insertion of fore paw to hind paw 2' 10"; breadth of back at fore paws 1', from one fore paw to the other 1', from one fore paw to the other extended 2' 6", of head across ears 7", of nose 4½"; length of fore paw 10", of hind paw 11", of head 9", of tail 3"; circumference of the body over fore paws 3' 2", at hind paws 1' 6"."

"One of the skins obtained by Mr. Wilkie was given to Mr. Gosse, and transferred by him to the British Museum. As the skull was not preserved, the actual identity of the species with the smaller specimen described by Mr. Hill cannot with certainty be established. The length of this skin from nose to tip of the tail is 6 feet 6 inches, circumference at the fore paw 3 feet 4 inches. Length of the fore paw 11½", of hind paw 10¾", of tail 2 inches." (See Gosse, p. 314.)

### Subfamily 5. ARCTOCEPHALINA (page 44).

These Seals, unlike those of the former groups, walk about more like other quadrupeds—that is to say, stand on the limbs, and use them (not the muscles of the abdomen) in progression. When walking they raise their body from the ground, resting on their limbs, the front limbs being erect to the wrist, with the hands bent out. When at rest, the hind part of the body is bent under, and the hind limbs are extended in front on the sides of the body.

The animals are represented at rest by Dr. Forster, who accompanied Captain Cook; and his figures were engraved by Buffon; but these figures scarcely prepare one for the great power possessed by these animals. I saw one lately alive at Cremorne Gardens, where it was erroneously called a "Sea-Bear."

Mr. Gould, in his 'Mammalia of Australia,' figures the *Arctocephalus lobatus*, probably from a stuffed specimen, resting in the same manner as the common earless Seal, with the hind limbs extended out behind on the sides of the tail—an attitude that was never assumed by the *Arctocephalus* exhibited at Cremorne; and indeed the articulation of the thigh-bones to the pelvis of this animal and the Morse shows that such an attitude cannot easily, if at all, be assumed by them. They have, unlike the earless Seals, a prominent scrotum.

### *Arctocephalus Monteriensis* (page 49).

The following is probably one of the Californian species of this

genus. Hutching's figure 1 represents the animal in the posture often assumed by the living specimen of the genus shown at Cremorne.

Sea Lion of the Turallone Islands, *Hutching, Scenes of Wonder and Curiosity in California*, 187, f. 1 & 2.

Inhab. California: St. Francisco. Turallone Islands.

"Upon the rock adjacent to the sea repose in easy indifference thousands, yes thousands, of Sea Lions (one species of the Seal), that weigh from one to five thousand pounds each. When we were within a few yards of them the majority took to the water, while two or three of the oldest and largest remained upon the rocks. 'standing guard' over the young calves that were either at play with each other or asleep at their sides.

"Most of these young Seals are of a dark mauve colour; but the old ones are of a light and bright brown about the head, and gradually become darker towards the extremities, which are about the same colour as the young calves'. Most of the male and young female Seals leave these islands during the month of November, and generally all go at once, returning in April or May the following spring, while the old females remain here nearly alone throughout the winter, a rather ungallant proceeding on the part of the males." —*Hutching, l. c.* 189.

#### *Otaria leonina* (page 59).

Buffon figured the Sea Bear and Sea Lion from the drawings of Dr. R. Forster, who accompanied Captain Cook in his voyage round the world. He also gives an account of their habits from Steller and Captain Cook's voyages. In his work the position and form of the ears, the peculiar structure of the feet, the external scrotum, and other particulars of the structure of the group are noted. Among other particulars of their habits, he states that the females lie on their backs on the sand of the shore when they receive the caresses of the males, that an old male heads each herd, which consists of several adult females and their young, and that the males fight fiercely among themselves to increase the number of the adult females in their herds.

Forster's drawings, copied by Buffon (Suppl. vi. t. 78), correctly represent the animals when at rest, with their hind feet bent forward; but they do not show the peculiarity (nor is it recorded in his notes) that the animal walks on the edge of the palm of the fore fin, with the fingers extended, raising the lower surface of the body from the ground. In this respect the eared Seal agrees with the Morse as figured by G. A. at Hessel in 1613, and by Captain Cook in his last 'Voyage.' (See Gray, Proc. Zool. Soc. 1853, 115, 116.)

There was exhibited at Cremorne, as a Sea Bear, an eared Seal; but it was not easy to determine the genus or the species, as it was not possible to examine its teeth and palate. The external colouring most resembled that of *Arctocephalus lobatus* from Australia; but the exhibitors said that it came from Cape Horn: if so, it was probably a small *Otaria leonina*. Unfortunately little reliance can be placed on

the statements of such people, as they seem to delight in making a mystery of the country from which they derived their specimen, probably fearing that some one else may procure one for exhibition. Thus all the specimens of the "Talking Fish," or Monk Seal (*Monachus albiventer*) of the Mediterranean and Madeira, are always said to be brought from South America. Very good figures of this animal, in various attitudes, and an amusing account of its manners, are given by the Rev. J. G. Wood in the 'Boys' Own Magazine,' vi. 213, 1865.

**Balæna Mysticetus** (page 81).

There is a beautiful skeleton of an adult female (a full-formed foetus was taken from the womb) in the Museum of the Royal College of Surgeons.

Mr. Flower informs me that this skeleton entirely invalidates the late Professor Eschricht's observations on the distinction between the skeleton of the male and female whales; but it is to be observed that Professor Eschricht never saw the skeleton of the adult female.

The figure of the "Bonnet of the Whale," at page 95, is unfortunately, as it was also in the 'Proceedings of the Zoological Society,' 1864, 170, placed wrong side upwards, the straight upper edge being the one affixed to the skin of the head of the whale, a portion of the skin still adhering to the bonnet.

Fig. 73.



**Balæna Sieboldii** (page 96).

Mr. Joseph Allen, of Stoke Newington, has a Japanese work, in two volumes, on whale-fishing in those waters. The first volume contains an account of the way in which whales are caught on the coast of Japan, with plates of the boats, nets, and the manner of boiling out the oil from the blubber and the bones, which they seem to chop up for the purpose. The second contains an account of the anatomy of the Right Whale and the Long-finned Whale, and of the apparatus used in whale-fishing, illustrated with figures of the bones, viscera, and of the barrels, knives, and harpoons used in the fishery, the figures of the knives and harpoons being the size of the instruments used.

**Caperea antipodarum** (page 101).

There is a nearly complete but not articulated skeleton, of a whale taken on the coast of New Zealand, in the court of the Museum of Comparative Anatomy at Paris, which M. Serres has named *Balæna australis*; but Professor Lilljeborg observes that "it is an entirely different species, and without doubt the *Eubalæna antipodarum* of Gray. The bladebone is of a very distinctive form, and has the rudiment of an acromion. The ear-bones are lost." The bladebone, according to the drawing that M. Lilljeborg sent to me, "is triangular, as wide at the upper end as the length of the bone, and the rudimentary acromion is a small protuberance about one-third from the upper edge."—*Letter from Professor Lilljeborg, 1865.*

The beautiful preserved skeleton, with all its whalebone, in the Paris Museum, which was prepared by a Captain of the French Navy on the coast of New Zealand, greatly resembles the skeleton of the Cape whale described by Cuvier as *B. australis*. It has the smaller head, square nasal bones, and simple (not forked) first rib of that animal. In the latter respect it differs entirely from the skeleton of *B. australis* in the Leyden Museum.—*W. Flower's Notes, Oct. 1865.*

**MACLEAYIUS** (pages 78 and 103).

It appears from further information and additional photographs that I have received from Mr. Krefft, that I misunderstood his letter and the photograph; and the section that I have formed in the family *Balænidæ* for a genus with a separate atlas, and the observations I have made on it, are all a mistake: the atlas bone is entirely soldered to the rest of the mass, as in other *Balænidæ*. This is to be regretted; but still the form of the atlas is so distinct from that of any other known genus of *Balænidæ*, that I believe the Australian Right Whale will be a distinct genus, to which the name *Macleayius* may be properly applied, and it is no doubt a true *Balænida*.

Mr. Krefft has sent the two following figures (p. 372) to further illustrate the mass of cervical vertebræ to which the name *Macleayius Australiensis* has been attached.

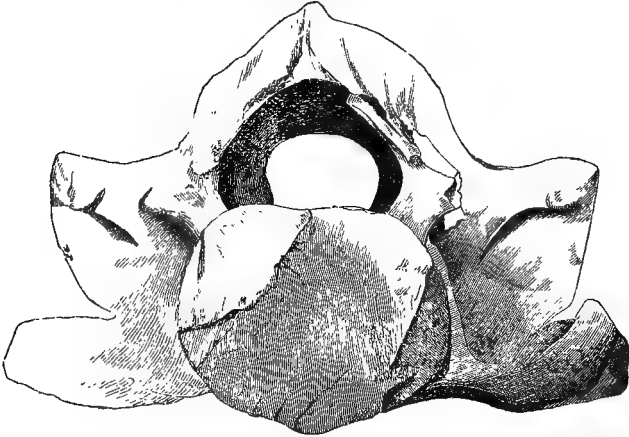
The additional photographs confirm the opinion that the cervical vertebræ are allied to those of the family *Balænidæ*—so much so that, if Mr. Krefft had not sent it to me figured with separate atlas placed in front, I should have believed that the mass was the atlas and cervical vertebræ of a *Balænida* agglutinated in a single body, as is usual in that family.

This similarity did not strike me so forcibly until I saw these additional views, especially the one that shows the hinder part of the lateral processes of the anterior cervical vertebra of the mass, fig. 74.

In describing from drawings and photographs, one labours under considerable difficulties; yet such is the extraordinary absence of knowledge on the subject of the larger whales, that it is better they should be noticed and figured until more complete skeletons can be obtained.

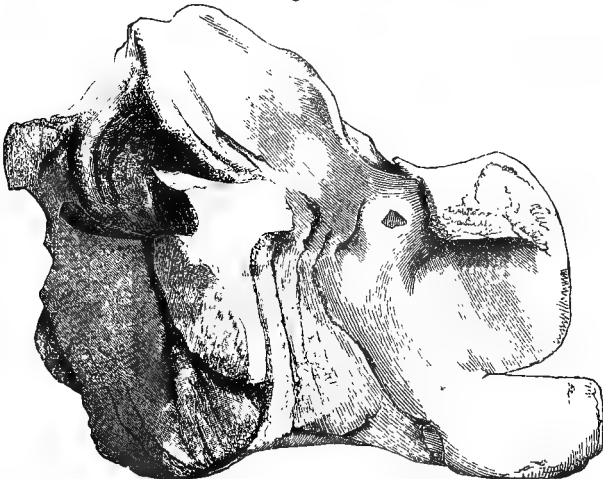
Species described from photographs of bones are at any rate much better established than the many of Dolphins and Whales which the French zoologists have described from figures taken when the animals were swimming in the sea at a greater or less distance from the ship, which encumber our catalogues; for they are described from tangible natural bodies that can be identified when more perfect specimens are obtained.

Fig. 74.



"The back view of the mass, the atlas ankylosed to the other cervical."

Fig. 75.



"An oblique view of the mass, from the same specimen."

The atlas vertebra (which is represented in front of the mass) is very unlike the atlas of any other known genus, as stated in my former paper: it is characterized by its broad, extended, and truncated lateral processes arising from the middle of the sides of the body, and especially by the neural arch being broad, and furnished with a high, sharp keel produced into a spine on the middle of the hinder part of the upper edge.

The second and third cervical vertebræ have thick, short, blunt upper and lower lateral processes, far apart on the upper and lower parts of the body. The two upper ones are anchylosed together into a mass; the two lower ones are separated at the end, thick, prominent, rounded at the sides, and seem, in the front view (fig. 10), to project under the lateral processes of the first cervical vertebra. The fourth, fifth, sixth, and seventh cervicals are thin, and have very thin lanceolate upper lateral processes, which are anchylosed together and are partly free down the sides of the bodies of these vertebræ. The lower lateral processes are rudimentary, only prominent tubercles. The first and second dorsal, as in *Balæna*, seem to be more or less anchylosed to the cervical vertebræ.

The united vertebræ have peculiar characters which separate them from the cervical vertebræ of any *Balænida* known, so that they indicate a new form of Right Whale.

**Megaptera longimana, var. MOOREI** (page 122).

The skeleton of the specimen which was taken in the estuary of the Dee, 1863, has been mounted, and is exhibited in the Free Museum at Liverpool.

**Poescopia Lalandii** (page 126).

Professor Van Beneden (Bull. Acad. Royale de Belgique, xviii. 1864) has published an essay to prove that the Cape Humpbacked Whale is a distinct species from the Greenland Long-armed Whale. He has described and figured some of the peculiarities; but he has overlooked the fact that the presence of the "bosse" or hump was recognized by the early whalers, and Dudley, in the middle of the last century, called them "Bunch or Humpbacked Whales:" he seems to believe that Professor Eschricht discovered it. It was extraordinary that so accurate an observer as my late friend Professor Eschricht did not observe the difference between the skeletons described and figured by Rudolphi and himself and the figures of the bones of the Cape Long-armed Whale figured by Cuvier.

**Eschrichtius robustus** (page 133).

*Eschrichtius robustus*, Gray, P. Z. S. 1865, 42 (figure of vertebra).

Mr. Pengelly has kindly informed me that a second cervical vertebra of this whale was picked up, washed ashore at Babbicombe Bay, early in June 1865.

**Physalus antiquorum** (page 144).

Dr. Murie, in Proc. Zool. Soc. 1865, 206, gives some details of the anatomy of this species, with figures.

A specimen, apparently of this species, was cast ashore on the beach at Pevensey in November 1865. Mr. W. Flower, who went to examine it, informs me "it is 67 feet long; the baleen is very light-coloured, almost like that of *Balænoptera rostrata* on the inner hairy side, but slate-coloured externally." The cuticle is nearly all off, and it smells abominably.

Professor Lilljeborg informs me there is a stuffed skin and the skeleton of a young common Finner (*P. antiquorum*), taken at the mouth of the Seine in 1847, in the Paris Museum, which is 14 metres (above 40 feet) long. The lateral process of the second cervical vertebra in this specimen has the two lobes united so as to form a ring on one side, and the lobes truncated and separate on the other, "as in *Benedenia*."

This form of the second cervical is to be observed in all the young specimens of *Physalus*; but that does not prove that *Benedenia* is a young *Physalus*.

After the remarks on **Physalus Duguidii**, (at page 160) add:—

\* *The lateral rings of the cervical vertebræ as long as the diameter of the body of the vertebræ.*

1. *P. antiquorum*, p. 144.

2. *P. Duguidii*, p. 158.

\*\* *The lateral rings of the cervical vertebræ shorter than the diameter of the body of the vertebræ.*

**3. Physalus Patachonicus.**

The neural canal almost half as wide as the diameter of the body of the vertebræ. The lateral processes of the atlas subcentral, sub-cylindrical, blunt. The rings of the second, third, and fourth cervical vertebræ shorter than the diameter of the oblong bodies. The upper lateral processes of the sixth cervical bent down.

*Physalus Patachonicus*, *Gray*, *P. Z. S.* 1865, 190.

*Balænoptera Patachonica*, *Burmeister*, *P. Z. S.* 1865, 195; *Ann. & Mag. N. H.* 1865, xvi. 59. f. 1-11 (figures of bones).

Inhab. River Plata. Museum of Buenos Ayres.—*Burmeister*.

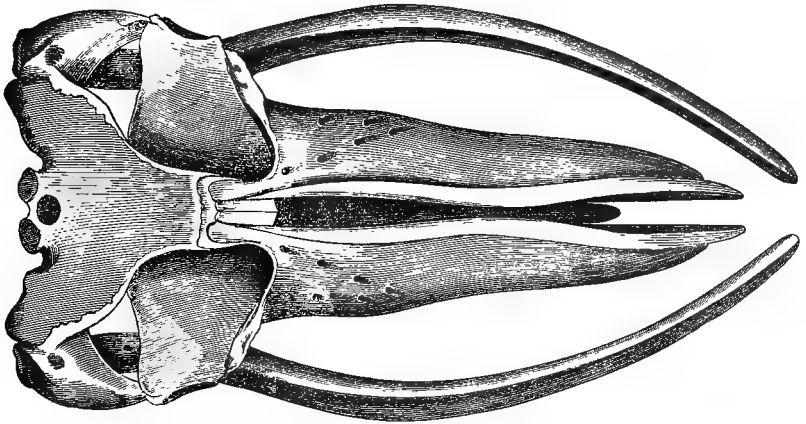
"I now send you drawings of the Whale in the Buenos Ayres Museum, drawn by myself, and, as I believe, exact to nature.

"Fig. 76. The skull. We have two specimens—one complete, the other consisting only of the hinder part, without the jaws. In the former the upper jaws are no longer in position, but separated from the cranium, and therefore little importance can be attached to the width of the opening between the intermaxillary bones in the anterior part of the cleft between them; it may be somewhat ex-



aggerated. All the other parts are entirely exact from nature, and well preserved.

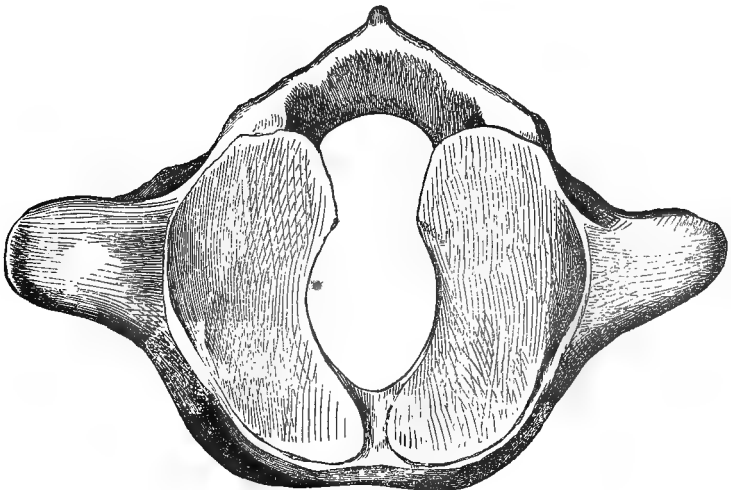
Fig. 76.



Skull seen from above.

“Length of the intermaxillary, 7 feet 2 inches; length of the maxillary, 7 feet; length of the under jaw, 10 feet 2 inches. Breadth of the frontal bones between the orbits, 5 feet; breadth of the vertex behind, 2 feet 8 inches.

Fig. 77.

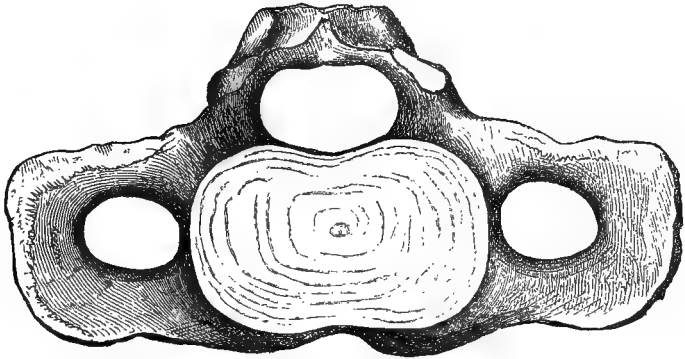


First cervical vertebra.

“The baleen is entirely black, without any other colour. We have two kinds in the Museum—one  $5\frac{1}{2}$  feet, and the other 1 foot 8 inches in length. This last only may be from the *Balænoptera*; the other perhaps from a *Balæna*, because it is much more slender and more fringed.

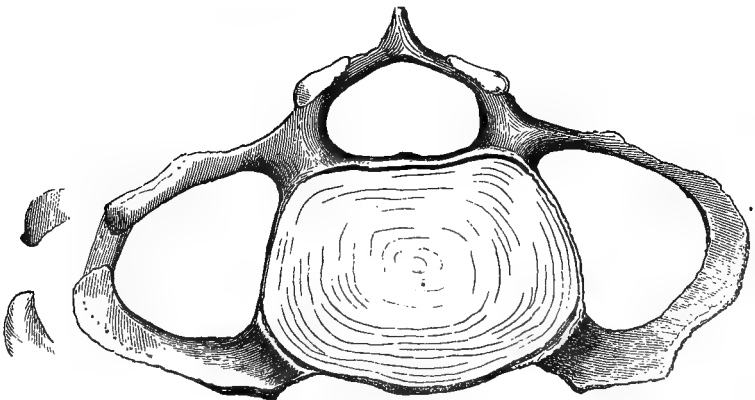
“Comparing my drawing (fig. 76) with that of Cuvier from the Cape *Balænoptera* (Oss. Foss. pl. 26. fig. 2), you will find that the suture between the frontal bone and the parietal is situated much

Fig. 78.



Second cervical vertebra.

Fig. 79.



Fourth cervical vertebra.

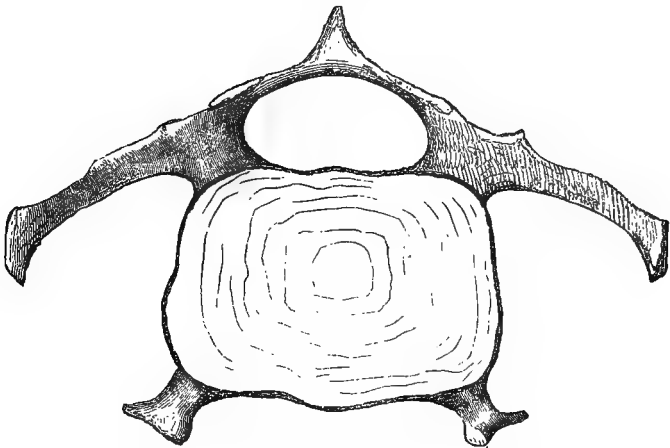
more towards the external part of the frontal bone, being in my skull exactly in the angle where both bones are united, and therefore not seen from above in my drawing. Another difference of the species

is indicated by the longitudinal carina in the vertex of the Cape species, there being no trace of such carina in either of my specimens.

“Unfortunately the tympanic bones are wanting in both, and I can tell you nothing of them. But the zygomatic bone is preserved, and is of the same form as that figured in Cuvier’s work, figs. 1 and 3, but somewhat smaller than the latter figure.

“The seven cervical vertebræ are free, separate from each other, and the body of every one has the epiphyses on each side, the specimen being that of a young individual. But in the atlas and front side of the axis these epiphyses do not exist. I send you drawings of the first (fig. 77), the second (fig. 78), the fourth (fig. 79), and the sixth (fig. 80)

Fig. 80.



Sixth cervical vertebra.

vertebræ: the third exactly resembles the fourth; and the fifth only differs in a small opening in the lateral arc, indicated in my drawing of the fourth, on the left side. The seventh has no inferior process at all, but a much stronger superior one, of the same form. All the five vertebræ after the second are very thin, 2 inches in diameter,—the third being the thinnest of all, and the following ones somewhat thicker; the seventh is  $2\frac{1}{4}$  inches in thickness.

“Of costal or dorsal vertebræ we have fourteen, very well indicated by the flattened ends of the transverse processes being united with the ribs. The first of these dorsal vertebræ is very thin, 3 inches in diameter; and the second somewhat thicker,  $3\frac{1}{2}$  inches; after these the bodies are much stronger, from 6 to 8 inches in diameter. The three first dorsal vertebræ have transverse processes more rounded, and directed forward. After the third they are more flat and broad, and directed transversely to the sides. After these fourteen vertebræ follow twelve others with thinner transverse processes, rounded and

sharp at the end, and with bodies of much larger diameter—from 10 to 12 inches. Then follows a strong vertebra, the thirteenth, 12 inches in diameter, with a smaller and shorter transverse process, which seems to me the first caudal; but as the epiphysis is wanting, there is no attachment for the hæmapophysis on its hinder end. Indeed its body is flattened on the under side, not carinated as the body of the antecedent; which also seems to me to prove that it is the first caudal. Of hæmapophyses we have four in the Museum, of unequal size, the first 5 inches high, the largest 8 inches, and 3 to 4 inches broad between the laminæ.

“The ribs are not perfect as regards number, but the first seven or eight are preserved. I send you drawings of the upper and lower extremities of the first four (figs. 81–84).

Fig. 81.



Fig. 82.

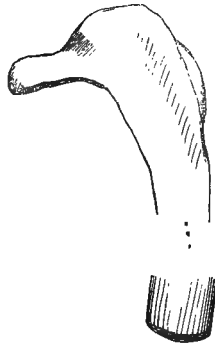


Fig. 83.



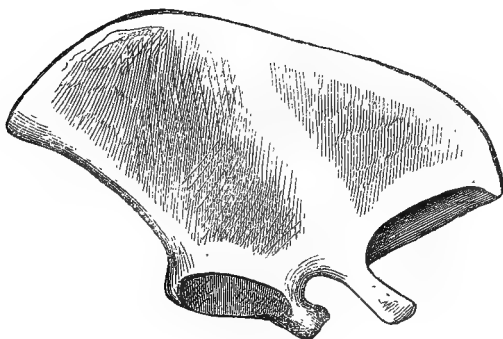
Fig. 84.



“The sternum is wanting; and of the os hyoideum we have only the corpus, of precisely the same form as that figured in Cuvier’s *Oss. Foss.* pl. 25. f. 14.

“Of the pectoral fin we have only the scapula, of which I send you a drawing (fig. 85); both processes are well developed and somewhat compressed.

Fig. 85.



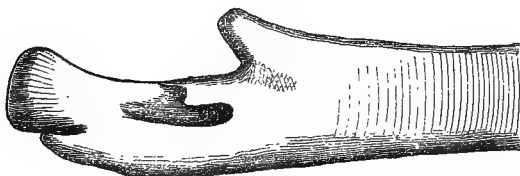
Scapula.

“The animal was found some leagues from Buenos Ayres, on the banks of the river Plata, where it came ashore some thirty years ago. It was brought to the gardens of Rosas, at Palermo, where the skeleton was exhibited a long time, till, after the fall of the tyrant, it was transferred to the Museum. The parts now deficient were then lost.

“I suppose that the species might be the same as that you have indicated in your synopsis as *Balænoptera australis*, Desmoulins (Voy. Ereb. and Terror, Mamm. p. 20); but as I have never seen that animal, I am unable to speak concerning its external appearance. Therefore I believe it is better to describe the species in question under a new name, and I propose to you, if you please to accept it, that of *Balænoptera patachonica*.”

“P.S.—I have told you nothing of the under jaw of *Balænoptera patachonica*, because the surface of the bone is much destroyed by long exposure to the air, rain, and sun; but the hinder part, with the coronoid process, is represented in fig. 86.”—*Burmeister, Proc. Zool. Soc.* 1865, 191–195.

Fig. 86.



**Physalus Sibbaldii** (page 160).

Section \*\*\* of the genus, and the description of *Physalus Sibbaldii*, are to be removed, as Mr. Flower, who has examined the skeleton at Hull, has determined that it is either the same species as, or very nearly allied to *Cuvierius latirostris*, p. 165.

**Cuvierius latirostris** (page 165).

Change name to *Cuvierius Sibbaldii*, and add:—

*Physalus Sibbaldii*, Gray, P. Z. S. 1847, 92; *Catalogue of Seals and Whales*, 160; Flower, P. Z. S. 1865, 472.

Mr. Flower, in the 'Proceedings of the Zoological Society,' 1865, p. 472, observes that the skeleton on which Dr. Gray established *Physalus Sibbaldii*, preserved in the museum of the Literary and Philosophical Society of Hull, is quite distinct from the common Fin-Whale (*Physalus antiquorum*, Gray), and agrees very closely with the skeleton at Utrecht (now in the British Museum) which he described under the name of *Physalus latirostris* (P. Z. S. 1864, 410), and states that he proposes to "withdraw the specific name of *latirostris* in favour of the prior one given by Dr. Gray."

He gives a sketch of the principal characters, showing where the Hull skeleton agrees with and differs from that of *Physalus antiquorum*. The Hull and Utrecht skeleton are nearly in the same stage of growth. The general size and proportions of the two specimens very nearly correspond, the Hull one being rather the largest; it is stated to have the total length of 47 feet, the cranium being 10½ feet; while the Utrecht specimen is about 43 or 44 feet, the skull being 9 feet 10 inches. If full-grown the specimens would probably reach the length of 60 feet, being rather less than that of *P. antiquorum*.

Both skeletons have 64 vertebræ; in *P. antiquorum* the vertebræ never appear to exceed 62. The foramen in the transverse process of the axis is smaller in the Hull than in the Utrecht specimen—probably only an individual variation.

The rostral portion of the skull is not quite so wide in proportion in the Hull as in the Utrecht specimen; the breadth across the middle of the beak in the latter is to the length of the skull as 27 to 100, in the former as 26 to 100. The actual breadth (measured across the upper surface following the curve) in the Hull specimen is 33 inches, each maxillary being 10 and the premaxillary 5 inches, the space between the latter 6 inches. The nasal bones in both skeletons differ from *P. antiquorum* in being slightly hollowed on the upper surface at the anterior margins. This character is most strongly marked in the Hull specimen.

The *stylo-hyals* are thicker, especially near the lower end, in both the skeletons than in the common Fin-Whale.

The *sternum*, which is so remarkable in the Utrecht specimen for its almost rudimentary state, is wanting in the Hull specimen, but may have been overlooked from its small size. The Hull specimen has 16 ribs: if this is the normal number in the species, it is a good specific character, as *P. antiquorum* has never been recorded to have

more than 15. The first rib in both the Hull and Utrecht specimens differs from *P. antiquorum* in wanting a well-developed capitular process. In the Utrecht specimen this process is present in the second, third, and fourth ribs—longest in the third. In the Hull specimen it is found in the second, third, fourth, fifth, and sixth ribs, being longest in the third and fourth. In *P. antiquorum* it is usually longest in the second, and obsolete in the fourth.

The *phalanges* of the digits in both skeletons are articulated artificially, and yet they correspond exactly in number and arrangement, except that the Hull specimen has an additional bone on digit III. The numbers are, II. 4; III. 5 (Utrecht), 6 (Hull); IV. 5; V. 3,—an arrangement somewhat different from that of *P. antiquorum*. One of the most striking and characteristic differences in this part of the skeleton is the greater length of the metacarpal bones and phalanges, which in both the Hull and Utrecht specimens, not only relatively but even actually, exceed those of the full-grown *P. antiquorum* of 70 feet in length.

The *baleen*, which is not preserved in the Utrecht specimen, in the Hull specimen is in excellent condition, and shows a striking difference from that of the common Fin-Whale in being of a uniform deep black, instead of dark olive-brown or horn-colour variegated towards the ends of the series with patches and stripes of a lighter colour.

After description of *Sibbaldius Schlegelii*, (at page 186) add:—

***Sibbaldius? antarcticus.***

*Sibbaldius antarcticus*, *Burmeister, Proc. Zool. Soc.* 1865.

Inhab. coast of Buenos Ayres, near the mouth of the river Salado. (Bladebone in Mus. Buenos Ayres.)

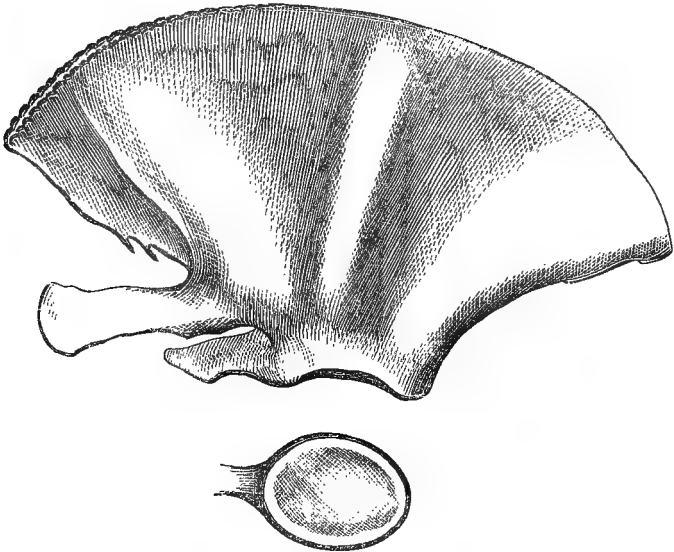
The bladebone (the only portion of the skeleton saved) flat, nearly one-third of a circle, half as high as broad; the outer margin is regularly curved, with an indication of an obtuse angle on the hinder part of the circumference; towards the glenoid cavity it becomes much thicker, and has here the thickness of the diameter of the glenoid cavity. The outer surface is somewhat excavated, with the indication of an obtuse radial crest on the beginning of the hinder half. The inner surface is flatter, and has five large and three short, obtuse, radial, elevated lines. The front margin is thin, with the indication of an obtuse angle in the upper half, and under that angle are two descending small spines. The hinder margin is somewhat curved to the interior, but more straight in the middle of its course.

The acromion is a very large, compressed process, which is somewhat broad and rounded at the end, and with two obtuse humps on the under margin near to the base. The upper margin is very short, and continued on the outside of the bladebone as a sharp, prominent crest. The coracoid process is only half the size of the former, and obliquely truncated at the end. The glenoid cavity is a broad ellipse,

14 inches long and 11 inches wide, but somewhat more curved on the outer than on the inner side.

The bladebone is 6 feet broad from before backward, and 3 feet high from the glenoid cavity to the upper margin. The acromion is 1 foot  $7\frac{1}{2}$  inches long and  $7\frac{3}{4}$  inches broad. The coracoid process is 11 inches long and 5 inches broad. The acromion is 7 inches broad in the middle, and 9 inches at the end, before the curved margin.

Fig. 87.



After generic description of **BALÆNOPTERA**, (at page 188) add:—

Subgenus 1. *The lower lateral processes of the third to the seventh cervical vertebræ with an angular projection on the lower edges.* Fabricia.

At the end of remarks on **Balænoptera rostrata**, (at p. 194) add:—

Subgenus 2. *The lower lateral processes of the third to the sixth cervical vertebræ slender, regularly curved, without any prominent angle on the lower edges.* Swinhoia.

## 2. **Balænoptera Swinhoei.**

Inhab. sea near Formosa.

a. Part of the skeleton, viz.:—Upper maxillary bone, left side (the upper surface is 6 feet 6 inches, under edge of the same bone 7 feet 8 inches); three cervical vertebræ; eight dorsal vertebræ,



seven of which are more or less imperfect; eight ribs, all with simple heads.

Mr. Swinhoe has sent to the British Museum part of the head, three cervical vertebræ, the first and seven other dorsal vertebræ, and eight ribs of a large Finner Whale which was thrown ashore on the coast of Formosa. The bones are nearly of the size of similar bones of the European Finner (*Physalus antiquorum*), which often reaches to the length of 60 or 70 feet, and they most probably belong to an animal nearly of that size.

The second and third cervical vertebræ are united, as in the small Finner (*Balænoptera rostrata*) of Europe, while in all the larger Finners which are as yet known these two bones are always free.

Fig. 88.

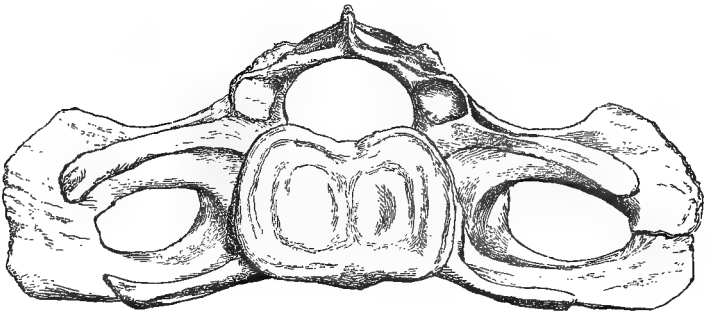


Fig. 89.



Fig. 88. Back view of the second and third cervical vertebræ united by the neural arches.

89. Side view of the same vertebræ.

This union of the second and third cervical vertebræ is one of the characters by which the genus *Balænoptera* is separated from the genus *Physalus*. The front part of the neural canal has the sub-

circular form of that in the genus *Balænoptera*, and not the transversely oblong form of the neural canal in *Physalus*. I am therefore inclined to refer these bones to the genus *Balænoptera* until we are able to know more of the skeleton and the external form of the animal.

Fig. 90.

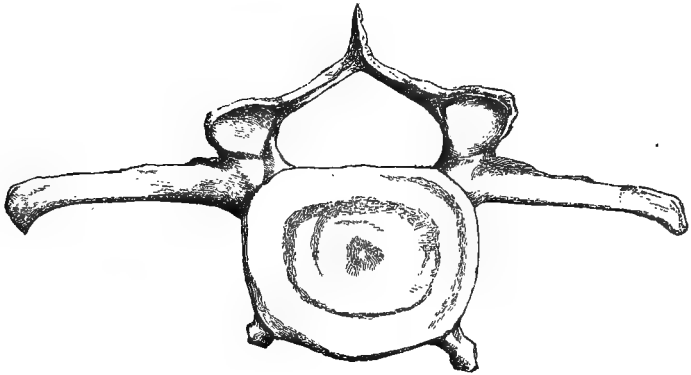


Fig. 91.



Fig. 90. The back view of the sixth or seventh cervical vertebra.  
91. Side view of the same vertebra.

I am, however, inclined to believe that when the animal and its skeleton are better known it will be found to have some particular characters (as the form of the bodies of the vertebræ), since the lateral processes show some alliance to the genus *Physalus*. It is to be regretted that the number of the vertebræ, the form of the lumbar vertebræ, and the form of the first ribs were not observed; and they are all required to determine with certainty to what genus the animal

must hereafter be referred. It may for the present be designated *Balenoptera Swinhoei*.

Fig. 92.

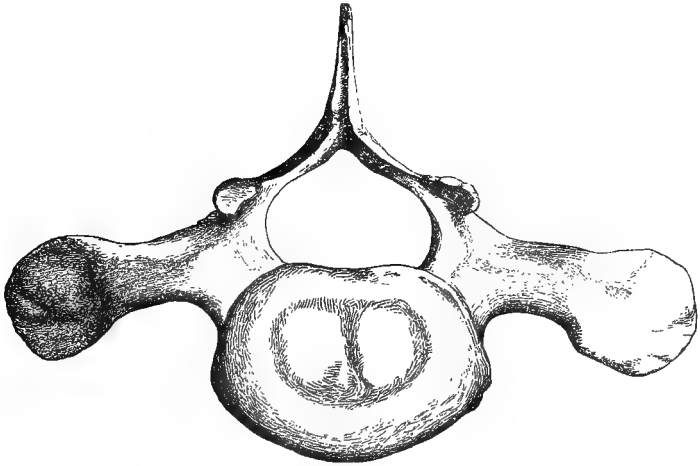


Fig. 93.



Fig. 92. The back view of the first dorsal vertebra.  
93. Side view of the same vertebra.

The second and third cervical vertebræ are united by the ankylosis of the neural arches. The second cervical vertebra has large, broad, truncated lateral processes with a large, oblong, subcentral

perforation; the lateral processes are each two-thirds of the transverse diameter of the articulating surface of the body of the vertebræ. The neural canal of the second cervical vertebra subcircular, rather less high than broad, and not quite so wide as half the diameter of the front surface of the body of it. The third cervical vertebra has a thin, oblong, transverse body, which is broader than high; the lateral processes are slender, truncated at the end, not so long as the transverse diameter of the body, curved towards each other at the end, but not united so as to form a ring. The neural canal of the third cervical vertebra is oblong transverse, rounded above, as wide as half the transverse diameter of the body of the vertebra, and about one-third broader than high. The rest of the cervical vertebræ are free, not ankylosed either by the body or neural arch. The sixth or seventh cervical has a thin body, with slender, nearly straight upper lateral processes, and only a very short tubercle on each side below. The first dorsal vertebra has a very high dorsal spine; a rather small, oblong body, and a strong lateral process on each side above, which is expanded at the end. The eight ribs have simple heads.

These bones seem to show an animal three times as large as the *Balenoptera rostrata* of Europe.

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### CATODONTIDÆ (page 195), add:—

While the Catalogue has been going through the press much new information respecting these animals has been received, especially the knowledge of the animals of two species of *Kogia*, showing its affinity to the *Physeter* of Sibbald, and of a new genus of Sperm Whale, and the opportunity of examining the skeleton of a Sperm Whale from the west of Scotland and of one from Australia.

In the place of the Synopsis of the Genera at p. 195, substitute:—

- I. *Head compressed, truncated in front. Blowers in front of the upper part of the head. Skull elongate. Dorsal hump rounded. Pectoral fin short, truncated. Catodontina.*
  1. CATODON. The atlas oblong, transverse, nearly twice as broad as high; the central canal subtrigonal, narrow below.
  2. MEGANEURON. The atlas subcircular, rather broader than high; the central canal circular, in the middle of the body, widened above.
- II. *Head depressed, rounded in front. Blowers at the back of the forehead. Mouth small, inferior. Dorsal fin compressed, falcate. Pectoral elongate, falcate. Physeterina.*
  3. PHYSETER. Head large, elongate, rather depressed in front.
  4. KOGIA. Head moderate, blunt, and high in front. Skull short and broad. The septum that divides the crown of the skull very sinuous, folded so as to form a funnel-shaped concavity.
  5. EUPHYSETES. Head moderate, blunt, and high in front. Skull short and broad. The septum that divides the crown of the skull simple, longitudinal, only slightly curved.

At page 196, add to characters of Section I. :—

*The pectoral fin short, broad, truncated. The deep cavity on the crown of the skull surrounded by perpendicular walls formed by the doubled-up maxillaries and occiput. Catodontina.*

Add to generic characters :—

The atlas oblong, transverse, nearly twice as broad as high ; the central canal subtrigonal, narrow below (see fig. p. 207).

The cervical vertebræ in *Catodon* are united into a single mass by their bodies, the neural arch, and the lateral processes. The lateral processes of the anterior vertebræ are produced, and form a thick, subconical, triangular prominence on each side of the mass ; the front surface is nearly flat ; and the lateral processes of the hinder vertebræ are shorter and shorter to the last. The hinder surface shelves from before backwards, and is arched over with some conical prominences, which indicate the lateral processes of the different vertebræ of which the mass is formed. The first dorsal vertebra is sometimes partially anchylosed with the seventh cervical vertebra. The arm-bones are very short.

**Catodon macrocephalus** (page 202), add to synonyms :—

*Physeter macrocephalus*, *Murie, P. Z. S.* 1865, 390. f. 1, 2 (figures of deformed lower jaws).

The skeleton in the Paris Museum, which was purchased in London, appears to be made up of the bones of several animals, as it has more vertebræ and ribs than any of the skeletons which have been prepared from a single specimen. It is very imperfect in other respects, wanting the phalanges, &c.

The British Museum has received the skeleton of an adult Sperm Whale that was cast ashore at Wick, on the coast of Scotland.

The Museum of the Royal College of Surgeons has received the skeleton of a Sperm Whale taken on the coast of Australia.

Mr. Flower, from the examination of the skeleton at Burton Constable, the one from Scotland in the British Museum, and the one from Australia in the Royal College of Surgeons, believes that they are most probably all one species. The Sperm Whale is essentially an inhabitant of the tropical seas ; the specimens which reach the shores of Europe and the Southern Ocean are probably only stray animals thrown out of their usual course by accidental circumstances ; and this explains why they only occur at distant periods.

After end of *Catodon* (page 210), insert :—

## 2. MEGANEURON.

Animal unknown.

The atlas is thin, high, being only about one-fourth wider than it is high ; the lower and lateral margins are arched, the lower edge being the most so. The neural arch is low, transverse, with a nearly

straight lower edge; it is thickest in the middle. The upper surface is shelving on the sides, with an angular central prominence. The central aperture is very large, nearly circular, and dilated above into an oblong transverse aperture, which is rather wider than the widest part of the central circle. The front articulating surface is horseshoe-shaped, continued to the upper outer angle, and obliquely shelving off on the upper edge to the base of the oblong part of the aperture. The articulating surface of the hinder side is similar; but the articulating surface is shorter at the sides, and transversely truncated in a line with the middle of the upper, oblong, transverse opening (figs. 94, 95).

Meganeuron, *Gray, P. Z. S. 1865, 440.*

Inhab. Australia.

Fig. 95.

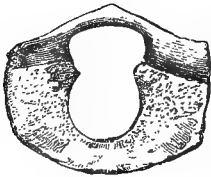


Fig. 94.

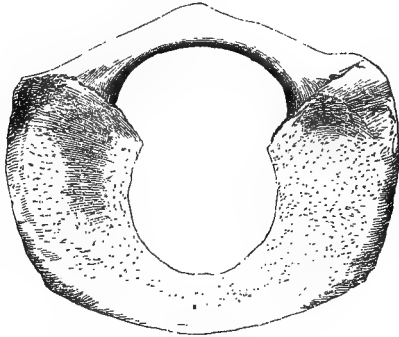


Fig. 94. Front of atlas of *Meganeuron Kreffii*.  
95. Hinder side of ditto (reduced).

“In a letter which I lately received from Mr. Gerard Krefft, the intelligent Secretary and Curator of the Australian Museum, he sent me some photographs (taken like those he formerly sent by Mr. Henry Barnes) of a separate atlas vertebra and of the second and other cervical vertebræ united into one mass of a species of whale, which are contained in the museum under his charge. The two bones, though not united, fit one another so exactly that Mr. Krefft has no doubt of their having belonged to the same animal; and the photographs sent justify this conclusion. However, should there be any mistake in this matter, it will not in the least invalidate the conclusion that I have come to, from the examination of these photographs, that they indicate the existence of a second species of Sperm Whale in the Australian seas, very distinctly characterized by the subcircular form of the atlas vertebra and of the neural canal in it.

“The mass formed by the second and other cervical vertebræ is somewhat similar to these bones in the skeleton of the Australian

*Catodon* lately received by the Royal College of Surgeons, which I hope will shortly be described by Mr. Flower, the energetic Curator of their Museum, who, in his late paper on the *Balanidæ*, has shown how well he can describe and determine the species of whales."—*Gray, P. Z. S.* 1865, 439.

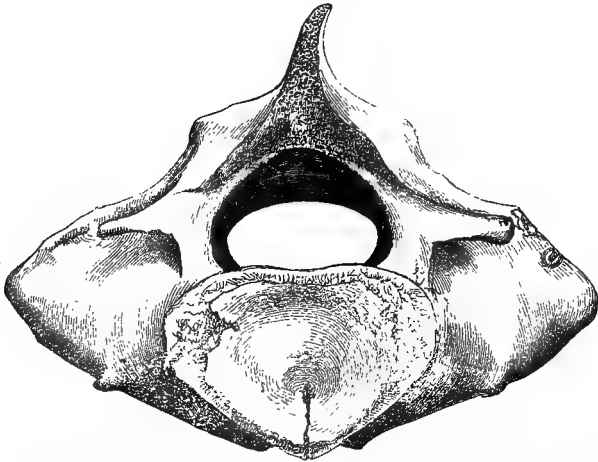
Mr. Krefft seems to have changed his mind on this subject; for in a letter just received, containing further remarks on these photographs, and some additional ones, he names the mass of vertebræ as belonging to *Catodon australis*.

### Meganeuron Krefftii?

"The second and other cervical vertebræ are all united together into one mass, ankylosed by their bodies, lateral processes, and neural arches. The neural arches form a triangular mass, which is strongly keeled on the central line; and the keel is stronger and produced into an acute point at the hinder end (figs. 96, 97).

*Catodon* (*Meganeuron*) *Krefftii*, *Gray, P. Z. S.* 1865, 440.

Fig. 96.



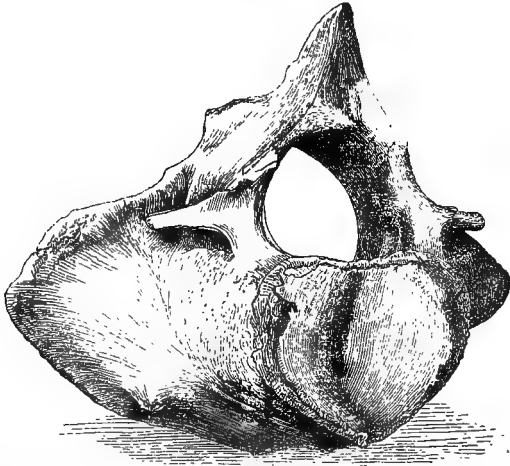
Hind view of cervical vertebræ of *Meganeuron Krefftii*? or *Catodon australis*.

"The lateral processes of the second, third, and fourth vertebræ are produced and united into a broad, thick, angular process, which is expanded at the side, giving the united mass a rhombic appearance, the width of the side being about one-fourth more than the height of the mass.

"There is a tubercle, which is most probably the end of the lower lateral process of one of the anterior cervical vertebræ, at the lower part of the hinder side of the front lateral expansion.

“The three hinder vertebræ have no distinct lower lateral processes; their place is only marked by three slight ridges on the lower edge of the hinder side of the mass. The upper lateral processes of the hinder cervical vertebræ are small, slender, forming a strap-like section, rather tapering towards and truncated at the tips on the side of the apertures for the passage of the nerves for the neural canal. The neural canal is rather large, oblong transverse, the height being about two-thirds of the width; it is rather larger and higher behind.

Fig. 97.



Side view of the hinder side of the cervical vertebræ of *Meganeuron Krefftii*? or *Catodon australis*.

“The hinder surface of the body of the last cervical vertebra is oblong transverse, about two-thirds of the height of its width at the widest part; the lower edge is rounded and rather angularly produced in the centre, and the upper margin transverse, with a slight central depression; the surface is concave, with a central, linear, perpendicular depression.”—Gray, *P. Z. S.* 1865, 440-442. .

Page 210, add to characters of Section II. :—

*The pectoral fin elongate, subfalcate. The cavity on the crown of the head situated backward, formed by the maxillaries, and divided as it were into two equal parts by a central bony ridge, which is more or less twisted towards the right side of the head. Physeterina.*

The larger-headed genus *Physeter* has only been found in the northern, and the shorter-headed genera *Kogia* and *Euphysetes* in the southern hemisphere.



4. **KOGIA** (page 215).

Substitute for generic characters:—

The animal will be described by Professor Owen, and is described by Mr. Krefft.

The subcentral longitudinal ridge of bone that divides the concavity of the crown into two parts is very sinuous, folded so as to form a central funnel-shaped concavity. Beak as long as broad at the base.

The atlas vertebra ———.

*Kogia*, Gray, *Proc. Zool. Soc.* 1865, 529.

Mr. MacLeay objects to the "barbarous" name of *Kogia*; but there is no generic name that cannot be objected to when a person wants to give a new one of his own. I have been asked, what does *Euphysetes* mean? should it not have been *Euphyctes*, with a *c*? It is often thus with names that are intended to have a classical derivation; the purist thinks the name is not well composed (in this way a large number of the names of the more modern genera of *Glires* have been altered by Mr. Brandt), or the name does not well characterize the animal, or has been used for some other animal or even plant, or for a country; indeed any argument will do when a naturalist is desirous of having his name appended to a genus distinguished by his predecessors.

1. ***Kogia breviceps*** (page 217), add:—

*Kogia brevirostris*, Gray, *Proc. Zool. Soc.* 1865, 529.

2. ***Kogia simus***.

*Physeter* (*Euphysetes*) *simus*, Owen, *Proc. Zool. Soc.* 1865, 511 (not described); *Trans. Zool. Soc.* (ined., animal and bones).

Inhab. India.

*a.* Cranium. India, coast of Vizagapatam, Madras Presidency. Presented by Walter Elliot, Esq., of Wolfslee.

3. ***Kogia Macleayii***.

*Euphysetes Macleayii*, Krefft, *Proc. Zool. Soc.* 1865 (ined.).

Inhab. Australia.

"A colt whale: total length 10 feet 8 inches; width of tail 2 feet 8½ inches, pectoral fin 1 foot 7 inches; circumference of body behind the pectoral fin 6 feet 2 inches, behind the eyes 5 feet 1 inch, before the dorsal fin or hump 5 feet 3 inches.

"Black, yellowish beneath. Head with a short, thick, rather broad snout, receding somewhat like a shark's; mouth small, upper jaw toothless, showing two rows of holes communicating with each other when the gums were removed, from which teeth may have been shed, as they were not present when the gums were perfect, and therefore cannot be for the reception of the teeth of the lower jaw.

"The skull is very like that of *Euphysetes Grayii*, but the sides of

the spermaceti-cavity, which are so sharp in Gray's whale are rounded off in the present species; and the blowhole, which is fully  $1\frac{1}{2}$  inch in diameter in Gray's whale, is not quite an inch in the new one.

"The ridge dividing the cavity in this new whale is almost formed into ivory, and many spots of the same substance are imbedded here and there in the less hard, darker, and porous bone.

"The lower jaw also resembles that of Gray's whale; but the sides are not so thin, and the teeth are longer, stronger, and curved backwards instead of standing out sideways. The rami in Gray's whale are not much thicker than parchment. The teeth 13. 13, the first being almost straight, the last six hooked. The seventh tooth is apparently the largest and strongest.

"The cervical vertebræ ankylosed; the dorsal vertebræ 14, including the ankylosed cervicals; lumbar 9; caudal 21, the first ten of which have chevron bones attached to them. Ribs 13. 13, nearly similar in size.

"The scapula, the hyoid bones, the sternum, and pectoral fins differ considerably from those of Gray's whale; but these parts, being in maceration, will be described hereafter.

"The two pelvic bones are irregular, subquadrangular."—*Kreffft.*

Mr. Krefft has sent me several photographs, representing the animal on the beach, and various views of the skull and other bones of the animal.

I could not discover in the photograph any difference between this skull and the skull from India; at least, from the very slight inspection which I have had of the latter, they are both exceedingly like the skull figured by De Blainville, and I should not be surprised if they all be found to belong to one species.

## 5. EUPHYSETES.

Animal described by MacLeay (quoted at p. 215, under *Kogia*).

The septum or longitudinal bony ridge which separates the concavity on the crown of the skull simple, only slightly curved. Beak of skull shorter than broad. The atlas vertebra thick, oblong, transverse, narrower on the sides, with two thick, short, blunt lateral processes, separated by a narrow deep notch; the upper edge thick, elevated, shelving into a cone behind.

I thought that the difference in the skull might be a sexual character when I received Mr. Krefft's account of the *Kogia* found on the Australian coast; but the difference in the form of the atlas, and in other parts of the skeleton, has satisfied me there are two Australian species, belonging to different genera.

*Euphysetes*, MacLeay, (*Wall*) *History of New Sperm Whale*, 1851; *Gray, P. Z. S.* 1865, 529.

*Kogia*, sp., *Gray, Cat. Seals & Whales*, 218.

### 1. *Euphysetes Grayii*.

*Kogia Grayii*, see the Catalogue, p. 218.

*Euphysetes Grayii*, *Gray, Proc. Zool. Soc.* 1865, 529.

*Inia Geoffroyii* (page 226), add to synonyms :—

*Inia Geoffrensis*, *Gervais, Castelnaud, Voy. Amér. du Sud*, 90. t. 19. f. 3.

*Bouto*, or *Inia Geoffroyii*. "When this rises, the top of the head is the first part seen (at the blower), and immediately afterwards it dips head downwards, its tail curving over, exposing successively the whole dorsal ridge with its fin (?). It seems thus to pitch heel over head, but does not show the tail first. They generally go in pairs. It is not killed willingly; the superstitious people believe that blindness would result from the use of its oil in lamps."—*Bates, Amazons*, ii. 264.

"The *Bouto*, the *Tucuxi*, and *D. pallidus* are all three found 1500 miles in the interior."—*Bates, op. cit.* i. 146.

### DELPHINIDÆ.

Page 230, Synopsis of Genera, add after TURSIO :—

4\*. SOTALIA. Dorsal distinct. Beak of skull elongate, depressed. The pectoral fin oval, obliquely truncated; hand short.

After Synopsis of Genera, add :—

*Delphinidæ* may be, perhaps, naturally arranged according to the form of the pectoral fin.

I. *Pectoral fin elongate, falcate, acute at the end; hand as long as the arm-bones; two forearm-bones close together, only separated by a straight line; carpal bones moderate, 5 or 7, close together, only separated by a thin cartilage.* Delphinina.

A. *Head more or less beaked; beak of skull slender, as long as or longer than the brain-cavity, &c.*

1. PONTOPORIA. 2. STENO. 3. DELPHINUS. 4. TURSIO. 5. LAGENORHYNCHUS. 6. DELPHINAPTERUS.

B. *Head rounded in front, scarcely beaked, &c.*

8. PSEUDORCA. 9. GRAMPUS. 10. PROCÆNA. 11. NEOMERIS.

II. *Pectoral fin large, broad, rounded at the end; hand shorter than the arm-bones; carpal bone single, immersed in a large cartilage; phalanges of index finger 5.*

7. ORCA.

III. *Pectoral fin ovate, obliquely truncated; hand shorter than the arm-bones; forearm-bones separate; carpal bones small, immersed in thick cartilage.*

12. BELUGA. Dorsal none. Teeth deciduous.

12\*. SOTALIA. Dorsal distinct. Teeth permanent.

IV. *Pectoral fin small, ovate, rounded at the tip; hands shorter than the arm-bones; carpal bones 5, small, immersed in a large cartilage; phalanges of index finger 5. Dorsal none.*

13. MONOCEROS.

After *Steno compressus*, (at page 235) add:—

4\*. *Steno Capensis*.

The beak of the skull elongate, rather compressed, tapering and more compressed in front. Teeth  $\frac{37.37}{37.3}$ , small, slender, about five in an inch. Lower jaw slender, attenuated, and without any gonyx in front; the symphyses nearly one-fifth the length of the jaw.

“*Delphinus obscurus, Gray,*” *Cat. S. A. Museum.*

*Steno Capensis, Gray, P. Z. S. 1865, 522.*

Inhab. Cape of Good Hope (*Capt. Carew, South-African Museum*).

Length of the skull 16, of beak from the notch 10, of the lower jaw 13, of symphyses  $2\frac{3}{4}$  inches; width of the beak at the notch  $3\frac{1}{2}$ , of the brain-case at the hinder part of the orbit  $6\frac{3}{4}$  inches.

The skull is somewhat like that of *Steno attenuatus* in the British Museum; but the beak of the skull is longer compared with the size of the brain-case, and it is more gradually attenuated and slender, and higher in front.

4\*\*. *Steno lentiginosus*.

Beak nearly half as long again as the brain-case, depressed at the base, compressed at the end. Teeth  $\frac{34.34}{33.33}$ , about four in an inch. Triangle far in advance of the notch.

*Delphinus (Steno) lentiginosus, Owen, Trans. Zool. Soc. vi.*

Inhab. Indian Ocean.

a. Skull, from India, Vizagapatam. Presented by Walter Elliot, Esq., of Wolfslee. Brain-case 8, beak 11 inches; symphyses of lower jaw one-fourth of the entire length of jaw.

4\*\*\*. *Steno? Gadamu*.

Beak of skull depressed. Intermaxillary bones half as wide as the beak, hard, polished. Triangle one-half in front of the notch, about one-fifth longer than the width at the notch. Teeth large, conical,  $\frac{24.24}{27.27}$ , about three in an inch. Lower jaw slender, rather bent up in front, without any gonyx.

*Delphinus (Steno) Gadamu, Owen, Trans. Zool. Soc. vi.*

Inhab. Indian Ocean.

a, b. Skull, without back part. Vizagapatam. Presented by Walter Elliot, Esq., of Wolfslee.

*Steno attenuatus* (page 235).

The skulls from Mrs. Ince and Mr. A. Pearson are not in good condition, and the beaks are more depressed in front and not so compressed, more like *Delphinus*, or rather *Clymene*.

**Steno Tucuxi**, (at page 237) add :—

Freshwater Dolphin, Steno Tucuxi, The Tucuxi, *Bates, Amazons*, i. 146.

It rises horizontally, draws in an inspiration, and then dives down head foremost, which distinguishes it from the *Bouto*.

“I saw here, for the first time, the flesh-coloured Dolphin (*D. pallidus*, Gervais) in the Lower Amazons, rolling away in pairs, both being of the same colour.”—*Bates, op. cit.* i. 303.

“The pale flesh-coloured species (*D. pallidus*, Gervais) is also abundant in the Upper Amazons.”—*Bates, op. cit.* i. 146.

*Delphinus pseudodelphis* (Wiegmann, Schreb. Säugeth. t. 358; Wagner, Schreb. Supp. vii. 332) appears to be a *Steno* with small teeth. The beak is figured near once and a half the length of the brain-case, and the teeth 42.45.

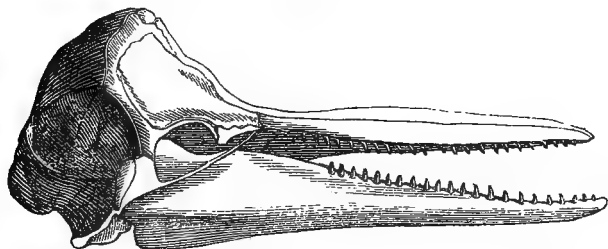
### DELPHINUS (page 239).

Add to generic characters :—

The fin moderate-sized, falciform, pointed at the end; the hand of the same length as the arm-bones; the forearm-bones close together; the carpal bones forming a mosaic, separated by thin cartilage; the index finger of six phalanges.—*Van Brambeke, Mém. Ac. Belg.* xviii. t. 1. f. 3.

The first and second cervical vertebræ united by the bodies and spinous processes of the neural arch, which is very much elongated and keeled above. The lateral processes of the first medial, broad, short, obliquely compressed. Hinder vertebræ thin.

Fig. 98.



Skull of *Delphinus*.

1. **Delphinus microps** (p. 240). Correct specific characters to :—

Beak of skull nearly twice as long as (that is to say, once and three-fourths the length of) the brain-cavity, and three times and three-fourths as long as wide at the notch. Teeth six in an inch.

This is the description of the skull, which is the type, figured in the ‘Voyage of the Erebus and Terror,’ t. 25; *a.* of this Catalogue.

Skull very like *D. Alope*, but head smaller and more globular, and beak much more slender.

**1\*. Delphinus stenorhynchus.**

Skull like former, but larger; the beak of the skull fully twice as long as the length of the brain-cavity, and three times and three-fourths as long as the width at the notch. Teeth five in an inch.

*Delphinus microps*, *b*, *Catalogue of Seals and Whales*, p. 240.

Inhab. — ?

Skull very like *D. microps*, but beak much longer for size of head.

**Delphinus Delphis** (page 242), add:—

*r*, *s*. Skulls, large. Length  $18\frac{3}{4}$  inches, beak  $11\frac{1}{2}$ ; width at notch  $3\frac{5}{8}$ ; length of lower jaw 6 inches. Teeth five in an inch length.

Length of the beak of the skull three times its width at the notch, and rather more than once and a half the length of the head.

After **Delphinus Delphis**, (at page 245) add:—

**3\*. Delphinus major.**

Skull larger than that of *D. Delphis*; the beak nearly twice as long as the head (or once and four-fifths the length), and more than three times as long as wide at the notch. Teeth nearly five in an inch, on the edge of the jaw,  $\frac{46 \cdot 46}{47 \cdot 47}$ . The grooves on the palate very wide, rather shallow, scarcely extending behind the hinder half of the beak.

Inhab. — ?

*a*. Skull. Length, entire, 21 inches, of beak  $12\frac{1}{2}$  inches; width at the notch  $4\frac{1}{6}$  inches; length of lower jaw  $17\frac{1}{2}$  inches.

**3\*\*. Delphinus Moorei.**

Beak of skull elongate, depressed, once and three-quarters the length of the brain-cavity, and five times as long as wide at the notch at the base. The intermaxillary bones rather convex. Teeth small, slender,  $\frac{44 \cdot 44}{48 \cdot 48}$ , five in an inch length of margin; the front upper very small. The groove on the palate deep and wide, reaching nearly to the tip, and wider and very shallow in front. The hinder part of the palate in front of the inner nasal opening with a broad, triangular, longitudinal groove having flat sides, and convex outer sides. The bladebone rather produced behind the ridges, and truncated at the lower part of the hinder edge. Coracoid process large, subtrigonal, the front edge being truncated, the lower one oblique. Length of skull  $17\frac{1}{2}$  inches, of beak 11, of brain-case  $6\frac{1}{2}$ , of lower jaw  $14\frac{1}{2}$  inches; width over condyles 7, at notch 3 inches 7 lines, at middle of beak 1 inch 11 lines.

The upper surface of the beak, a narrow lunule over base of beak to the eye, the back, dorsal fin, and upper surface of tail black; a narrow lunule over the face-streak, the sides of the head, and sides,

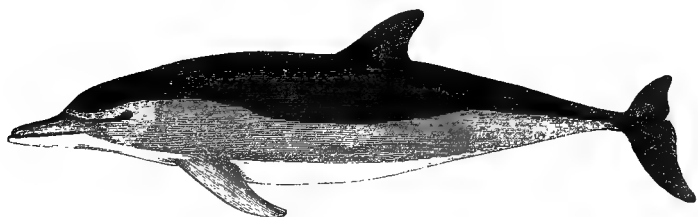
including the pectoral fin, grey; the chin and belly to the vent white. Dorsal fins high; tip rounded.

*Delphinus Moorii*, *Gray*, *P. Z. S.* 1865, 736.

Inhab. South Atlantic Ocean, lat.  $34^{\circ}$  S., long.  $7^{\circ} 3'$  W.

Length of a female from mouth to tip of tail 6 feet  $3\frac{1}{2}$  inches, of mouth 11 inches, of snout  $5\frac{3}{4}$ , to eye 13, to snout-hole 13, to pectoral fin  $18\frac{1}{2}$ , to back fin 33; length from end of tail to back fin 32 inches, to vent 20, to privates 21; diameter of back fin  $14\frac{5}{8}$  inches.

Fig. 99.



*Delphinus Moorei*.

### 3\*\*\*. *Delphinus Walkeri*.

The skull similar to the former, so similar that it is not easy to point out any difference in words. The teeth are rather more numerous, viz.  $\frac{47}{49}$ , rather smaller, being six in an inch length of margin.

The hinder part of the palate, in front of the inner nasal opening, narrower and very sharply keeled on the sides; the sides of the narrower and shallower central groove convex, smaller, and the outer sides of the keels concave and shorter.

The bladebone not so much produced behind the ridge, and with an oblique hinder margin, without any truncation at the lower part. The coracoid process is similar, but broader in the middle of its length, the lower edge being nearly straight.

Length of skull  $16\frac{1}{2}$  inches, of beak 11, of brain-case  $6\frac{1}{2}$ , of lower jaw  $14\frac{1}{4}$ ; width over condyles 6 inches 7 lines, at notch 3 inches 4 lines, at middle of the beak 1 inch 10 lines.

The back fin, snout, the dorsal fin, a wavy streak from base of beak to eye, and upper surface of tail black; sides of the face and body to near the base of the tail grey, with an elongated triangular patch beginning below the pectoral fin and extending near to the base of the tail, the broadest part over the vent. Dorsal fin high, as high as long at the base; tip acute, bent back. Chin and beneath, as high as the base of the pectoral fin, and to the vent, white.

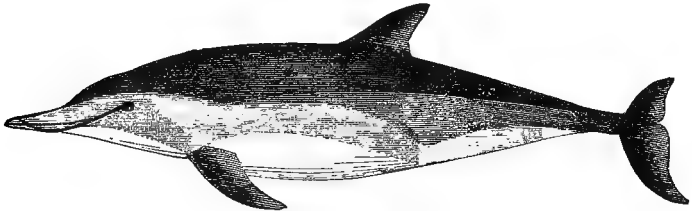
*Delphinus Walkeri*, *Gray*, *P. Z. S.* 1865, 737.

Inhab. South Atlantic Ocean, lat.  $35^{\circ} 38'$  S., long.  $10'$  E. A female.

Length from end of snout to tip of tail 6 feet  $7\frac{1}{2}$  inches; the other measurements are nearly the same as in *D. Moorei*.

The skulls show that these species belong to the restricted genus *Delphinus*, which has *D. Delphis* for its type. These have a very deep groove on each side of the palate.

Fig. 100.



*Delphinus Walkeri*.

Both the figures of the animals belonging to these species have a narrow black streak from the base of the upper part of the beak to the eye; but the colours of the sides of the animals are differently distributed. There is also a very slight difference in the form of the bladebones (and this cannot be sexual, as they were both females), and in the form of the back part of the palate just in front of the hinder entrance to the nostrils.

Considering that the colouring of the animals shows that they represent two species, one is struck with the very small difference exhibited in the skull by species showing such marked external differences, and can only conclude by thinking how hasty we have been when we have referred skulls received from very distant parts of the world all to *Delphinus Delphis*, and said that that species had a very wide geographical distribution—more especially when we consider that these two species were obtained, the one in lat.  $35^{\circ} 38' S.$ , long.  $10' E.$ , and the other in lat.  $34^{\circ} S.$ , long.  $7^{\circ} 3' W.$

**Delphinus Janira** (page 245), add:—

*a.* Skull. Jamaica. Presented by J. H. Gurney, Esq. Length of skull 16 inches, of beak  $9\frac{1}{2}$ ; width at notch  $3\frac{1}{2}$ . Teeth 47/, five in an inch length of maxilla.

The beak of the skull twice and three-quarters the breadth of the notch in length.

After **Delphinus Janira**, (at page 246) add:—

**Delphinus punctatus.**

The beak of the skull once and a half the length of the brain-cavity, depressed behind, and gradually tapering and rather slender in front, in length nearly three times the width at the notch. Lower jaw attenuated and slender, and rather bent up in front, without



any gonyx. Teeth small, slender,  $\frac{40 \cdot 40}{38 \cdot 38}$ , five in an inch of margin. The palate flat; the hinder part of the palate in front of the internal nostrils broad, swollen, with a very shallow central groove with rather convex sides, and very oblique, flat, external sides.

Length of skull  $15\frac{1}{2}$  inches, of beak  $9\frac{1}{4}$ , of brain-case  $6\frac{1}{4}$ , of lower jaw  $12\frac{3}{4}$ ; width over condyles  $6\frac{1}{2}$  inches, at notch 3 inches 4 lines, in middle of beak 1 inch 8 lines.

The two bladebones are rather different in general form, one being more truncated behind than the other; they are both truncated in front, and in both the coracoid process is large, with a short upper, and a long straight lower edge; one has a long, regularly arched, and the other an equally long, but sinuous upper edge, showing that, considering the bladebone a specific distinction, some allowance must be made for occasional variation.

The skull is much like some of the skulls I have named *Clymene Doris*; but perhaps I have included several species under that name, as some of the skulls differ in the form of the hind part of the palate. The one here described differs from all of them in having a more slender and attenuated beak.

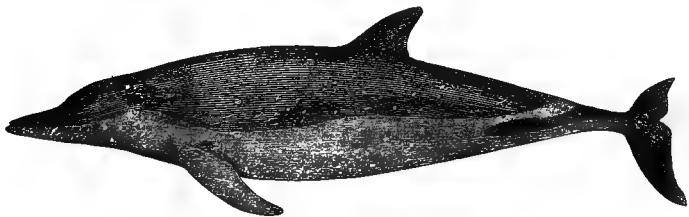
Dorsal fin high, rather acute at the tip. Black, sides with minute white specks; the sides of the body above the base of the pectoral to the base of the tail blackish grey, which colour is obliquely extended as a lunate band from behind the vent to the back near the base of the tail.

*Clymene punctata*, Gray, P. Z. S. 1865, 738.

Inhab. North Atlantic Ocean, lat.  $16^{\circ} 40' N.$ , long.  $21^{\circ} W.$  A female.

Length from end of snout to tip of tail 6 feet, to blowhole 1 foot  $\frac{7}{8}$  inch, to the eye 1 foot  $\frac{7}{8}$  inch, to front of dorsal fin 2 feet  $8\frac{1}{4}$  inches, to base of pectoral fin 1 foot  $3\frac{3}{8}$  inches; length from tip of tail to back fin 2 feet  $4\frac{3}{8}$  inches, to vent 1 foot  $6\frac{7}{8}$  inches; diameter of body behind back fin 1 foot  $1\frac{1}{2}$  inch, of snout  $4\frac{5}{8}$  inches, of mouth  $9\frac{5}{8}$  inches.

Fig. 101.



*Delphinus punctatus*.

**Delphinus Alope** (page 252), add:—

Inhab. Cape Horn.

- b. Skull, perfect. Cape Horn. Entire length  $16\frac{1}{2}$  inches, of beak  $10\frac{1}{2}$ ; width at notch  $3\frac{3}{8}$ ; length of beak three times its width at the notch, depressed. Teeth very slender, six in an inch length.

**TURSIO** (page 254).

Add to generic characters:—

Pectoral fin moderate, falcate, pointed at the end; hand same length as the arm; forearm-bones close together; carpal bones close together, with only a small quantity of cartilage; index finger of six phalanges.

**Tursio Doris** (page 255), add:—

Inhab. Cape of Good Hope (*Layard*). Skull in South-African Museum. (See Proc. Zool. Soc. 1865, 522.)

**Tursio Dorcides.**

Skull like that of *T. Doris*, but larger, thicker, and stronger; beak thick, solid, shelving on the sides, once and one-third the length of the brain-case, twice and one-third as long as wide at the notch; palate flat. Teeth small, slender,  $\frac{43 \cdot 43}{43 \cdot 43}$ , full five in an inch.

Inhab. ———?

a. Skull.

**Tursio Metis** (page 256), add:—

b. Skull. Teeth two in an inch.

**Tursio Cymodoce** (page 257), add:—

b. Skull. Teeth three in an inch.

Erase **Tursio Guianensis** (page 257), as it forms a distinct genus on account of the form of its fins.

**Tursio truncatus** (page 258), add:—

The first and second cervical vertebræ united by their bodies and the spinous processes of the neural arch, which is very much elongated and keeled above; the lateral processes of the first broad, short, obliquely compressed; hinder cervical vertebræ thin.

*Delphinus brevidens* (Gervais, Zool. et Paléont. Franç. t. 9. f. 4, 6) is founded on part of the lower jaw of a Dolphin with truncated teeth, like *Tursio truncatus*.

**Tursio obscurus** (page 264), add:—

- d. Front of the jaws and the pectoral fin. South Pacific. Type of Mr. Waterhouse's *D. Fitzroyii*. From the Zoological Society's Museum. Teeth  $\frac{28}{28}$ , just five in an inch.
- e. Skull, rather imperfect behind. The type of *Delphinus obscurus* of Mr. Waterhouse, in Catalogue of Zoological Society's Museum, no. 530. From the Zoological Society.

**Tursio Abusalam** (page 261), add to synonyms:—

*Delphinus hamatus*, "*Hemp. & Ehrenb.*," *Wiegmann, in Schreb. Säugeth.*  
18. t. 369 (skull); *Schlegel, Abhandl. i.* 29.  
*D. Abusalam*, *Wagner, Schreb. Suppl. vii.* 324.

After **TURSIO**, (at page 267) add:—

#### 4\*. **SOTALIA.**

Beak depressed, rather longer than the brain-cavity. Palate flat. Lower jaw rather broad behind; symphyses short. Teeth slender, conical. Pectoral fin obliquely truncated. Forearm-bones free; hand shorter than the arm. Carpal bones five, small, surrounded by cartilage. Phalanges of the index finger six, of the middle finger five, and the fourth finger one.

#### 1. **Sotalia Guianensis.**

*Delphinus Guianensis*, *Van Beneden.*  
*Tursio Guianensis*, *Catal.* 257.

Inhab. British Guiana. Mus. Stuttgart.

The skull differs greatly from that of *D. microps*, with which it has been compared, in the length of the beak and the shortness of the symphysis.

"Ce dauphin présente dans la conformation de son squelette diverses particularités qui lui donnent un certain intérêt. La colonne vertébrale est très-massive principalement à la région caudale; la nageoire pectorale est fort-étendue en largeur. La tête a un aspect à part, surtout par la conformation du maxillaire inférieur."

"Vertebræ 55: thoracic 12, lumbar 14, caudal 22, cervical 7. The first two cervical are united, the five others are free and have long bodies, making a long neck, as in the *Platanistæ*, which have a similar-shaped pectoral. The caudal vertebræ form two distinct series, the first thirteen have large bodies, and are much higher than broad; the first nine have the upper spinous apophyses well developed; and the first seven have transverse processes; the twelve chevron bones are very strong; the last nine caudal vertebræ are much depressed, and twice as broad as high. Ribs 12. 12; the first rather the broadest, the first four only have a double articular surface, the first five are articulated directly to the sternum. The sternum is formed of three distinct bones, the front being the largest. The pectoral fin is only rather longer than broad, and is not so long as the arm-bones united; the bladebone is much extended in form, and has the acromion and coracoid well developed. The two bones of the forearm are rather longer than the humerus. The radius is very broad. Carpal bones five, in two rows, the three upper being the largest; metacarpals five. There is no phalange for the thumb, only one for the little finger, six for the index, and four for the ring finger.

"The skull is rounded on all sides, the falx is ossified, the face is slender, the nasal canal open, the vomer is shown above between the

two intermaxillaries. The jaws have 28. 28 teeth, of which two are in the intermaxillary bones. The teeth are conical, acute, rather far apart. The tympanic bone is two-lobed, as in *Delphinus*. The petrous bones are without apophysis. The lower jaw is very high behind and curved, giving it the appearance of a *Ziphius*."—*Van Beneden*.

Page 276, add:—

10. *Lagenorhynchus fusiformis*.

*Delphinus* (*Lagenorhynchus*) *fusiformis*, *Owen, Trans. Zool. Soc.* ined. Inhab. India.

a. Skull. Presented by Walter Elliot, Esq., of Wolfslee.

**PSEUDORCA** (page 290).

Dr. Wagner (Supp. Schreber's *Säugeth.* vii. 305) has given the name of *Delphinus carbonarius* to "the Blackfish of the South-Sea whalers," described and figured in Bennett's 'Narrative of a Whaling Voyage,' ii. 233. fig., copied Wagner, tab. 352. f. 1.

**PHOCÆNA** (page 301).

At the end of remarks on the genus, add:—

Several porpoises caught on the coast of England have been lately examined, and they all have spines or tubercles on the upper edge of the dorsal fin. The specimens without these spines or tubercles are desiderata, and one is almost led to the belief that they do not exist; but it is difficult to prove a negative, and one can hardly believe, if they are always present, that so many zoologists should have overlooked them. The stuffed specimen in the Museum shows them very indistinctly, if at all; but then, stuffed specimens are so mauled and rubbed with pumice and other material, that they may have been rubbed off; and they are so covered with varnish that they may have been hidden. So the existence of a porpoise without spines must be left for future research. The differences discovered by various anatomists seem to show that there must be more than one species included under the name of *P. communis*, which are very like externally, but this is probably the case with several Dolphins, Bottle-noses, and Porpoises.

THE END.













