The Whales and Dolphins of Tasmania

Part I. External Characters and Habits[1]

By

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Whales are mammals which have become entirely aquatic, though there is every reason to believe that they have been derived from land mammals. As in the case of the specialized ichthyosaurian reptiles, the aquatic environment has imposed upon whales a fish-like form; the head passes imperceptibly into the trunk without a constricted neck; the anterior limbs or flippers have lost all external semblance to the typical mammalian fore-limb; and the hind limbs have disappeared, though internal skeletal vestiges still persist. A dorsal fin is generally present, but does not contain skeletal supports as in the case of fishes. The well-developed caudal fin has no skeleton, and differs from the vertical tail of fishes in being prolonged laterally into fleshy horizontal expansions, the flukes. The nostrils (blowhole, single or double) are situated high upon the vertex of the head. The eyes are small, the external part of the ear is almost non-existent and has no pinna. Teeth are generally present at some stage in the life history, but in whalebone whales the teeth disappear before the end of foetal life. The blubber, which is characteristic of whales, is a thick subcutaneous tissue containing fat, and is impregnated with oil. The hairy covering, which is present in all mammals, is reduced to a few isolated hairs in the region of the mouth, and the body is naked and shiny. This group includes the largest animals which have ever lived.

The term 'Tasmanian whale' is a misnomer, as it is only in exceptional, and for them unfortunate, circumstances that members of the Cetacea become stranded. The natural habitat of most whales is the high seas, and they have as a rule a very wide distribution. In fact, no other group of animals, except man, is so cosmopolitan. For the purposes of the present account it has been deemed neces-

[1] The original purpose of this paper was to give a comprehensive account of Tasmanian whales. Owing, however, to limitations of space, it has been found necessary to divide this account into two parts; the first, dealing with the external characters and habits of whales, forming the subject of the present paper; and the second, being concerned with internal anatomy and osteology, which, it is hoped, will find a place in the next issue of this Journal. In a way, this separation may be regarded as a fortunate circumstance, for while a comparatively large number of people may be interested to learn about the external appearance and habits of whales, only the specialist would be interested in the anatomical details.

sary to include in the list of Tasmanian whales only the forms of which some record exists either of their having been stranded on Tasmanian beaches or seen in the adjacent seas.[1]

Whales may be divided into two main groups:—

1. Absence of teeth in adult. Presence of whalebone. Blowhole double. Lower jaw very wide, the halves curving outward and being loosely united in front. Females larger than males .... The Whalebone Whales (sub-order *MYSTACOCETI*)

2. Presence of teeth. Absence of whalebone. Blowhole single. Lower jaw triangular, narrow in front, the two halves firmly united. Males larger than females .... The Toothed Whales (sub-order *ODONTOCETI*)

WHALEBONE WHALES

Sub-order **Mystacoceti**

The main external characters of this sub-order are given above.

There are at least six species of whalebone whales found in Tasmanian waters, namely, the Southern Right Whale, now almost extinct, the Humpback, formerly very abundant, now not so common, the Blue Whale, the Fin Whale, the Piked Whale, and the Sei Whale, the latter probably being a rare visitant to sub-antarctic waters.

All of these whales are hunted for their oil. In the early days of southern whaling the Southern Right Whale was one of the principal objects of capture; now it is almost extinct and is protected under a convention entered into recently by twenty-four nations, including Australia.[2] Later the Humpback formed the main object of southern whaling expeditions, but at the present day the Blue Whale and Fin Whale constitute over 90 per cent. of the catches of most southern whaling stations, the two being caught in nearly equal numbers (Mackintosh and Wheeler, 21, p. 272).

Until recently the whalebone, or baleen, was also valuable owing to its use in ladies' garments. The plates of baleen are suspended from the roof of the mouth, and the frayed edges of the plates form an efficient sieve through which the animal sucks the sea water, and in this way sifts from the water enormous quantities of minute crustaceans, collectively known as 'Krill', which consists principally of *Euphausia superba*.

The period of gestation of the whalebone whales is nearly one year, and the females produce calves every two years. The average size at birth of whalebone whales is from 25 per cent. to 30 per cent. of the maximum size of the adult.

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[1] There is every reason to believe, however, that in addition to the forms dealt with in the present paper the following whales and dolphins are to be found in the seas around Tasmania:—*Hyperoodon planifrons, Berardius arnuxii, Cephalorhynchus hectori, Delphinapterus leucas, Grampus exilis, Sousa gamadu, and Tursiops catalania.*

[2] Japan is not a signatory to this convention. This convention also prohibited the capture of immature whales of all kinds.

In southern seas the whalebone whales have a definite migration, generally passing north, so as to spend the winter months near the equator. In most cases the young are born at this period, and this northern migration may be regarded as the *breeding migration*. They pass southward again for the summer, presumably in search of planktonic food, which is more abundant in antarctic waters than in the warmer seas. This is known as the *feeding migration*.

The statement made by whalers that the whales of the genus *Balaenoptera* can remain under water for eight to twelve hours without coming up to breathe is not supported by the facts. Normally a large whale remains below water for five or ten minutes, or in extreme cases as much as forty-five minutes. After having been submerged the whale comes up to breathe, and as soon as the nostrils reach the surface the first process is to expel the deoxygenated air from the lungs. The hot, moist air passing out into the colder atmosphere forms a column or 'spout' containing particles of condensed water. This expiratory process is made with considerable force, and often produces a distinct whistling sound. Thus the whale is said to 'blow'. For some minutes after having come to the surface the whale will go through the inspiratory and expiratory processes several times, and normally may blow two or three times a minute. Eventually when the lungs are completely recharged with a fresh supply of air the whale will 'sound', i.e., it will dive to a considerable depth, the maximum depth being at least 100 fathoms. In sounding the Right Whale, Humpback and Sperm Whale leave the surface in a vertical position, the large tail being the last part of the animal to disappear. In the Fin Whale and other members of the genus *Balaenoptera*, the animal, when about to sound, gradually sinks below the surface in a more or less horizontal position, so that the flukes are not seen standing up from the surface of the water.

The Tasmanian forms of whalebone whales may be distinguished as follows:—

1. No grooves on throat:
   - (i) No dorsal fin .... family *BALAENIDAE* *Southern Right Whale*
   - (ii) Dorsal fin present .... family *CAPEREIDAE* *Pygmy Whale*
2. Numerous grooves on throat .... family *BALAENOPTERIDAE*
   - (i) Flippers nearly one-third the length of the animal .... *Humpback*
   - (ii) Flippers not more than one-eighth the length of the animal:
     - (*a*) Bluish-grey. Whalebone and bristles black .... *Blue Whale*
     - (*b*) Grey above, white below. Whalebone dark-grey striped with white, bristles grey .... *Fin Whale*
     - (*c*) Grey above, white below. Flippers with white band. Whalebone yellowish-white, with bristles of same colour .... *Lesser Piked Whale*
     - (*d*) Bluish-grey above, lighter below. Whalebone black, bristles grey or white .... *Sei Whale*

The Right Whales
Family *Balaenidae*

Head more than one-fourth the length of the body. No dorsal fin. No grooves on throat. Plates of baleen long and narrow.

1. Southern Right Whale

Balaena australis Desmoulins, 1822

This species was described by Desmoulins in 1822 from a specimen from the Cape of Good Hope. In 1843 Gray gave the name *Balaena antipodarum* (and later in the text, presumably in error, *B. antipodum*) to the New Zealand right whale in Dieffenbach's Travels (6). The New Zealand and South African forms belong to the same species.

Distribution. This whale is now almost extinct, though formerly it was abundant throughout the southern seas, mainly between 20° S. and 55° S. (commonest about 35° S.). In this connexion it is interesting to note that Governor Collins, writing to Sir John Banks from Hobart Town in July, 1804, stated that for six weeks the Derwent estuary had been 'full of the whales called by the whalers, the Right or Black Whale'. It is now wholly protected under a recent International Convention of the League of Nations. There is only one species of right whale in southern waters, and it is generally accepted that this species differs from the northern right whales.

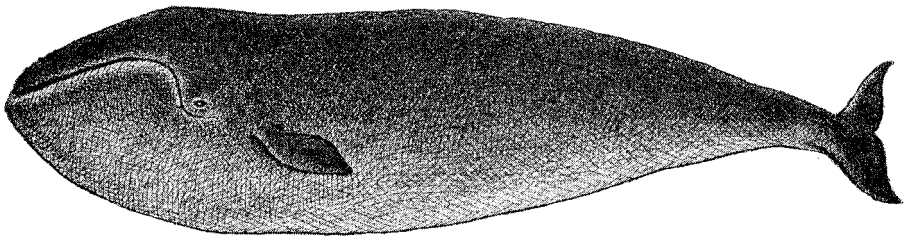

Fig. 1.—The Southern Right Whale (*Balaena australis*)

External Characters. Maximum length, about 18·25 m. (60 feet). No dorsal fin. No longitudinal grooves on throat. Head large, about a quarter the length of the body. *Colour*, generally uniformly black. Sometimes black or greyish-black above, lighter on the ventral surface. *Whalebone*, black, about 200 plates on either side. These plates have a maximum length of about 22·8 cm. (7 ft. 6 in.) No detailed external measurements of this whale are known to me.

Natural History. This species is the 'Black Whale' of the early southern whalers. Dieffenbach (6, Vol. 1, pp. 42-55) gives a detailed account of the habits of this form. Females come inshore in the

winter months to calve. When accompanied by their young the females of this species are easily captured. Males are seldom captured, as they rarely approach the land. This whale blows every 10 or 15 seconds. According to Dakin (5, p. 338) a Southern Right Whale produced an average of 55 barrels of oil, valued at £250.

The Southern Right Whale was formerly fished in the sub-antarctic sea immediately to the south of Australia, in the South Pacific (New Zealand waters, and to the north and west of Chatham Island, on the Coast of Chile Ground, off South America), in the South Atlantic (Brazil Banks and False Banks, the Falkland Islands, off South America, the Pigeon and Tristan Grounds, off the Cape of Good Hope, and the Woolwich (Walfis Bay) Ground), and in the South Indian Ocean (Delagoa Bay Ground, Crozettes Ground, Desolation Ground, and the grounds north of St. Paul). The seasonal migration does not appear to have been very extensive, but on the whole the records show that the whales went north for the winter (July) to a northern limit of 20° S., and migrated south for the summer (January) to a southern limit of 55° S. Most of the whaling was done in the vicinity of the 35th parallel.

For a comprehensive account of ' Black Whale ' fishing see Crowther (4).

Family *Capereidae*

Head about one-fourth the length of the body. Dorsal fin present. No grooves on throat. Plates of baleen long and narrow.

2. The Pygmy Whale

Caperea marginata (Gray, 1846)

Synonymy. This species was founded in the first instance upon the whalebone only. Later, in 1864, the earbone was described separately and a new genus *Caperea* founded. In 1870 the skull, with the whalebone attached, was first described from New Zealand, and Gray, later recognizing the peculiarity of this skull, founded the new genus *Neobalaena*. In 1872 Hector re-examined the New Zealand skull, and found that the earbone agreed with that of *Caperea*. This name, therefore, has priority over the later name *Neobalaena*.

Distribution. Recorded from New Zealand and the southern half of the Australian coast. Probably occurs throughout the Australian portion of the sub-antarctic seas. Apparently a rare species.

External Characters. *Colour*, black above, paler below. Maximum length about 6·1 m. (20 ft.). Body slender. Small head, less than a quarter the length of body. Dorsal fin present. No longitudinal

ridges on throat. *Whalebone* differs from that of any other whale. It is extremely narrow. Ivory coloured, the outer margin having a characteristic dark band. Longest plate examined by me, 78 cm. (31 in.). Width 7 cm. (2¾ in.). Hector (15) records 230 plates on each side in a specimen from Stewart Island.

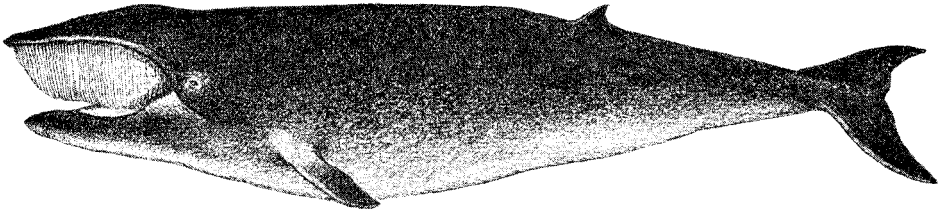

Fig. 2.—Pygmy Right Whale (*Caperea marginata*)

EXTERNAL MEASUREMENTS, after Hale (12):—

Total length to middle of tail	10 ft. 10 in. (325 cm.)
Tip of snout to eye	21·5 %[1]
Tip of snout to origin of dorsal fin	66·9 %
Height of dorsal fin	3·8 %
Tip of lower jaw to origin of flipper	30·0 %
Length of flipper	10·8 %
Length of gape	20·0 %

Nothing is known of the habits of this form.

THE FIN WHALES

Family *Balaenopteridae*

Head less than one-fourth the length of the body. Dorsal fin present. Throat marked by numerous longitudinal furrows. Plates of baleen short and broad.

3. BLUE WHALE OR SULPHUR BOTTOM

Balaenoptera musculus (Linné, 1758)

DISTRIBUTION. Worldwide distribution, but more abundant in the southern hemisphere, and particularly common in antarctic waters. Frequently found in pack ice. Recorded from Australian seas. This form undoubtedly frequents Tasmanian waters.

EXTERNAL CHARACTERS. This species is the largest of all whales. Maximum length, 29 m. (95 ft.), the female being slightly larger than the male, fully matured males being about 95 per cent. of the length of the mature females. Dorsal fin very small, and situated three-quarters of the way down the body. Ventral grooves 70-118 (average about 90). *Colour*, uniformly bluish-grey above with lighter mottlings, rather paler below, dark towards the tail. Inner surface

[1] Throughout this paper measurements are given in percentages of the length from the tip of the snout to the tail notch.

of pectorals grey to white. *Whalebone*, coarse and short, entirely black or bluish-black. 270-395 (average 320) plates on each side. Largest plates in the largest whales are 85 cm. (34 in.) long and 60 cm. (24 in.) wide.

EXTERNAL MEASUREMENTS. The following measurements, taken from Mackintosh and Wheeler (21, p. 276), are the mean measurements of several hundred specimens:—

	Male.	Female.
Tip of snout to posterior insertion of dorsal fin	75·33 %	75·18 %
Tip of snout to eye centre	20·21 %	20·14 %
Tip of snout to blowholes	17·59 %	17·71 %
Length of base of dorsal fin	4·51 %	4·26 %
Height of dorsal fin	1·30 %	1·23 %
Length of flipper (tip to axilla)	9·89 %	9·81 %
Greatest width of flipper	3·67 %	3·65 %

Proportion of head to body increases with age. Thus in a 12·2 cm. (40 ft.) whale the head (tip of jaw to eye) is 15·3 per cent. of total length, and in a 26·5 m. (87 ft.) whale the proportion is 21·2 per cent.

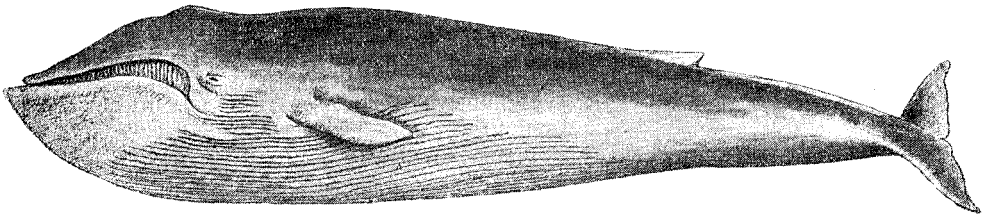

Fig. 3.—The Blue Whale (*Balaenoptera musculus*)

NATURAL HISTORY. This species spouts at intervals of 30 to 40 seconds. The spoutings are vertical and fairly dense and about 12 feet high. When the whale sounds it remains under water 30-40 minutes at the most. The female attains sexual maturity at an average length of 23·5 m. (77 ft. 2 in.) and the male at an average length of 22·5 m. (74 ft. 2 in.) (*International Whaling Statistics*, 1932). Average size at birth, 7 m. (23 ft.), sometimes as large as 8·2 m. (27 ft.). The sexes are about equal in number. The breeding season in the southern ocean is from May to September. Period of gestation, 11½ months. This species is of greater economic value than any other whale. Average yield of oil, 70 to 80 barrels, worth £360 to £400 (the record is 305 barrels). Wood-Jones (32, p. 276) states that the blubber is of poor quality, but Mackintosh and Wheeler (21, p. 272) emphasize the value of this whale, as the yield of oil is proportionately greater than in other whales; in fact, a higher price is paid to whalers for the capture of this species than for any other whale. Harmer (14, p. 109) states that when Blue Whales and Fin Whales are found together, as is usually the case, the former is the preferred object of the chase, as being the more productive animal.

4. The Fin Whale or Finner (Rorqual)

Balaenoptera physalus (Linné, 1758)

Distribution. Worldwide distribution. Fairly common in sub-antarctic waters. Does not usually frequent pack ice. No published record from Tasmania, but undoubtedly this species is found in Tasmanian waters and in Australian seas generally.

External Characters. Maximum length, about 25 m. (82 ft.). The females are larger than the males, the length of male being about 91 per cent. of that of the female. The general form of this whale is proportionately slimmer than that of the Blue Whale, and the pectoral fins are relatively smaller. *Colour*, dark-grey above, white below, the two colours gradually merging. More white colour on the right of underside of the head than on the left. Right lower jaw white, left grey. This asymmetry of colour is explained tentatively by Mackintosh and Wheeler (21, p. 354) as being due to the fact that this whale swims slightly on the right side while under water. Pectorals grey above, light below. *Whalebone*, dark-grey, striped longitudinally with yellowish-white in varying proportions, bristles variable in colour but generally greyish. Anterior third of whalebone on right side white. Number of plates on each side, 270-480 (average 360). The whalebone plates 40-80 cm. (16-32 in.) long, with a mean length of 65 cm. (26 in.), and a width equal to 60-70 % of the length. Ventral grooves 68-114 (average about 85).

External Measurements. The following averages, taken from Mackintosh and Wheeler (21, p. 323), are based upon the measurements of a large number of specimens.

	Male.	Female.
Tip of snout to posterior insertion of dorsal fin	75·55 %	75·17 %
Tip of snout to eye centre	20·87 %	21·00 %
Tip of snout to blowholes	18·86 %	18·94 %
Length of base of dorsal fin	6·00 %	5·65 %
Height of dorsal fin	2·50 %	2·39 %
Length of flipper (tip to axilla)	8·27 %	8·23 %
Greatest width of flipper	2·82 %	2·75 %

Natural History. When the animal sounds it disappears for a maximum period of 10 to 15 minutes. The female attains sexual maturity at a length of 20 m. (66 ft.) and the male at a length of 19·5 m. (64 ft.). Proportion of sexes: males 55 per cent., females 45 per cent. Average size at birth is 21·3 feet. The breeding season in the Southern Ocean is from May to September. Period of gestation 11½ months. This whale is said to reach maturity in 6-8 years, is fully mature at 10 years, and is old at 27 years. Average yield of oil, 35 to 50 barrels.

5. The Lesser Piked Whale

Balaenoptera acuterostrata, Lacépède, 1824

Distribution. Apparently not a common form. Probably has a worldwide distribution. Found in high latitudes in pack ice in the southern summer. Found throughout the antarctic and subantarctic seas.

External Characters. This is the smallest species of the genus. Maximum size about 9·1 m. (30 ft.). Body relatively deeper than in other species of the genus. Head narrow and pointed; the upper jaw fits closely into the hollow of the lower jaw, which projects beyond the upper. Dorsal fin relatively high, the tip being strongly recurved. Flippers small. Body keeled dorsally and ventrally behind the dorsal fin. *Colour*, grey-black above, white below. Flukes grey above, white below. Flippers with white band on the outside. A triangular patch of lighter colour is generally present on either side of the back in the region of the dorsal fin. *Whalebone*, plates and bristles yellowish-white, average 325 plates on each side. Greatest length, 20 cm. (8 in.) without bristles.

External Measurements of a female (after Turner, 30):—

Length	8·6 m. (28 ft. 4 in.)
Tip of beak to posterior insertion of dorsal fin	75·3 %
Tip of beak to blowholes	13·2 %
Length of base of dorsal fin	5·6 %
Height of dorsal fin	3·5 %
Length of flipper (tip to axilla)	9·3 %
Greatest width of flipper	3·8 %

Natural History. Little is known of the habits of this species. It probably has the same migratory habits as other species of the genus. Length at birth, about 2·7 m. (9 ft.).

6. The Sei Whale

Balaenoptera borealis (Lesson, 1828)

Distribution. The natural home of this species is probably in the northern hemisphere. Its appearance south of the equator is spasmodic and its occurrence in the antarctic is rare. Lillie (18) records several specimens from the seas south of Australia in parallels 41° to 44° S. Some of these observations were made not far from the Tasmanian coast, so that we are justified in including this species in the Tasmanian list. There is no record of this whale having been washed ashore on the Australian coast, but specimens have been taken in New Zealand. It has also been recorded south of the equator from the Falkland Islands, South America, and South Africa.

External Characters. Comparatively small size. Greatest length, about 16·4 m. (54 ft.). Average length of mature animals, 14·3 m. (47 ft.). Females slightly larger than males. Dorsal large, high

and falcate. Intermediate in general body proportions between the Blue Whale and Little Piked Whale. *Colour*, variable. Grey, with or without bluish tinge. Ventral surface lighter. The grey dorsal area sometimes continued into a ventral band across the abdomen. Ventral folds white or pink, with the furrows a deeper colour. Ventral furrows 32 to 60 in number. *Whalebone*, deep bluish-black, bristles grey or white, 290-340 on each side. Greatest length 77 cm. (31 in.), greatest width 30 cm. (12 in.).

EXTERNAL MEASUREMENTS (Andrews, 1):—

	Male.	Female.
Total length	14·5 m. (47 ft. 6in.)	14·6 m. (48 ft.)
Tip of snout to eye	18·9 %	20·1 %
Tip of snout to blowholes	15·4 %	16·6 %
Tip of snout to posterior insertion of dorsal fin	70·4 %	72·0 %
Height of dorsal fin	3·6 %	3·1 %
Length of base of dorsal fin	4·1 %	—
Length of flipper	9·0 %	8·9 %
Width of flipper	2·7 %	2·7 %

NATURAL HISTORY. This whale is now not so abundant as in former times, probably the result of overfishing. Strictly speaking, it is a northern form, and is said to migrate from the northern latitudes about September; it goes as far south as the sub-antarctic, and returns northward about May or June, remaining in northern waters during the summer (June to August). It is not unlikely, however, that many animals remain permanently in the southern hemisphere. The spout of the species is rather diffuse, and ascends vertically to a height of 10 to 14 feet. It blows once or twice a minute, or sometimes as frequently as every 20 seconds. It is said to be the fastest of the larger whales for short bursts of speed, for example, immediately after having been harpooned. It feeds upon *Euphausia* and the Copepod *Calanus finmarchicus*, but is said to feed also on sardines when these are present in the surface waters in large numbers. Period of gestation, 10-11 months.

7. THE HUMPBACK

Megaptera nodosa Bonnaterre, 1789

This whale has been given several names since it was described in 1789, partly because the northern and southern forms were considered to be distinct species. There appears to be no justification for such a distinction, and most authorities now regard the humpbacks of the world as belonging to one species.

DISTRIBUTION. Cosmopolitan. Recorded from all parts of the coast of Australia and from New Zealand.

EXTERNAL CHARACTERS. Maximum length, about 16·7 m. (55 ft.), though much larger animals have been recorded. The female is larger than the male, the average length of a mature male being about

90 per cent. of that of the mature female. The external form is very characteristic, and leaves no doubt as to the identity. The body is relatively much deeper than in *Balaenoptera*. The snout and mandible bear a number of hemispherical tubercles. The dorsal fin is low and thick. The flippers are long and narrow, exceeding in relative length those of all other whalebone whales, and the preaxial border of each fin bears a number of protuberances. The ventral grooves are few and broad, 14-30 in number. *Colour*, variable. Normally black on head, back, and sides, but frequently broken up by white lines or patches. The throat, chest, and undersurface generally entirely white, sometimes streaked with black. Flukes black above, white or spotted below. Flippers: upper surface black or streaked black and white, anterior edge white, posterior black, undersurface white. *Whalebone*, dull greyish-black, though some of the anterior plates may be white. Longest whalebone (without bristles), 61 cm. (24 in.). Greatest breadth, 12·5 cm. (5 in.). 400 plates on each side.

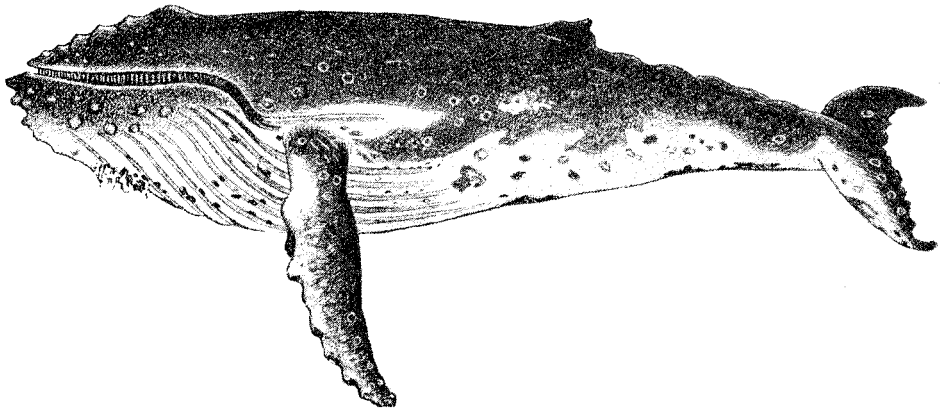

Fig. 4.—The Humpback (*Megaptera nodosa*)

EXTERNAL MEASUREMENTS, given by Chubb (3):—

	Female.	Male.
Total length (snout to notch in tail)	14 m. (46 ft.)	13·2 m. (43 ft. 6 in.)
Tip of snout to posterior insertion of dorsal fin	70·2 %	68·9 %
Tip of snout to eye centre	23·3 %	27·5 %
Tip of snout to blowhole	—	23·0 %
Vertical height of dorsal fin	3·2 %	2·3 %
Length of flipper from head of humerus	32·6 %	—

NATURAL HISTORY. The Humpback is somewhat slower in its movements than the various species of *Balaenoptera*. According to Lillie (18), it seldom stays under water for more than seven minutes. It shows a distinct partiality for coastal waters. The southern forms

spend the summer in the Antarctic, and migrate northward towards sub-tropical waters in the winter. Thus this whale probably visits Tasmanian waters in the early winter during its northerly migration, and again in the spring on its way back to the Antarctic. The young are born in the warmer waters during the winter months. Period of gestation, about 11½ months. Size of young at birth 4·5 m. (15 ft.). The females are more abundant than the males. This form is becoming less abundant. The beginning of the twentieth century saw the revival of antarctic whaling, and at first the humpback was almost the only whale which was hunted. In South Georgia, for instance, nine-tenths of the whales caught in 1911 were humpbacks In recent years, however, only a small percentage of the whales caught have been humpbacks.

According to Dakin (5, p. 238), a humpback yields an average of 35 to 40 barrels of oil. Crowther (4, p. 132) states that the yield was 6 to 7 tuns.[1]

In early days the humpback was principally hunted in the following parts of the southern seas: Indian Ocean (Mozambique, Madagascar, and N.W. Australia), Pacific Ocean (New Caledonia, Tonga Islands, New Zealand, Lower California, Galapagos, Coast of Chile), Atlantic Ocean (West Indies, Cape Verde Islands, Coast of Angola).

THE TOOTHED WHALES

Sub-order **Odontoceti**

The principal external characters of this sub-order are given above (p. 164).

With the exception of the Sperm Whale, the toothed whales have not the same economic importance as the whalebone whales. The former are, moreover, generally smaller than the latter, the Sperm Whale being the only member of the group which is known to attain the gigantic size of the larger whalebone whales. Unlike the latter, the males of the toothed whales are larger than the females. The presence of teeth accounts for the predacious character of most toothed whales, which generally feed upon fish. The enormous Sperm Whale, however, usually feeds upon cuttlefish, and the Killer Whale is said to be the only whale which will prey upon other whales. It also feeds upon seals and other aquatic mammals.

It cannot be said that our knowledge of the smaller dolphins is very satisfactory. Owing to their small size and negligible economic importance, together with their habit of frequenting the high seas, our precise knowledge of these forms is dependent upon the occasional strandings of specimens. The stranding of a dolphin of small size arouses little or no comment, and consequently only a small per-

[1] One tun = 8 barrels.

centage of such animals come under the notice of specialists, and in most of these cases only the skeleton is available for examination.

Tasmanian representatives of the toothed whales may be divided into three families, as follows:—

1. Functional teeth present only in lower jaw. One pair of grooves on throat:
   (i) Teeth numerous. Blowhole on left side of head. Single nasal passage. Mouth on lower side of head .... family *PHYSETERIDAE*
   (ii) Teeth few. Blowhole median. Double nasal passage. Mouth terminal. Tail not notched .... family *ZIPHIIDAE*
2. Functional teeth present in upper and lower jaws. No grooves on throat. Tail notched .... family *DELPHINIDAE*

THE SPERM WHALES

Family *Physeteridae*

Members of this group may be distinguished as follows:—

1. Large size. Large, sharply truncated head. Blowhole at tip of snout. 22-26 pairs of large conical teeth .... *Sperm Whale*
2. Small size. Relatively small head. Blowhole at vertex of head. 13 pairs of small recurved teeth .... *Pygmy Sperm Whale*

8. SPERM WHALE OR CACHELOT

Physeter catodon Linné, 1758

It is considered by some that there are distinct northern and southern species, by others that there are two southern forms and one northern. Flower (8) considered that there was no difference between northern and southern forms, and that there is only one cosmopolitan species. This would appear to be the soundest view to take.

DISTRIBUTION. Worldwide, and recorded on many occasions from Australian and Tasmanian waters. A school of 36 males and one female was stranded on Perkins Island, North-West Tasmania, in February, 1911. Harmer (13) states that this species occurs in all tropical waters, but stragglers, nearly always old males, reach both polar seas.

EXTERNAL CHARACTERS. The size of this species has been greatly exaggerated. The male rarely exceeds 18·25 m. (60 ft.), the normal size being 12-15 m. (40-50 ft.), and the fully grown female is about 30 per cent. shorter. The Sperm Whale cannot be mistaken for any other whale owing to the enormous head and sharply truncated snout. The blowhole is single, as in all toothed whales, and is situated near the tip of the snout on the left side, and the 'spout' is directed

forward. The dorsal fin is not well defined, and is represented by a series of humps. There are normally 22-26 pairs of teeth in the lower jaw. These teeth are large and conical. Generally there are no teeth in the upper jaw, but on rare occasions a few pairs of small irregular teeth are found. It was a favourite hobby of old-time whalers to engrave the teeth of the Sperm Whale with portraits of ships, &c. The Tasmanian Museum contains a good collection of such 'scrimshaw' work brought back by Hobart whalers. *Colour*, black above, greyish below.

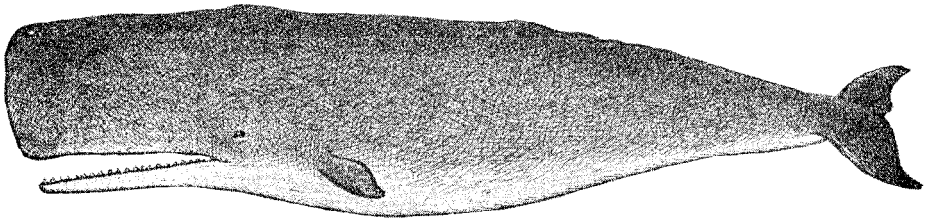

Fig. 5.—The Sperm Whale (*Physeter catodon*)

EXTERNAL MEASUREMENTS of a male (Chubb, 3):—

Tip of snout to notch of tail	16·4 m. (54 ft.)
Tip of snout to posterior insertion of dorsal fin	70·4 %
Length of base of dorsal fin	7·4 %
Tip of snout to eye centre	32·4 %
Tip of snout to anterior insertion of flippers	39·3 %
Length of flipper from head of humerus	8·9 %

NATURAL HISTORY. This species prefers the warmer waters, but passes into higher latitudes in the summer, and usually keeps to the high seas and avoids the land. As a rule, a school consists of several females with one or two males, so that the stranding of a school of whales in Tasmania, all of which, with one exception, were males, as referred to above, must be regarded as unusual. It feeds upon squids. According to an old log-book quoted by Dakin (5, p. 73), if the male is harpooned the cows will desert him. If, however, a cow or calf is harpooned the rest of the school will flock around the wounded whale. The Sperm Whale is very active in spite of its size. It sounds to a great depth, and is said to be capable of remaining submerged for an hour. At one time it was very abundant, and was hunted for its valuable spermaceti, but its numbers have been greatly reduced. The sperm oil is mixed with spermaceti, most of which is contained in the thickened anterior part of the head. This whale is also famous for its ambergris, a pathological secretion of the intestines, which is used in the manufacture of perfumery, and was formerly used as a medicine. According to Dakin (5, p. 238), large males have given as much as 120 barrels of sperm oil, and females averaged 15 to 20 barrels, valued at £250. One sperm whale actually yielded £1600 worth of oil in 1860. Log-book records

dating from 1761 to 1920 show that, so far as the southern hemisphere is concerned, during the months April-September the majority of sperm whales were caught (*a*) in the South Pacific on the equator, also on the Vasquez Ground (sub-tropical) between New Zealand and Fiji, and on the Archer Ground (tropical) and on the Coast of Chile Ground (sub-tropical), off the South American coast; (*b*) in the South Atlantic, mainly on the Carroll Ground, off the African coast; (*c*) in the Indian Ocean, off the African coast, on various tropical and sub-tropical grounds, and the Coast of New Holland Ground, off Western Australia. During the months October-March the records are much more scattered, and show that this species passes southward during these months: (*a*) in the South Pacific still abundant on the grounds already mentioned, but also common to the south of New Zealand, at Chatham Island, also on the Middle Ground between Australia and New Zealand, and more abundant on the Coast of Chile Ground; (*b*) in the South Atlantic abundant down the coast of South America as far as the Falklands, on the Tristan Ground (lat. 35° S.) and Cape of Good Hope, and still abundant on the Carroll Ground; (*c*) in the Indian Ocean, around Zanzibar and Madagascar, and as far south as 40°, and West and South-Western Australia.

Crowther (4, p. 148) gives an interesting map showing the whaling grounds of the Hobart Town whalers. He also gives a detailed historical account of sperm-whaling in Tasmanian ships.

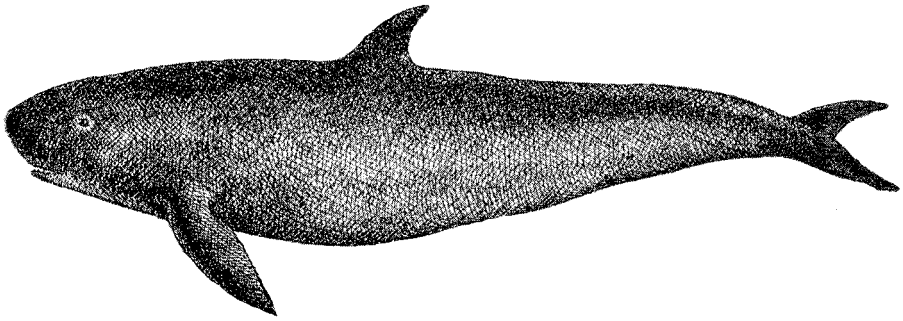

Fig. 6.—The Pygmy Sperm Whale (*Kogia breviceps*)

9. Pygmy Sperm Whale

Kogia breviceps (Blainville, 1838)

Distribution. A rare form, but widely distributed throughout the world, particularly in the southern hemisphere. Not recorded from polar seas. Recorded from Tasmania.

External Characters. Maximum length, 4 m. (13 ft.). Average length of adult, about 2·7 m. (9 ft.). This species is rather delphinoid in appearance. It has a small head and slightly overhanging snout. Dorsal fin is well developed and falcate. The blowhole

is single and placed slightly on the left of the middle line. There are about 13 curved teeth on each side of the lower jaw. Usually no teeth are present in the upper jaw, though there are a few cases on record of one pair being found at the front of the upper jaw. *Colour*, jet black above, white or pinkish-white below, the colours of the two surfaces being clearly separated.

EXTERNAL MEASUREMENTS, after Pearson (24):—

Total length to tip of tail	2·55 m. (8¼ ft.)
Tip of snout to tip of dorsal fin	50·6 %
Height of dorsal	7·4 %
Length of flipper	12·9 %
Tip of snout to front of eye	9 %
Distance between tips of flukes	21·9 %

Practically nothing is known of the natural history of this form.

THE BEAKED WHALES

Family *Ziphiidae*

Tasmanian members of this family may be distinguished as follows:—

1. Conical tooth at tip of lower jaw on each side, at the front of mouth ... *Cuvier's Beaked Whale*
2. One tooth (laterally flattened) situated about halfway along the gape of the mouth, at each side:
   (i) Teeth strap-shaped in mature specimens, and grow upward around the beak ... *Strap-toothed Whale*
   (ii) Teeth triangular in side view ... *Southern Beaked Whale*

10. CUVIER'S BEAKED WHALE

Ziphius cavirostris Cuvier, 1823.

Some authors regard the southern form (*Epiodon chathamiensis* Hector or *Ziphius novae zealandiae* Haast) as being a distinct species. The view taken here, however, is that there is one cosmopolitan species common to both northern and southern hemispheres.

DISTRIBUTION. A cosmopolitan species, which has been recorded from Australia, including Tasmania and New Zealand. It is probably not found farther south than 50° S.

EXTERNAL CHARACTERS. Maximum length, about 8·5 m (28 ft.). Delphinoid shape. Well-defined hump on posterior part of head, over the eyes. Eyes some distance behind the angle of the mouth. Lower jaw underhung and bearing one tooth at each side at the extremity. The teeth of the male are larger than those of the female. In some cases the teeth do not break through the gums. A number of small rudimentary teeth concealed beneath the gums have been recorded in both upper and lower jaws. One pair of grooves joining in front to form a V-shaped groove on the throat. Dorsal fin falcate and situated two-thirds of the distance down the back. *Colour*, head and

anterior portion of back as far as dorsal fin, white; rest of body black. Dorsal fin black, except a narrow white line along the anterior edge. The division between the two colours is well marked except on the cheeks. The colour of this species appears to vary, and a specimen stranded in New Zealand was reported to be dark above and white below.

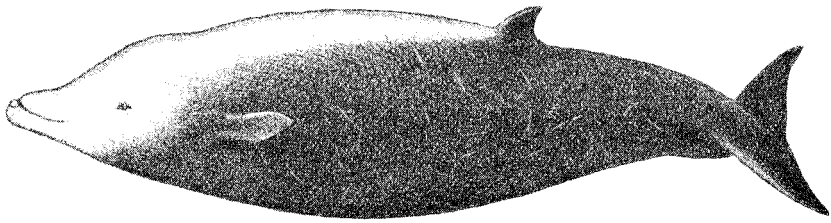

Fig. 7.—Cuvier's Beaked Whale (*Ziphius cavirostris*)

EXTERNAL MEASUREMENTS, after True (29).
Dimensions of a female whale 5·9 m. (19 ft. 4 in.) long.

Tip of snout to eyes	10·8 %
Tip of snout to blowhole	10·4 %
Tip of snout to axilla	20·0 %
Tip of snout to posterior margin of dorsal fin	67·2 %
Length of mouth	5·0 %
Length of flipper from axilla	8·1 %
Breadth of flipper	2·9 %
Vertical height of dorsal fin	5·2 %
Breadth of flukes	28·0 %

Nothing of importance is known of the natural history of this form. The beaked whales are related to the sperm whales, and have spermaceti.

11. STRAP-TOOTHED WHALE

Mesoplodon layardii (Gray, 1865)

DISTRIBUTION. This is a southern form, apparently rare, and has been recorded from Australian waters, New Zealand, Cape Colony, the Falkland Islands, and Tasmania.

EXTERNAL CHARACTERS. The only general description of this animal is given by Waite (31), from a specimen stranded near Lyttleton, New Zealand. Maximum length, about 5·5 m. (18 ft.). The dorsal fin is triangular, the posterior border being about vertical. There is a well-defined 'forehead' and a distinct beak. The most characteristic feature is the single tooth growing up on each side from the lower jaw about half-way along the gape of the mouth, arising from the mandible opposite the posterior end of the symphysis. These teeth grow upward and backward, and curve over the beak

in old specimens (probably only in males), nearly meeting above, and thus preventing the mouth from opening to any extent. In immature specimens the teeth are short, and have a long antero-posterior axis. They are triangular in side view, the apex of the triangle being uppermost and forming the cutting surface of the tooth. The throat has one pair of grooves, widely separated behind and converging in front. *Colour.* From a point half-way down the back to the region immediately in front of the flippers there is a line surrounding the body in an oblique direction. Anterior to this line the body is yellowish-grey, with the exception of an irregular black band encircling the forehead and throat. Posterior to this line the animal is black, with the exception of a small greyish area on the ventral side and the tips of the fluke, which are yellow.

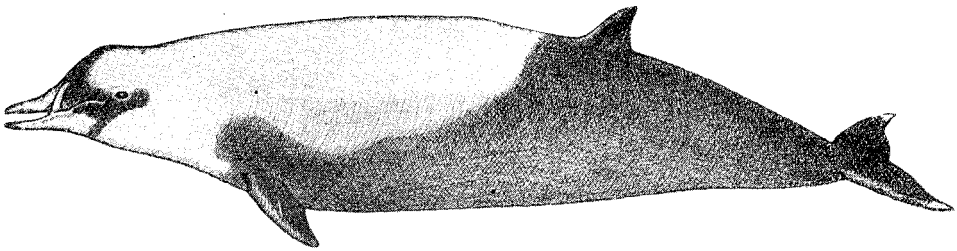

Fig. 8.—Strap-toothed Whale (*Mesoplodon layardii*)

EXTERNAL MEASUREMENTS of a male, given by Waite (31):—

Total length of animal	5·5 m.	(18 ft. 3 in.)
Snout to blowhole	12·2 %	
Snout to dorsal fin	60·8 %	
Base of dorsal fin	8·2 %	
Height of dorsal fin	5·9 %	
Length of flipper	11·6 %	
Width of tail flukes	26·5 %	

Nothing is known of the natural history of this species.

12. SOUTHERN BEAKED WHALE

Mesoplodon grayi von Haast, 1876

DISTRIBUTION. South coast of Australia. Southern Pacific generally, including New Zealand and Patagonia.

EXTERNAL CHARACTERS. Snout pointed and beak-shaped. Flippers small. Dorsal fin falcate. A pair of grooves on the throat. A single tooth on each side of the lower jaw arising at the posterior end of the symphysis, having a position half-way along the gape of the mouth. This tooth is small in young specimens, and may be completely enclosed by the gum. In mature specimens it is large and triangular in side view and laterally compressed. In addition to these functional teeth there may be a series of 17-19 minute teeth on each side of the upper jaw. This row occupies a space of about

10 cm. (4 in.). These teeth are not attached to the maxillae, and come away with the tissues of the gum when these are removed. *Colour*, black all over, sometimes lighter below.

EXTERNAL MEASUREMENTS of a male, given by Hector (15):—

Total length	4·7 m. (15 ft. 6 in.)
Snout to eye	12·3 %
Snout to angle of mouth	8·1 %
Snout to flipper	20·9 %
Snout to dorsal fin	58·1 %
Snout to blowhole	11·3 %
Length of flipper	10·2 %
Height of dorsal fin	4·8 %
Base of dorsal fin	6·4 %

Nothing is known of the natural history of this form.

THE DOLPHINS

Family *Delphinidae*

The Tasmanian dolphins may be identified as follows:—

I. Teeth small. More than 20 on each side of both jaws:
  1. Three teeth in about 15 mm. ($\frac{3}{5}$-in.) of tooth line—
    (i) With dorsal fin:
      (*a*) Teeth 47-51 ... *Common Dolphin*
      (*b*) Teeth 35-44 ... *Slender-beaked Dolphin*
      (*c*) Teeth 28-34 ... *Dusky Dolphin*
    (ii) Without dorsal fin, teeth 35-44 ... *Péron's Dolphin*
  2. Three teeth in about 30 mm. (1¼ in.) of tooth line ... *Bottle-nosed Dolphin*

II. Teeth large. Less than 15 on each side of both jaws.
  1. Three teeth in 80-110 mm. (3¼-4½ in.) of tooth line. Head not globular:
    (i) Three teeth in 100-110 mm. (4-4¼ in.) of tooth line. Colour, black and white ... *Killer Whale*
    (ii) Three teeth in 80-90 mm. (3¼-3½ in.) of tooth line. Colour black ... *False Killer*
  2. Three teeth in 45-55 mm. (1¾-2¼ in.) of tooth line. Head globular ... *Pilot Whale*

13. THE COMMON DOLPHIN

Delphinus delphis Linné, 1758

DISTRIBUTION. Universal. Common in Australian waters. Flower (10) examined a series of skeletons from Tasmania, and stated that they were identical with the English form in every character.

EXTERNAL CHARACTERS. Average length, 2·1 m. – 2·4 m. (7-8 ft.). Body slender. Forehead sloping gradually. There is a distinct beak, which is separated by a groove from the upper part of the head. Dorsal fin triangular, slightly falcate, half-way down the back. Pectoral fin long and narrow. Teeth 46 to 51 on each side of both jaws. One tooth in every 5 mm. of tooth line. *Colour*, variable, generally black above, white or grey below (sometimes yellow in immature specimens). A curved black line outlined

with white runs from the constriction of the beak to the eye. A curved line runs along the side of the body from the eye to the level of the hinder end of the dorsal fin. Above this line the animal is black, below it shades gradually from grey to white. Sometimes the light under-surface is streaked with dark curved lines.

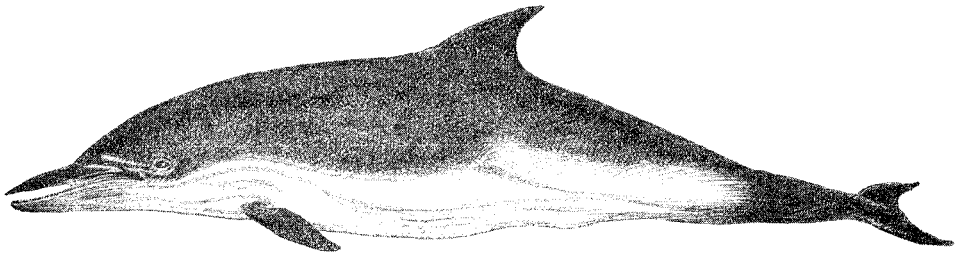

Fig. 9.—The Common Dolphin (*Delphinus delphis*)

EXTERNAL MEASUREMENTS of a female (True, 28):—

Total length	1·9 m. (6 ft. 4 in.)
Tip of snout to angle of mouth	14·5 %
Tip of snout to eye	16·5 %
Tip of snout to blowhole	18·5 %
Tip of snout to base of flipper	23·8 %
Tip of snout to dorsal fin	46·3 %
Length of flipper	15·2 %
Height of dorsal fin	9·3 %
Width of flukes	20·5 %

NATURAL HISTORY. This species is an active, powerful swimmer, and ascends estuaries for many miles from the open sea. It is frequently seen in large schools, which accompany ships on the high seas and play about near the ships' bows. This habit would appear to be common to many of the smaller toothed whales. The Common Dolphin is a fish eater. The stomach of a Mediterranean specimen contained over 15,000 otoliths of fishes. Scott and Lord (27) found the remains of cuttle-fish and Spatangoid spines. In some European countries the flesh of this dolphin is eaten. In Roman Catholic countries it is classed as a fish, and thus affords a welcome variation in the fish diet on fast days.

14. SLENDER-BEAKED DOLPHIN.

Stenella pseudodelphis (Schlegel, 1841)

DISTRIBUTION. Temperate and sub-tropical seas of southern hemisphere.

EXTERNAL CHARACTERS. Similar to the Common Dolphin in general shape, and probably grows to same size. Teeth 35 to 44 on each side of both jaws. One tooth in every 5 mm. of tooth line. *Colour*, dark above, lighter below.

EXTERNAL MEASUREMENTS, from True (28):—

Total length (female)	1·75 m. (5 ft. 9 in.)
Tip of snout to dorsal fin	46·6 %
Tip of snout to base of flipper	23·0 %

Nothing is known of the natural history of this dolphin.

15. DUSKY DOLPHIN

Lagenorhynchus obscurus (Gray, 1828)

DISTRIBUTION. Southern seas as far south as 58° S. Recorded from New Zealand. A skull of this form is in the Tasmanian Museum.

EXTERNAL CHARACTERS. Maximum length, about 1·8 m. (6 ft.). There is a well-developed triangular dorsal fin about half-way down the body. This species is not unlike the Common Dolphin in external shape, except that the dorsal fin has a wider base and there is no distinct beak. Teeth small and numerous. 28-34 on each side of both jaws, commonest dentition 32. One tooth in every 5 mm. of tooth line. *Colour*, variable. Normally the back and fins black. (Sometimes the dorsal fin and flippers are white.) Ventral surface

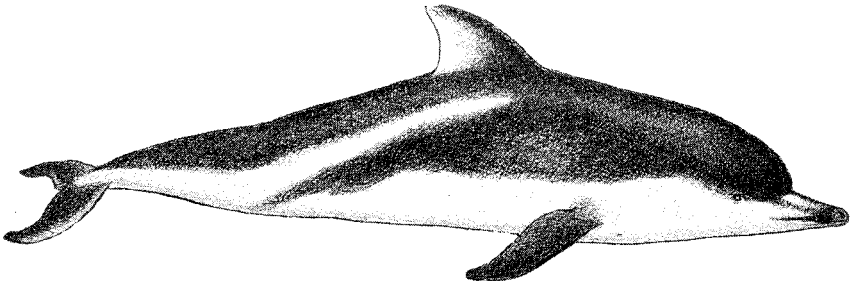

Fig. 10.—The Dusky Dolphin (*Lagenorhynchus obscurus*)

white, an oblique white area invading the dorsal black area immediately below the dorsal fin. Throat white, and this colour may also invade the upper lips. The two colours throughout the body are clearly separated from each other.

EXTERNAL MEASUREMENTS, after True (28), from a dried skin in the British Museum. The measurements may be regarded as only approximately correct.

Total length	1·6 m. (5 ft. 5 in.)
Tip of snout to angle of mouth	13·4 %
Tip of snout to eye	15·4 %
Tip of snout to blowhole	14·6 %
Tip of snout to anterior base of flipper	25·4 %
Tip of snout to anterior base of dorsal fin (along curve of back)	48·8 %
Length of dorsal fin	13·8 %
Height of dorsal fin	11·5 %
Length of flipper	16·9 %
Greatest width of flipper	5·4 %
Width of flukes	24·2 %

NATURAL HISTORY. Little is known of the habits of this form, but it occurs in large schools which play about the bows of ships, and so far as is known it is found only in southern seas.

16. PERON'S DOLPHIN

Lissodelphis peronii (Lacépède, 1804)

DISTRIBUTION. The few recorded observations of this species limit its distribution between 42° S. and 47° S. in the South Pacific and the seas around Tasmania. The first specimen was captured by Péron in 1802 to the south-west of Tasmania. The second specimen recorded from Tasmanian waters was seen in 1910 by the 'Terra Nova' expedition.

EXTERNAL CHARACTERS. This dolphin has two unmistakeable features, the absence of the dorsal fin and the peculiar colour. The lower jaw projects slightly beyond the upper. There is a groove separating the beak from the forehead, the beak being short and nearly in the same plane as the forehead. About 43 teeth on each

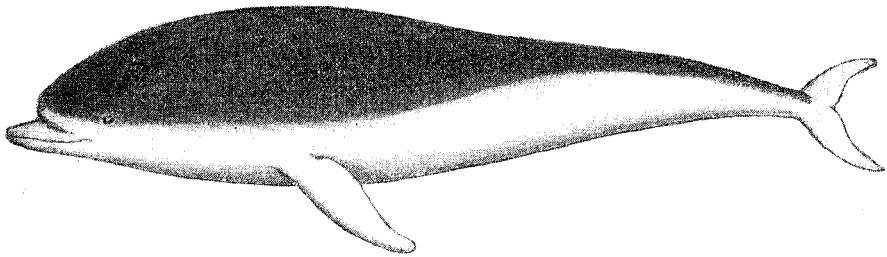

Fig. 11.—Péron's Dolphin (*Lissodelphis peronii*)

side of both jaws. One tooth in every 5 mm. of tooth line. *Colour.* The back is black and the underside white, the separation between the two colours being very pronounced. The black area may or may not invade the tail-flukes.

EXTERNAL MEASUREMENTS, from True (28), after Lesson.

Total length	1·84 m. (6 ft. 2 in.)
End of snout to flipper	32·3 %
End of snout to angle of mouth	14·7 %
Length of flipper	11·4 %
Breadth of flukes	23·5 %

NATURAL HISTORY. This species has been recorded only about half a dozen times, so that little is known of its habits. Lillie (18) records a pair of dolphins belonging to this species as having been seen playing under the bows of the ship. In one case they were in company with a school of Dusky Dolphins, but separate from them, and distinguished not only by their colour and absence of dorsal fin, but also by their larger size.

17. Bottlenosed Dolphin

Tursiops truncatus (Montagu, 1815)

This species was formerly known as *T. tursio*, a name which is now rejected in favour of the designation *T. truncatus*. Scott and Lord (26), though believing that the Southern Tursiops 'closely simulates that of European waters, and upon the whole justifies the retention of a single classification for both parts of the globe', at the same time suggest that the additional distinctive title of 'southern form' should be retained for this dolphin in southern waters. Such a proposal would not be in accordance with the International Rules of Zoological Nomenclature. If the 'southern form' is distinct it should be given definite specific or sub-specific rank. Iredale and Troughton (17), recognizing this, have established a new species, *T. maugeanus*, for Scott and Lord's southern form, but,

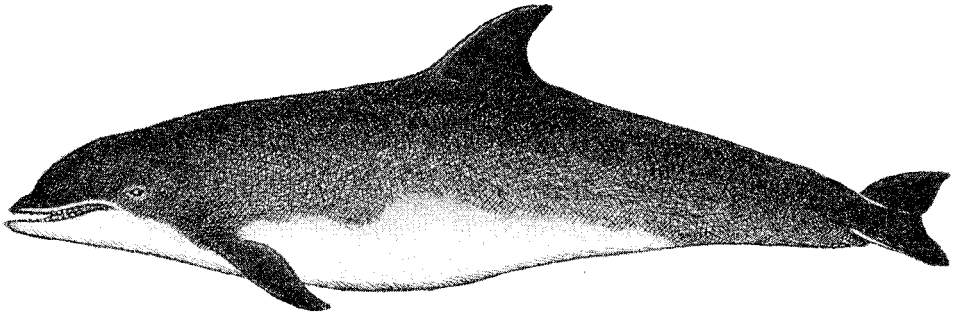

Fig. 12.—The Bottle-nosed Dolphin (*Tursiops truncatus*)

as no diagnosis and no indication as to what characters distinguish it from *T. truncatus* have been published, *maugeanus* is a *nomen nudum*, and cannot stand. Until a complete examination of the 'southern form' has been made it would appear to be advisable to follow Flower (9, p. 481), who stated that the New Zealand form, which, presumably, is identical with the one from Tasmanian waters, differs neither in external appearance nor in its osteological characters from the European form.

Distribution. Universal, ranging from northern temperate to southern temperate seas. Probably not found in polar seas.

External Characters. A large robust dolphin. Maximum length, about 3·0 to 3·3 m. (10-11 ft.), the females being about 10 per cent. shorter than the males. Lower jaw usually projects beyond upper jaw in the males. There is a well-developed, though short, beak. Forehead sloping. About 22-25 large teeth on each side of both jaws. Crown of tooth 17 mm. long, 8 mm. in diameter at the base. One tooth in every 10 mm. of tooth line. Dorsal fin in middle of

back, high and falcate. *Colour*, back and head shining dark-grey or black. Underside white or light-grey, the upper and lower colours passing into each other by insensible gradations.

EXTERNAL MEASUREMENTS of a male, given by Flower (9).

Total length tip of snout to tail notch	2·9 m. (9 ft. 6 in.)
Tip of snout to angle of mouth	10·9 %
Tip of snout to blowhole	13·1 %
Tip of snout to anterior angle of eye	12·9 %
Tip of snout to anterior edge of dorsal fin	44·7 %
Length of flipper	13·6 %
Greatest breadth of flipper	5·3 %
Height of dorsal fin	7·9 %
Breadth of flukes	21·0 %

NATURAL HISTORY. Little appears to be known of the habits of this species. It is stated to ascend estuaries for a considerable distance. The related form *Tursiops catalania*, which is found off the Queensland coast, and may occur in Tasmanian waters, has very interesting habits, which it is stated have been utilized very cunningly by the aborigines. Longman (19, p. 276) has summarized the various accounts of this reputed co-operation. It is stated that the aborigines of Queensland are assisted by this dolphin, which frequents the inshore waters in shoals, in the capture of 'mullet'. The men sit on the sandhills overloking the bay. When a shoal of mullet is sighted the men rush down to the beach and splash the water with their spears. Upon this signal the dolphins drive the mullet inshore. The men enter the water with spears and hand-nets and a scene of confusion follows, in which fish, dolphins, and blacks are all mixed up together. The blacks leave the water when the nets are filled, and the dolphins are left to deal with the remaining fish. It is said that the dolphins will take a fish from the end of a spear when it is offered. The blacks claim that they know the individual dolphins, which become quite tame.

18. THE KILLER

Orcinus orca (Linné, 1758)

I do not propose to follow Iredale and Troughton (16) in assigning to this form the generic name *Grampus*.

DISTRIBUTION. Universal. Probably more common in colder waters.

EXTERNAL CHARACTERS. Grows to a size of 9 m. (30 ft.) in the male and 4·9 m. (16 ft.) in the female. The mature male has the largest dorsal fin of any whale, and may be as much as 1·8 m. (6 ft.) high. The male has relatively larger flippers than the female, and there is a record of a male Killer 9 m. (30 ft.) long, with a flipper 2 m. (6 ft. 8 in.) long and 1·1 m. (3 ft. 7 in.) wide. The flippers are broad and rounded. The teeth are large, and occupy practically the whole length of the gape of the mouth. There are generally 10 to 13 on each side of upper and lower jaws. One tooth in every 35 mm. of tooth line. The *colour* is very characteristic, with sharply

defined black and white (or yellow) areas. The dorsal side is mainly black, but there is a small white patch on each side of the head immediately behind the eyes. There is usually a triangular white patch on each side of the body immediately behind the dorsal fin. The dorsal fin and flippers are black, the flukes black above and white below. The ventral surface has a well-defined white patch, with a wide anterior portion beneath the throat, narrowing behind the flipper, and dividing further back into two lateral areas situated at the sides of the body between the dorsal fin and tail.

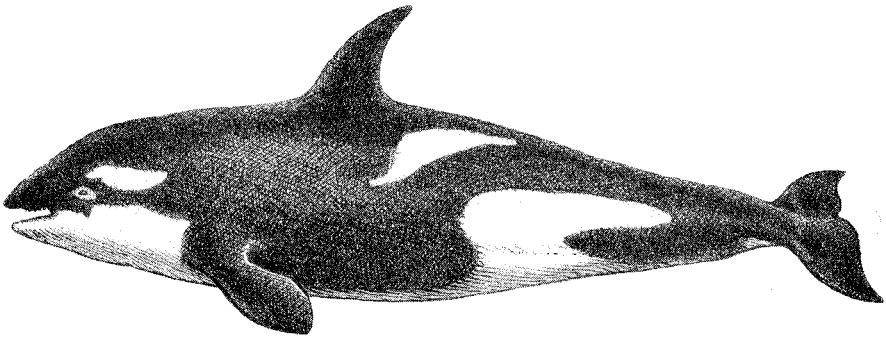

Fig. 13.—The Killer (*Orcinus orca*)

EXTERNAL MEASUREMENTS of a male, from Eschricht (7).

Total length	6·5 m.	(21 ft. 4 in.)
Snout to angle of mouth	7·4 %	
Snout to angle of blowhole	12·1 %	
Snout to angle of dorsal fin	36·7 %	
Snout to angle of base of flipper	16·8 %	
Angle of mouth to eye	2·3 %	
Length of flipper	18·3 %	
Breadth of flipper	15 %	
Height of dorsal fin	18·7 %	
Length of base of dorsal fin	13·3 %	
Distance between flukes	29·3 %	

NATURAL HISTORY. The Killer is very powerful and active. It is the most predatory of all whales, and is said to be the only whale which preys upon other whales. A school of Killers will attack a large whalebone whale or sperm whale very much as a pack of hounds will tackle a deer. These predatory habits of the Killer whales were referred to by Pliny. Eschricht (7) reports that the stomach of a Killer contained 13 porpoises and 14 seals.

19. FALSE KILLER.

Pseudorca crassidens (Owen, 1846)

DISTRIBUTION. Cosmopolitan. Probably more abundant in sub-antarctic seas than elsewhere.

EXTERNAL CHARACTERS. Maximum length, about 5·8 m. (19 ft.). The males are much larger than the females. The head is obtuse. The flippers are small, narrow, and pointed, and relatively shorter than in the Killer. The dorsal fin is situated slightly in front of the middle of the body and is recurved. The teeth are similar in shape and disposition to those of the Killer. The number varies from 8 to 11 on each side of the upper jaw, and 8 to 12 on each side of the lower jaw. Usually there are more teeth on the lower jaw, and the commonest arrangement is $\frac{8}{10}$. One tooth in every 25 to 30 mm. of tooth line. *Colour*, black all over. Sometimes lighter below.

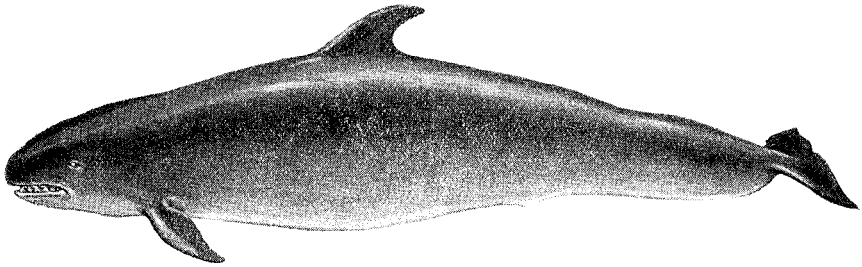

Fig. 14.—The False Killer (*Pseudorca crassidens*)

EXTERNAL MEASUREMENTS. I can find no records of external measurements. Fortunately, while this paper was in the press a school of False Killers was stranded near Stanley, N.W. Tasmania (June, 1936). Mr. E. O. G. Scott, of Launceston, visited the spot and made numerous observations, including measurements. I am indebted to Mr. Scott for the following measurements of three males, varying from 2·79 m. (9 ft. 2 in.) to 4·65 m. (15 ft. 3 in.), and two females, 2·51 m. (8 ft. 3 in.) and 2·67 m. (8 ft. 9 in.), in length. These measurements show that there is considerable variation in the proportions of the body.

	Males.	Females.
Tip of snout to eye	8·2—11·8 %	9·9—13·1 %
Tip of snout to blowhole	9·6—12·4 %	11·7—12·3 %
Tip of snout to base of flipper	14·5—19·6 %	15·3—21·4 %
Tip of snout to posterior margin of dorsal fin	51·2—62·0 %	63·2—71·7 %
Length of base of dorsal fin	15·2—15·7 %	13·8—14·7 %
Height of dorsal fin	8·3— 8·6 %	7·4— 8·3 %
Length of flipper	11·8—13·2 %	11·5—12·6 %
Greatest breadth of flipper	4·7— 5·0 %	4·6— 5·0 %
Distance between flukes	24·0—24·4 %	20·9—21·4 %

NATURAL HISTORY. This whale was first described by Owen in 1846, from a skull found in a sub-fossil condition in the Lincolnshire fens. Fifteen years later it appeared in the flesh on several occasions in the Baltic, and provided Reinhardt (25) with material for a monograph, in which he assigned the False Killer to a new genus, *Pseudorca*. Most subsequent writers have accepted this generic dis-

tinction, though the points in which the Killer and False Killer differ are not very great, and it is doubtful if there is justification for placing these two forms in separate genera. Since its first discovery this species has been recorded from various parts of the world. It occurs in large schools consisting of several hundreds of individuals, and on many occasions more than one hundred specimens have been stranded. In the southern seas it is probable that, in common with most whales, the False Killer migrates into warm tropical and sub-tropical waters in the breeding season (winter), and returns southward in the summer. It is interesting to note that the first record of this species from the southern hemisphere was based upon the Tasmanian specimens sent to the Royal College of Surgeons in 1864 by Dr. W. L. Crowther, of Hobart Town, and described by him as the Blackfish. It is not unlikely that Tasmanian whalers used this term for two distinct forms, the False Killer and the Pilot whale.

20. Pilot Whale

Globicephalus melas (Traill, 1909)

Iredale and Troughton (16) have given reasons for concluding that Lacépède's *Delphinus ventricosus*, established in 1804, referred to the Pilot Whale. If they are right the specific name *ventricosus*

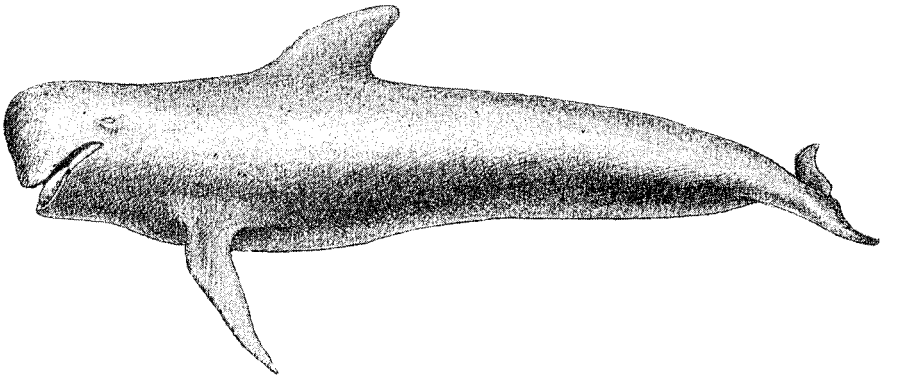

Fig. 15.—The Pilot Whale (*Globicephalus melas*)

would have priority over *melas*. I am not convinced, however, that their case has been established, and I propose, therefore, to retain the name by which this form is generally known.

Distribution. Universal in tropical, temperate, and sub-polar seas.

External Characters. May reach a length of 8·5 m. (28 ft.). It is easily recognized by the shape of its head and the length of the flippers. The head is swollen in front, where it is almost globular.

It overhangs the upper jaw, which forms a very short beak. The flippers are relatively much longer than in any other toothed whale. The dorsal fin is well developed, and is in the anterior half of the body. The number of teeth is very variable. Normally there are about 10 teeth on each side of both jaws, with a maximum of 13 on the upper and 11 on the lower, according to Mr. E. O. G. Scott's observations. One tooth in every 15 to 18 mm. of tooth line. *Colour*, variable, generally described as black all over, with a small amount of white on the under-side. The white (or greyish-white) of the under-surface usually consists of a broad patch under the throat, which sends lateral extensions to the two flippers and a narrow median extension backwards to join a large area which reaches the posterior third of the body.

EXTERNAL MEASUREMENTS. The following measurements were made from specimens which were stranded at Stanley, North-Western Tasmania, in October, 1935.[1] The measurements are given in percentages of the total length.

	Male.	Female.	Female. Foetus.
Total length to caudal notch	3·87 m.	3·88 m.	1·02 m.
Tip of snout to vent	59·4 %	62·3 %	65·6 %
Tip of snout to base of flipper	16·2 %	16·6 %	20·4 %
Tip of snout to front edge of dorsal fin	20·2 %	30·5 %	39·0 %
Tip of snout to blowhole	10·1 %	9·5 %	10·2 %
Length of mouth cleft (measured along the mouth)	8·0 %	8·6 %	8·1 %
Length of flipper	16·9 %	18·8 %	22·9 %
Breadth of flipper	4·8 %	5·3 %	5·8 %
Height of dorsal fin	5·4 %	6·1 %	6·8 %
Width of flukes	20·4 %	19·5 %	18·5 %

A comparison of the foetal with the adult measurements shows that in the younger stages the anterior half of the body is proportionately larger than in the older stages. This is shown, for example, in the comparisons of the length from the snout to vent and in the length of the flippers.

NATURAL HISTORY. This species travels about in large schools. Beddard (2, p. 281) has given a good account of the method of capturing this species. This whale has been fished for many centuries in the northern hemisphere. When a school is sighted the fishermen put out to sea in numerous boats, with the object of driving the whales ashore. Hence the Scottish vernacular term 'Caa'ing whale', which means 'driving whale'. According to Beddard, an average whale gives 1½ barrels of oil, valued at £3 7s. 6d. The meat is dried and pickled, and the stomach is dried and made into buoys.

A large school of nearly 300 Pilot Whales was stranded near Stanley, North-Western Tasmania, on 14th October, 1935. Mr. E. O. G. Scott, B.Sc., of the Queen Victoria Museum, Launceston, accom-

[1] The measurements of the two adults are taken from very copious notes made by Mr. E. O. G. Scott, to whom I am also indebted for the details of the colour of this species, as well as for other information.

panied by Mr. Cunningham, of the Tasmanian Museum and Art Gallery, Hobart, visited the spot, and I am indebted to Mr. Scott for the information I have given regarding measurements and colours. The sex of 194 individuals was determined by Mr. Scott, 80 being males and 114 females. Detailed measurements of 20 specimens were made by Mr. Scott. The largest specimen measured was about 6·1 m. (20 ft.) long. It is hoped that a detailed account of Mr. Scott's observations will be published in the next issue of this Journal.

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