CHAPTER 20

THE WHALES, DOLPHINS, AND PORPOISES

Order Cetacea

ORDER CETACEA

The word Cetacea, derived from the Greek word meaning "whale," is the name used for an order of mammals with two well-defined suborders, the Mysticeti or baleen whales, and the Odontoceti, containing the toothed whales, dolphins, and porpoises. The two groups are very similar in many ways, but there are also striking and basic differences. Both suborders are fully aquatic, with fusiform bodies and tails provided with a horizontal pair of large flukes made of fibrous connective tissue (Fig. 20.1). A dorsal fin supported by similar connective tissue is present in all but a few species in each suborder, but the height of this fin ranges from 22.5% of the body length in the killer whale, *Orcinus orca,* to 1.5% in the sperm whale, *Physeter catodon,* and 1% in the blue whale, *Balaenoptera musculus* (Mörzer Bruyns 1971).

Posterior limbs are absent externally, but remnants of the pelvic girdle and major leg bones may be present internally (Fig. 20.1). The anterior limb is enclosed in the body contour to the wrist, and the exposed manus is termed a flipper. The humerus, radius, and ulna are greatly shortened, and the phalanges of at least digits two and three greatly exceed the usual mammalian number (Fig. 20.1). The nostrils, termed blowholes, are located high on the dorsal surface of the head (Figs. 20.1, 20.14), and the external nares are located at the proximal end of the rostrum of the skull. To allow for these posteriorly displaced nasal openings, the nasal, maxillary, and frontal bones may be telescoped and come to overlap the parietals (Fig. 20.2).

The neck is very short. There are seven cervical vertebrae, but they may be very thin antero-posteriorly and fused together. The necks of most whales are virtually inflexible; that of the white whale or beluga, *Delphinapterus leucas,* is a notable exception.

The skin is essentially hairless. A few vibrissae are present on the snouts of mysticetes and on the heads and bodies of certain freshwater odontocetes, (e.g., *Platanista gangetica*); other odontocetes have vibrissae only during embryonic development (Sokolov 1982). A thick layer of subcutaneous fat (blubber) provides insulation. The eyes are small, and pinnae are absent. The uterus is bipartite, and the urethra and vagina open separately to the exterior. The penis is completely retractile into the body contour, and the testes are permanently internal.

As air-breathing, fully marine animals, the whales have numerous anatomical, physiological, and behavioral specializations that allow them to dive to great depths and to remain underwater for long periods, to move rapidly through water, to travel great distances, and to communicate and reproduce in the vast oceans.

Whales were of major economic importance in the eighteenth and nineteenth centuries, but their commercial importance has declined over the last several decades. Whales have been hunted by coastal peoples in many parts of the world, and a commercial industry developed in western Europe, North America, Japan, Russia, and some parts of South America. Whale meat was eaten in many parts of the world, and is still a food source in

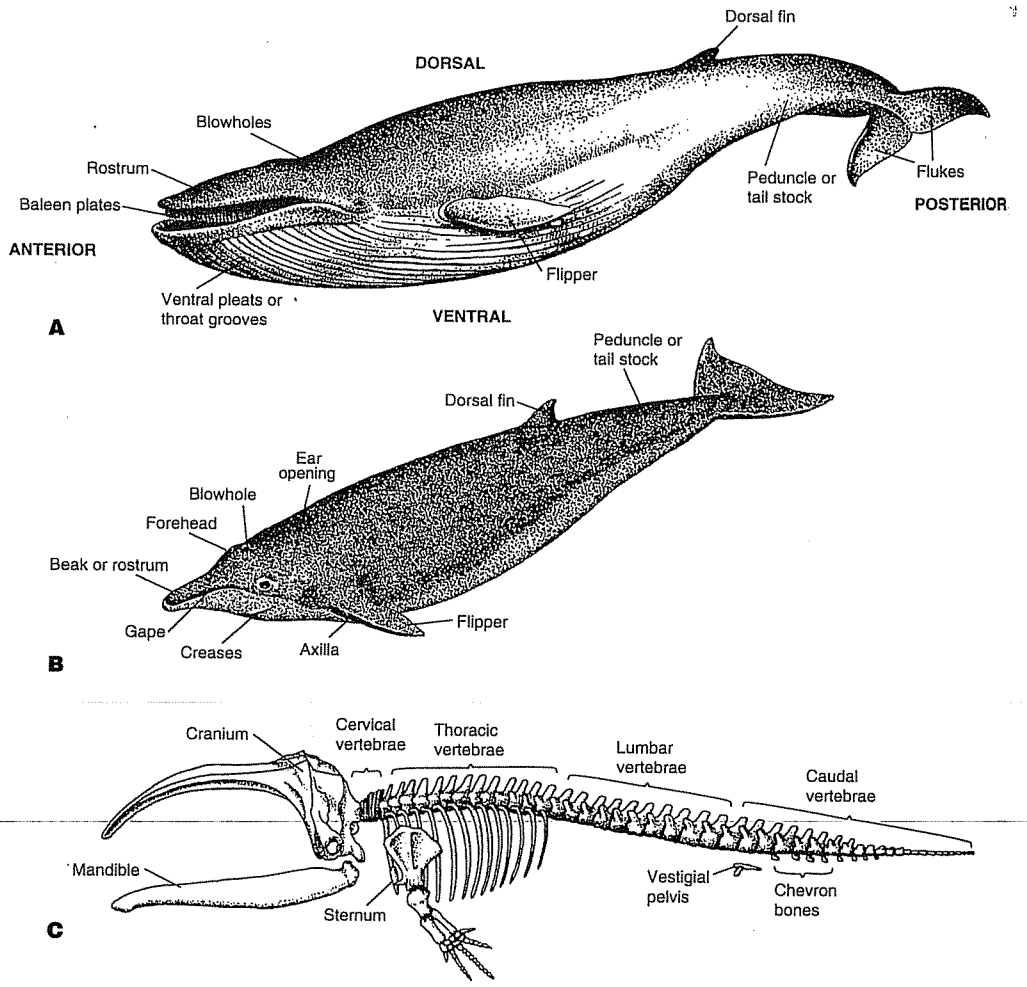

Figure 20.1 Whale body morphology. Lateral view of the general body plan and terminology for (A) baleen whales and (B) toothed whales. (C) Skeleton of a mysticete whale. Note the vestigial pelvis and the chevron bones on the caudal vertebrae. (Feldhamer et al. 1999)

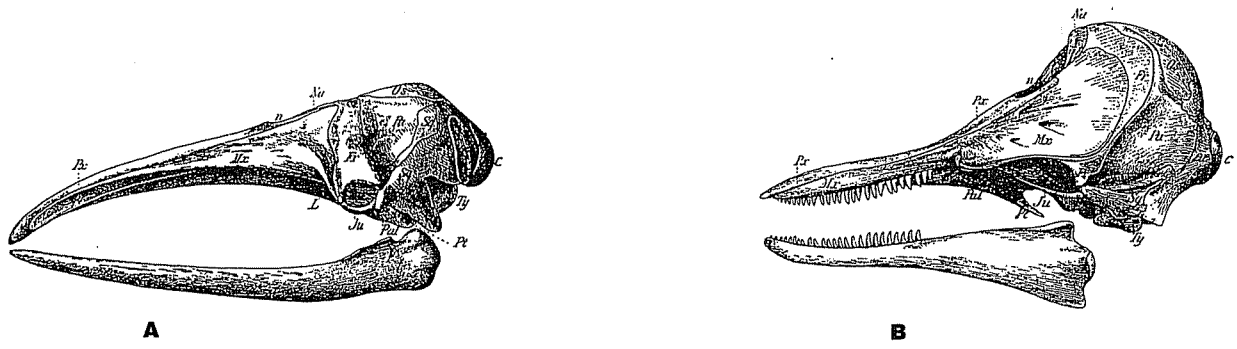

Figure 20.2 Skulls of (A), the northern right whale, *Eubalaena glacialis,* Balaenidae, Mysticeti; and (B), the saddleback dolphin, *Delphinus delphis,* Delphinidae, Odontoceti. C, occipital condyle; Fr, frontal; Ju, jugal; Mx, maxilla; n, external nares; Na, nasal; Oe, exoccipital; Os, supraoccipital; Pa, parietal; Pal, palatine; Pt, pterygold; Px, premaxilla; Sq, squamosal; Ty, tympanic bulla. (Weber 1928)

Japan and the Arctic. Whale oil was an important source of illumination until the development of kerosene, and eventually electricity replaced it.

Modern whaling began with the invention of the harpoon gun that enabled whalers to hit the fast-swimming whales such as the fin and blue, and, later, factory ships were built that allowed complete processing of whales at sea. These developments, together with faster and bigger ships and advanced techniques for locating whales, have had a serious effect on population levels of the "great" whales (the sperm whale and most baleen whales). These whales have become rare, and some, such as the right and blue whales, are near the verge of extinction. In addition, tuna fishermen net huge schools of fish and the dolphins that accompany them, which results in the death of many of these small cetaceans. The United States has prohibited the importation of all whale products and has instituted some controls for the tuna fishing industry. Some other nations have joined in international agreements protecting cetaceans, but the whaling practices of Japan are still being strongly criticized, and more effective international conservation practices still are needed.

The cetaceans have frequently been described as the most intelligent of nonprimate mammals, and some people claim that they are even more intelligent than the anthropoid apes. They have a large brain in proportion to their body size, and they demonstrate complex patterns of behavior and communication. Stories of dolphins aiding humans by helping with fishing, driving away attackers (e.g., sharks), and saving people who were drowning date from Greek mythology and continue into the present.

SUBORDER MYSTICETI

The subordinal name, Mysticeti, is derived from the Greek words for "mystic whale" (Jaeger 1955), and it is not difficult to understand how these marine giants could seem mysterious to men in small boats. The Mysticeti include the blue whale, *Balaenoptera musculus,* which at 27.5 to 33.5 m, and weighing 150 tons (Mörzer Bruyns 1971), is not only the largest living creature but is also the largest known ever to have lived. It weighs as much as 25 elephants or 1,600 men (Slijper and Heinemann 1975). The smallest mysticete, the pygmy right whale, *Caperea marginata,* is about 6 m long and weighs about five tons (Mörzer Bruyns 1971).

The taking of right, gray, blue, and humpback whales is now prohibited to member nations of the International Whaling Commission, but not all whaling is conducted by countries that are members of the Commission. The remaining mysticetes, together with one odontocete, the sperm whale, *Physeter catodon,* are the mainstays of the whaling industry.

Distinguishing Characters

Present-day baleen whales lack teeth in both upper and lower jaws. From 130 to 400 baleen plates are suspended from each side of the upper jaw (Fig. 20.3). Each plate is composed of longitudinal strands of horny epithelial material embedded in a less resistant matrix. On the lingual edge, the matrix is worn away, producing a fringe of the tougher strands (Fig. 20.4). The plates are so arranged that the fringes of adjacent plates overlap to produce a continuous strainer-like network. The baleen whales feed by taking in huge mouthfuls of sea water (Fig. 20.5). Then they partially close the mouth and use their large tongues to force the water out between the frayed fringes of the baleen plates. The fringes strain small organisms from the water, and this food is then swallowed.

The skull is bilaterally symmetrical, and the nasal bones extend anteriorly over the nasal passage (Fig. 20.2A). The two nasal passages exit as separate, adjacent blowholes.

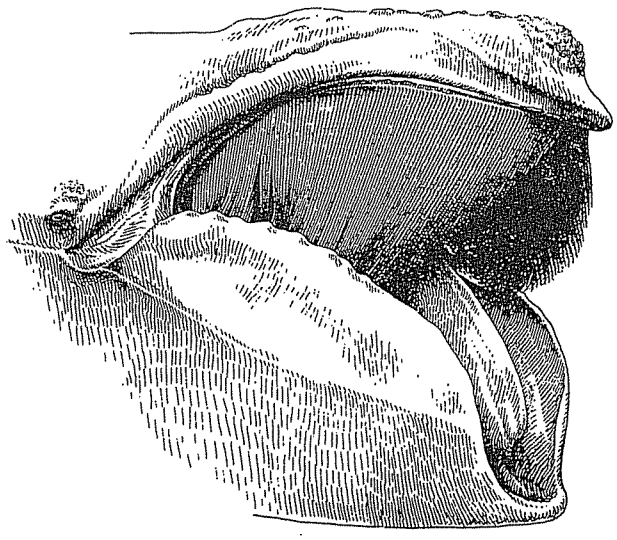

Figure 20.3 The head of a northern right whale, *Eubalaena glacialis,* Balaenidae, showing the arrangement of baleen plates.
(Gromov et al. 1963)

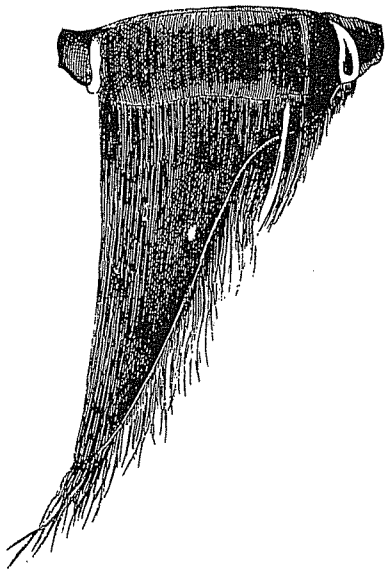

Figure 20.4 A single plate of baleen.
(Duncan 1877)

LIVING FAMILIES OF MYSTICETI

A list of living families of Mysticeti, and their contents, is given in Table 20.1.

Mysticetes are found in all oceans, but they are more common in the far north and far south than in tropical waters. Little is known about the movements of the pygmy right whale and of Bryde's whale. All other mysticetes are known to be migratory, moving between the cooler water areas that they inhabit in the summer and the warmer water areas that they winter in.

KEY TO LIVING FAMILIES OF MYSTICETI

1 Posterior border of nasals and premaxillae anterior to supraorbital process of frontals; rostrum long, slender, and may be very highly arched (Fig. 20.6); throat not grooved (Fig. 20.7) or with only two faintly developed grooves; middle baleen plates on each side considerably longer than anterior and posterior plates **3**

1' Nasals and nasal processes of premaxillae extending posteriorly beyond anterior borders of supraorbital processes of frontals (Fig. 20.8); rostrum broader, less arched; throat grooved (Fig. 20.5); baleen plates all approximately the same length **2**

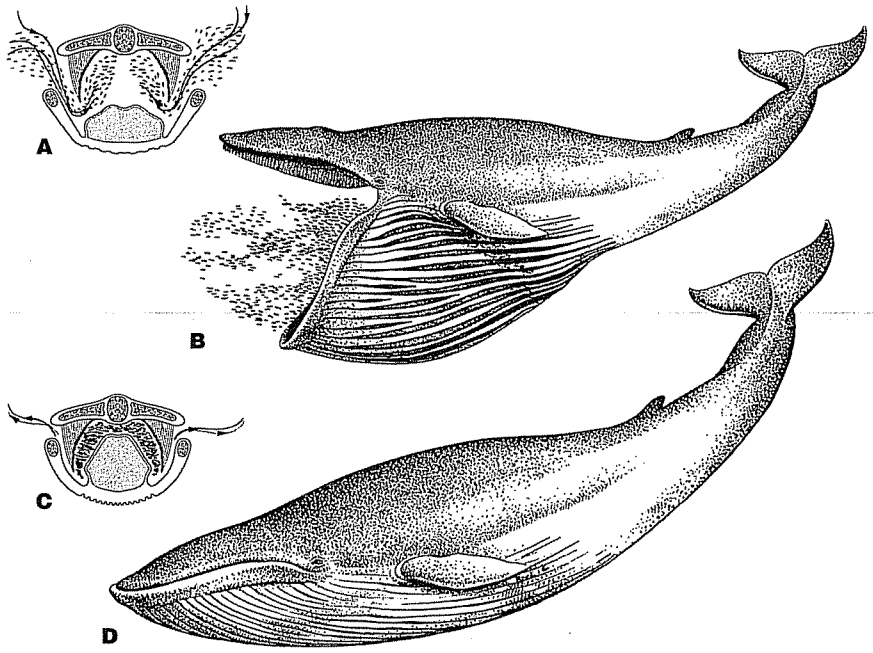

Figure 20.5 Gulping in baleen whales. (A) As the mouth opens, huge amounts of water pour in along with vast quantities of plankton and necton, with the (B) throat grooves allowing for expansion of the oral cavity. (C) This water is then expelled through the filterlike baleen mat as (D) the throat contracts, trapping the food, which is scraped off by the tongue and swallowed.
(Feldhamer et al. 1999)

TABLE 20.1 Living Families of Mysticeti*

Family	Common Name	Number of Genera	Number of Species	Distribution
Balaenidae	Right whales	2	3	All oceans except in Southern Hemisphere tropics
Eschrichtiidae	Gray whale	1	1	North Pacific coasts (extirpated in North Atlantic in historic times)
Balaenopteridae	Rorquals and humpback whale	2	6	All oceans
Neobalaenidae	Pygmy right whale	1	1	Oceans of Southern Hemisphere in cold to temperate waters

*Based upon Mead and Brownell (1993).

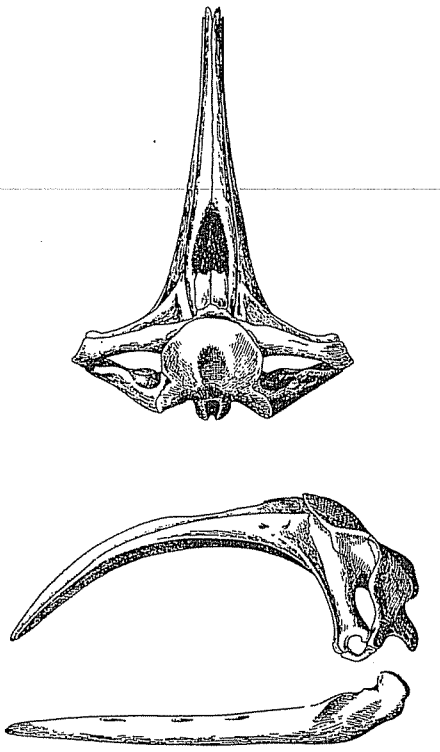

Figure 20.6 Skull of a northern right whale, *Eubalaena glacialis,* Balaenidae.
(Cabrera 1914)

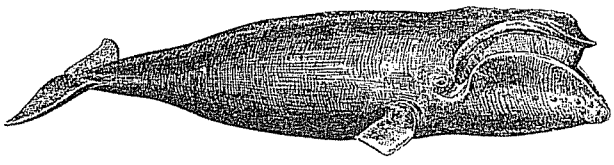

Figure 20.7 A northern right whale, *Eubalaena glacialis,* Balaenidae.
(Cabrera 1914)

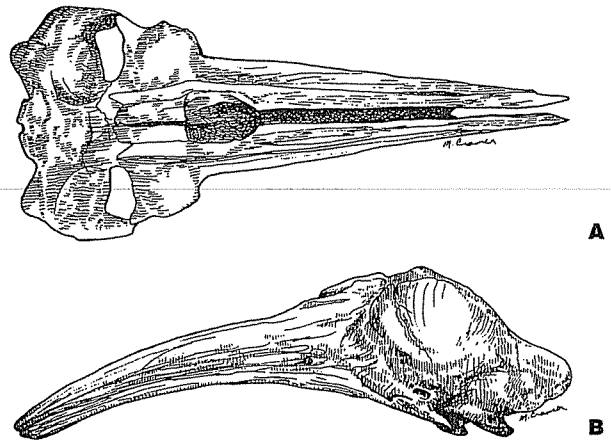

Figure 20.8 Skull of a gray whale, *Eschrichtius robustus,* Eschrichtiidae. (A) Dorsal view; (B) lateral view.
(Mary Ann Cramer)

2 (1') Nasals large, frontals broadly exposed on vertex of skull; rostrum arched (Fig. 20.8); mandibles not conspicuously bowed outwards; throat with only a few short grooves; dorsal fin absent, but with a series of middorsal bumps posteriorly (Fig. 20.9) ..... **Eschrichtiidae**
gray whale, *Eschrichtius robustus*

2' Nasals reduced, frontals scarcely or not at all exposed on vertex of skull (Fig. 20.10); rostrum not arched (Fig. 20.10); mandibles conspicuously bowed outwards; numerous parallel grooves covering entire throat and chest region (Figs. 20.5 and 20.11); dorsal fin present (Fig. 20.11) ..... **Balaenopteridae**
rorquals and humpback whale

3 (1) Dorsal fin present; two poorly defined throat grooves present; skull length not exceeding 2 m ..... **Neobalaenidae**
pygmy right whale, *Caperea marginata*

3' Dorsal fin absent; no indication of throat grooves (Fig. 20.7), skull length of adults greatly exceeding 2 m ..... **Balaenidae** right whales

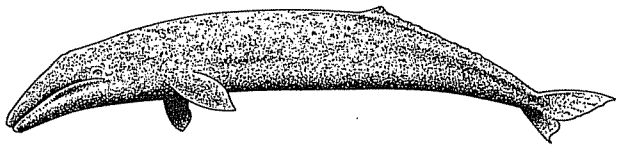

Figure 20.9 A gray whale, *Eschrichtius robustus,* Eschrichtiidae. The small raised point on the dorsum is the first and largest of a series of middorsal bumps. The more posterior ones are poorly indicated in this drawing.
(Giuliani 1995)

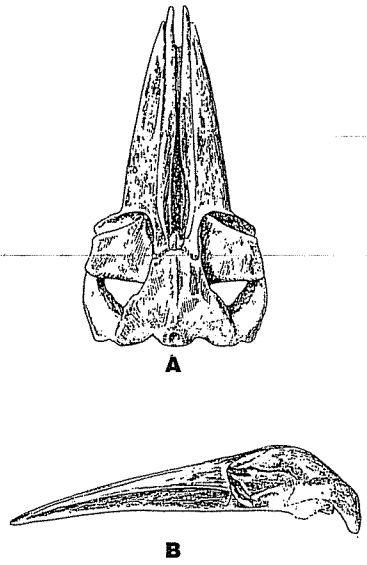

Figure 20.10 Skull of a fin whale, *Balaenoptera physalus,* Balaenopteridae. (A) Dorsal view; (B) lateral view.
(Tomilin 1962)

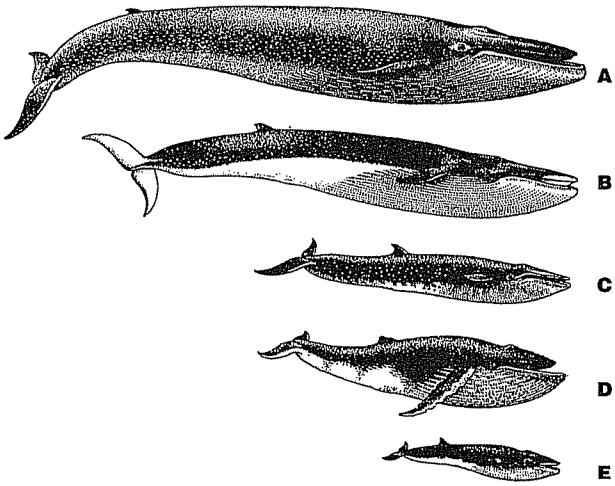

Figure 20.11 The size range in rorquals and humpback, Balaenopteridae. (A) Blue whale, *Balaenoptera musculus* (27–33.2 m); (B) fin whale, *B. physalus* (20–25 m); (C) sei whale, *B. borealis* (12–18 m); (D) humpback whale, *Megaptera novaeangliae* (± 17 m); (E) minke whale, *Balaenoptera acutorostrata* (7.6–9.2 m). The only species of Balaenopteridae not pictured, Bryde's whale, *B. edeni,* (12–15 m), is about the same size as the sei whale.
(Figures, Gromov et al. 1963; dimensions, Mörzer Bruyns 1971)

COMMENTS AND SUGGESTIONS ON IDENTIFICATION

Skulls of the four mysticete families can generally be distinguished by the degree of arching of the skull (see Figs. 20.6, 20.8, and 20.10). Externally, the gray whale could be confused with a small rorqual, but it has no dorsal fin and only a few throat grooves. A humpback whale could be confused with a balaenid, but the humpback has throat grooves and a dorsal fin, both lacking in the balaenids. The combination of small size with the presence of a dorsal fin and only two poorly defined throat grooves distinguishes the pygmy right whale.

SUBORDER ODONTOCETI

The subordinal name, Odontoceti, literally means "tooth whales," and the presence of teeth most prominently distinguishes this group from the Mysticeti. The teeth are single-rooted, unicuspid, usually conical, and homodont. In some forms, teeth are lost entirely in the upper and/or lower jaw or are greatly reduced in number (Fig. 20.12A and B). But in most forms, teeth are numerous (Figs. 20.2B, 20.12C and D, 20.26C, 20.30A) and can range up to a total of 220 in the La Plata dolphin, *Pontoporia blainvillei* (Mörzer Bruyns 1971). The toothed cetaceans specialize in utilization of relatively scarce food sources. Different kinds hunt different sorts of fish or invertebrates, and, consequently, they have developed different feeding adaptations. Sight is not well-developed, and olfaction is probably nonexistent, but hearing is extremely well-developed. Most, if possibly not all, odontocetes communicate by sound and sense objects in their environments by sonar.

The sperm whale, *Physeter catodon,* at 20 m and 60 tons for males, and 12 m and 18 tons for females, is the largest odontocete and the only toothed whale that is a major target of the whaling industry. Dolphins are popular zoo animals, and marine exhibits featuring performing delphinids are now common.

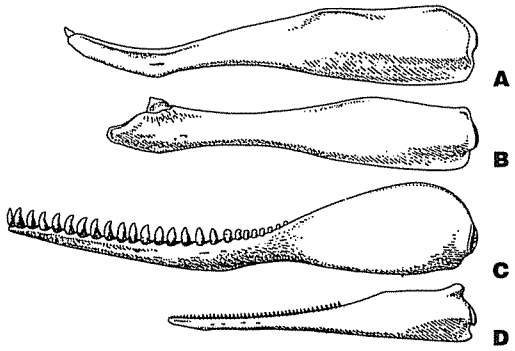

Figure 20.12 Lower jaws of four odontocetes. (A) Male goose-beaked whale, *Ziphius cavirostris;* and (B) Gray's beaked whale, *Mesoplodon grayi,* both Ziphiidae; (C) the sperm whale, *Physeter catodon,* Physeteridae; and (D) a saddleback dolphin, *Delphinus delphis,* Delphinidae.
(Gromov et al. 1963)

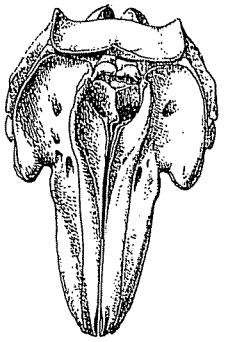

Figure 20.13 Dorsal view of the skull of an odontocete, the killer whale, *Orcinus orca,* Delphinidae, showing asymmetry in the region of the external nares.
(Gromov et al. 1963)

Distinguishing Characters

Teeth are almost always present; baleen is always absent. The skull is often bilaterally asymmetrical in the area of the external nares (Fig. 20.13), and the nasal bones do not project anteriorly over the nasal passages (Figs. 20.2B, 20.13). Externally, the nostrils are united into a single blowhole (Fig. 20.14).

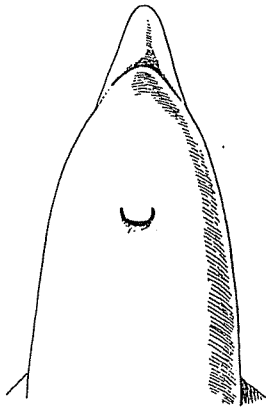

Figure 20.14 Dorsal view of the anterior portion of a bottle-nosed dolphin, *Tursiops truncatus,* Delphinidae, showing the single blowhole.
(Cabrera 1914)

Living Families of Odontoceti

A list of living families of Odontoceti, and their contents, is given in Table 20.2.

Most odontocetes are marine, but one family, Platanistidae, primarily inhabits fresh water; certain species of Delphinidae are common in fresh water, and at least one species of phocoenid is commonly found there as well.

Odontocetes occur in all oceans and seas, but many species never venture far from coastlines. The sperm

Table 20.2 Living Families of Odontoceti*

Family	Common Name	Number of Genera	Number of Species	Distribution
Platanistidae	Freshwater dolphins	4	5	Neotropical, Oriental, coastal waters off southeastern South America
Delphinidae	Dolphins, killer whales, etc.	17	32	All oceans and seas, Neotropical, some rivers outside Neotropics
Phocoenidae	Porpoises	4	6	All oceans, some rivers
Monodontidae	Narwhal and beluga	2	2	Arctic Ocean, adjacent seas and large rivers
Physeteridae	Sperm whales	2	3	All oceans
Ziphiidae	Beaked whales	6	19	All oceans

*Based on Mead and Brownell (1993).

whale and many other kinds of Odontoceti, except for the platanistids, are known to be migratory (Rice 1984).

KEY TO LIVING FAMILIES OF ODONTOCETI

1 Teeth absent (or apparently absent) in lower jaws **2**

1' Teeth present in the lower jaw; these may be unerupted but form obvious bulges **3**

2 (1) Rostrum broad, nearly as wide as long; two teeth present in upper jaw, right one in males usually unerupted, both teeth may be unerupted in females, left tooth (and sometimes right one as well) in adult males a long spiraling tusk (Figs. 20.15, 20.16A) ..... **Monodontidae** (in part)
narwhal, *Monodon monoceros*

2' Rostrum narrow, much longer than wide (Fig. 20.17); teeth absent in upper jaw, unerupted teeth only may be present in lower jaw ..... **Ziphiidae** (in part)
those without obvious teeth

3 (1') Size very large, total length of skull over 2 m, total length of animal 12–20 m; 16 to 30 large conical teeth present in each dentary; no erupted teeth present in upper jaws (rarely a few rudimentary teeth erupted) (Fig. 20.18A); mandibular symphysis at least 35% of mandible length (Fig. 20.18A); head very large and blunt anteriorly (Fig. 20.19A) ..... **Physeteridae** (in part)
sperm whale, *Physeter catodon*

3' Size large to small, skull less than 2 m (rarely more than 1 m), total length of animal less than 12 m; teeth present in both upper and lower jaw, or if absent in upper jaw, lower teeth do not number more than 16 per dentary; mandibular symphysis less than 35% of mandible length, or if more than 35%, many well-developed teeth present in upper jaws; head shape various (Fig. 20.20) **4**

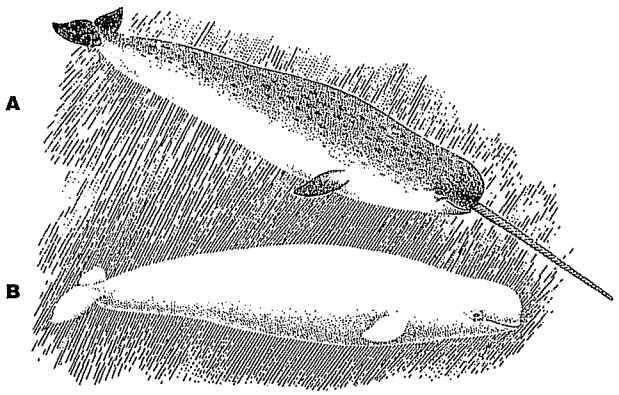

Figure 20.16 The Monodontidae. (A) A male narwhal, *Monodon monoceros;* and (B) a beluga, *Delphinapterus leucas.*
(Gromov et al. 1963)

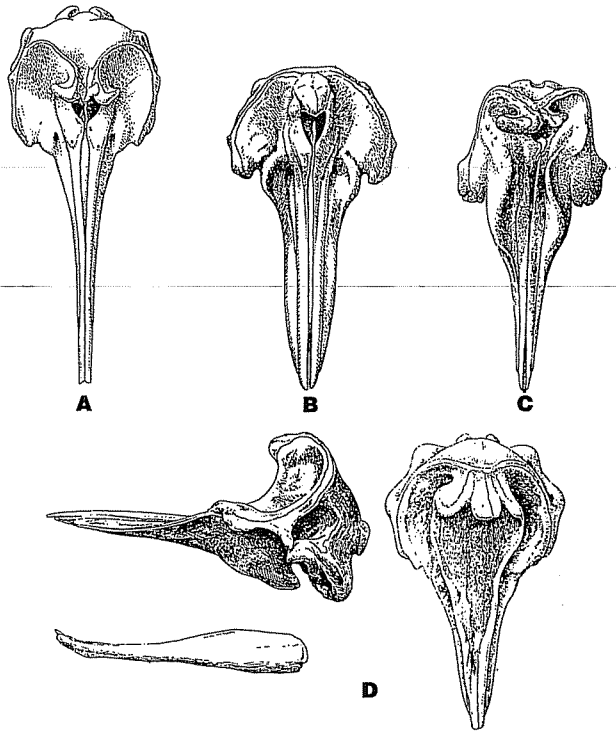

Figure 20.17 Skulls of some beaked whales, Ziphiidae. (A) Sowerby's beaked whale, *Mesoplodon bidens;* (B) Baird's beaked whale, *Berardius bairdii;* (C) northern bottle-nosed whale, *Hyperoodon ampullatus;* and (D) goose-beaked whale, *Ziphius cavirostris.*
(Dorsal views, Gromov et al. 1963; lateral view, Cabrera 1914)

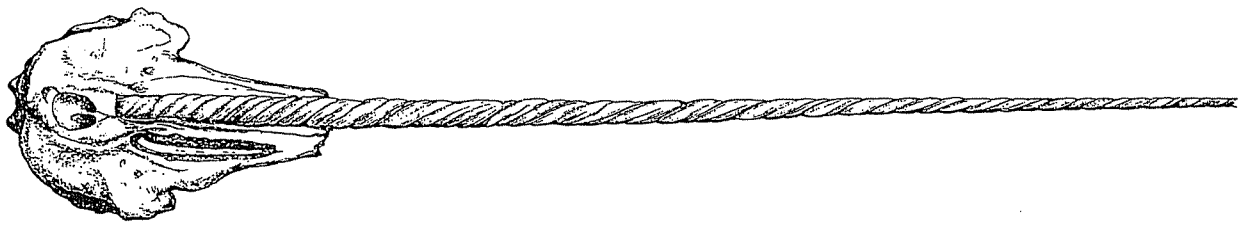

Figure 20.15 Skull of a male narwhal, *Monodon monoceros,* Monodontidae. The top of the rostrum has been dissected to show the root of the large left tusk and the small, unerupted, right tusk.
(Flower and Lydekker 1891)

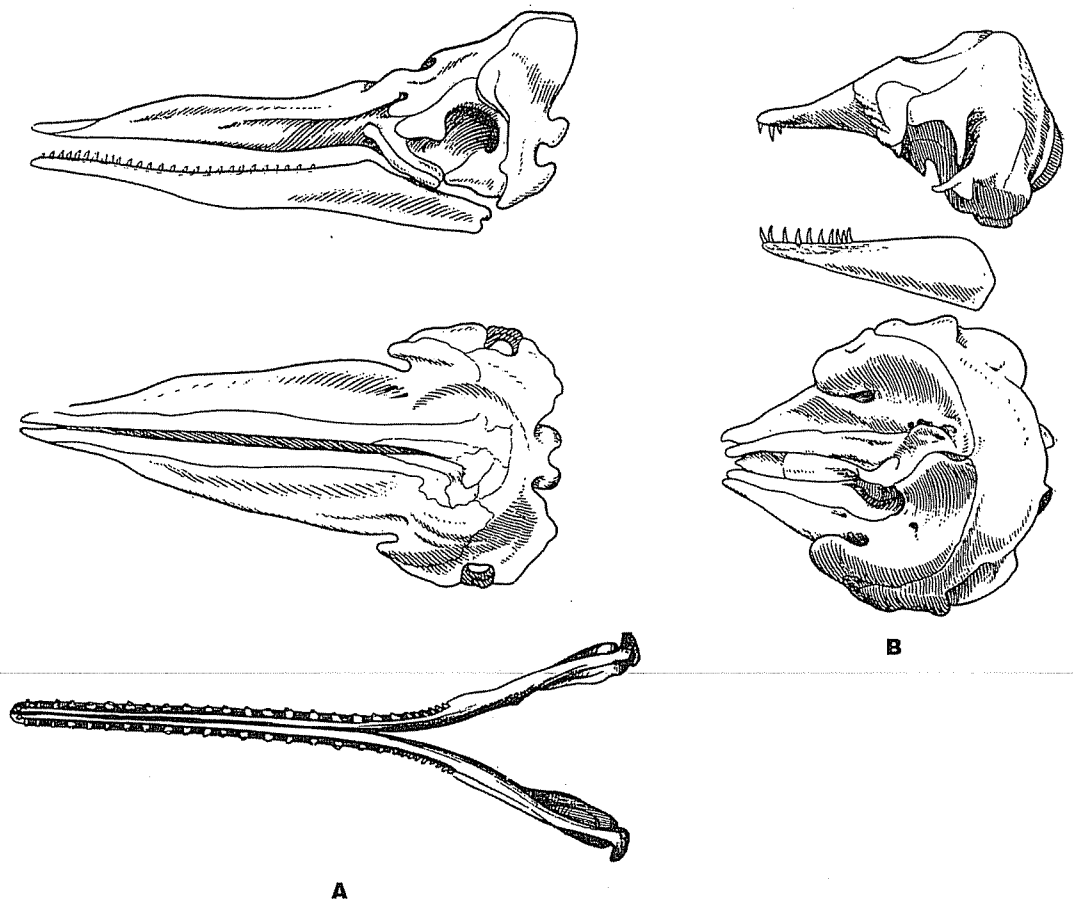

Figure 20.18 Lateral and dorsal views of the skulls of two physeterids. (A) The sperm whale, *Physeter catodon;* and (B) a pygmy sperm whale, *Kogia simus.*
(A, dorsal view of *Physeter* lower jaw, Giebel 1859; A, *Physeter* skull views and B, Bobrinskii et al. 1965)

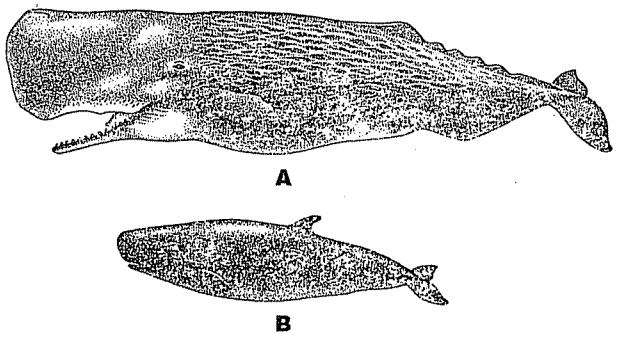

Figure 20.19 Two physeterids. (A) The sperm whale, *Physeter catodon;* and (B) a pygmy sperm whale, *Kogia breviceps.*
(Gromov et al. 1963)

4 (3') Zero to seven teeth present on each side above, or if eight or more on each side above, then anterior one or two lower teeth on each side much larger than upper teeth or posterior lower teeth **5**

4' At least eight well-developed teeth present on each side above and below, anterior lower teeth not appreciably larger than the others **7**

5 (4) One or two teeth in each dentary (Fig. 20.12A, B), usually large—if more than two present, posterior teeth considerably smaller than anterior teeth; rostrum long and narrow (Fig. 20.17); two deep grooves on throat, converging anteriorly (Fig. 20.21); size large, 3.6 to 12 m total length; snout "beaklike" (Figs. 20.20A–D, 20.21) ..... **Ziphiidae** (in part)
beaked whales with teeth

5' Three or more teeth in each dentary, posterior teeth not appreciably smaller than anterior teeth (Fig. 20.18B); rostrum short and broad (Figs. 20.18B, 20.22); no grooves on throat; size medium, 3 to 4 m total length; head blunt (Figs. 20.19B, 20.20G) **6**

6 (5') Lower teeth number fewer than eight in each dentary; external nares fully visible in dorsal view of skull (Fig. 20.22); dorsal fin tall, about 42 cm (Fig. 20.23) ..... **Delphinidae** (in part)
Risso's dolphin, *Grampus griseus*

6' Lower teeth number eight or more in each dentary; external nares barely visible in dorsal view of skull (Fig. 20.18B); dorsal fin short, about 24 cm high (Fig. 20.19B) .... **Physeteridae** (in part) pygmy and dwarf sperm whales

7 (4') Mandibular symphysis greater than 40% of mandible length; tooth-rows parallel for most of their length; teeth number from 25 to 60 in each quadrant; rostrum very long and very narrow, depth and breadth of rostrum about equal (Figs. 20.24, 20.25) ..... **Platanistidae** freshwater dolphins

7' Mandibular symphysis less than 40% of mandible length; tooth-rows diverge, teeth number from five to 52 in each quadrant; rostrum various but never as above, depth always considerably less than breadth **8**

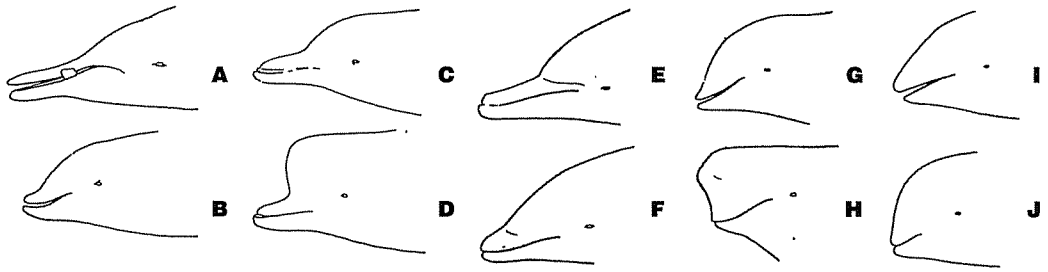

Figure 20.20 Some examples of head shape in the Ziphiidae (A–D), Delphinidae (E–H), and Phocoenidae (I–J). (A) Stejneger's beaked whale, *Mesoplodon stejnegeri;* (B) goose-beaked whale, *Ziphius cavirostris;* (C) a giant bottle-nosed whale, *Berardius;* (D) a bottle-nosed whale, *Hyperoodon;* (E) saddleback dolphin, *Delphinus delphis,* or *Stenella,* or a bottle-nosed dolphin, *Tursiops truncatus;* (F) *Lagenorhynchus,* or a right whale dolphin, *Lissodelphis;* (G) Risso's dolphin, *Grampus griseus;* (H) a pilot whale, *Globicephala;* killer whale, *Orcinus orca;* false killer whale, *Pseudorca crassidens;* (I) a harbor porpoise, *Phocoena,* or Dall porpoise, *Phocoenoides dalli;* and (J) finless porpoise, *Neophocaena phocaenoides.*
(Gromov et al. 1963)

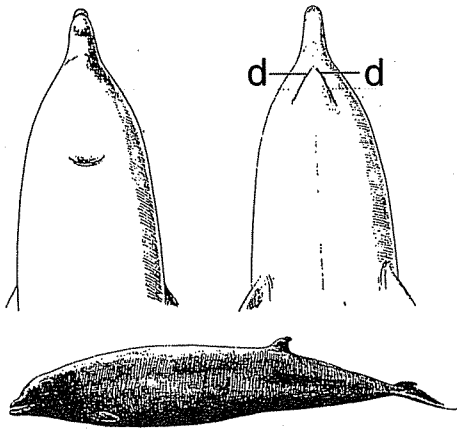

Figure 20.21 Dorsal and ventral views of the anterior end of and a lateral view of an entire goose-beaked whale, *Ziphius cavirostris,* Ziphiidae; d, grooves on the throat.
(Cabrera 1914)

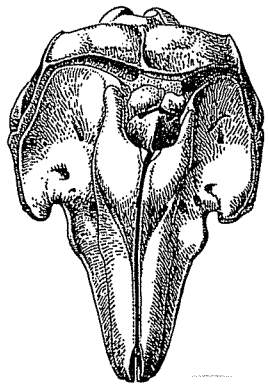

Figure 20.22 Dorsal view of the skull of Risso's dolphin, *Grampus griseus,* Delphinidae.
(Gromov et al. 1963)

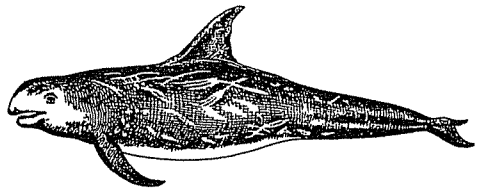

Figure 20.23 Risso's dolphin, *Grampus griseus,* Delphinidae.
(Cabrera 1914)

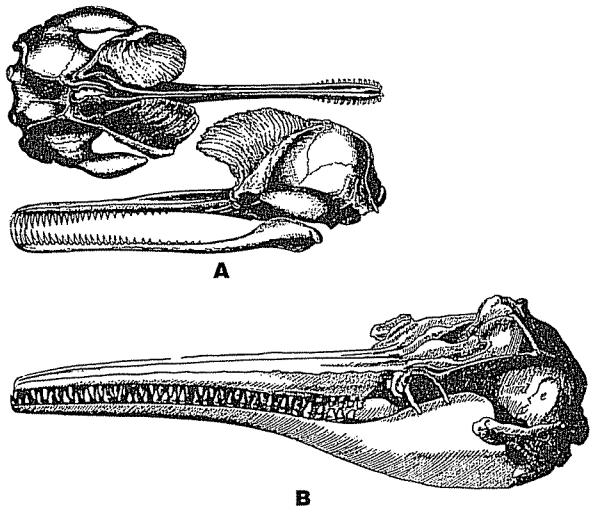

Figure 20.24 Skulls of two platanistids. (A) Dorsal and lateral views of a Ganges river dolphin skull, *Platanista gangetica.* Note the shieldlike processes of bone. These are unique to the genus. (B) Lateral view of the skull of the boto, *Inia geoffrensis.*
(A, Duncan 1877; B, Geibel 1859)

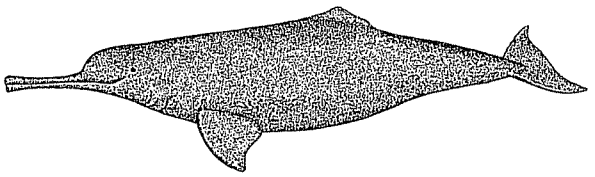

Figure 20.25 A Ganges river dolphin, *Platanista gangetica,* Platanistidae.
(Feldhamer et al. 1999)

8 (7') Premaxillae with prominent bosses (bumps) immediately in front of external nares (Fig. 20.26); teeth laterally compressed and spadelike (Fig. 20.27); head blunt (Figs. 20.20I, J, 20.28) ..... **Phocoenidae** porpoises

8' Premaxillae flat or concave immediately in front of narial openings; teeth generally conical, never laterally compressed and spadelike; head shape various (Fig. 20.20E–I) **9**

9 (8') When skull is viewed in profile, top of rostrum flat or slightly convex between anterior edge of nares and distal tip of premaxillae (Fig. 20.29); teeth 10/8; dorsal fin absent, color white in adults (gray or yellowish in immatures) (Fig. 20.16B) ..... **Monodontidae** (in part) beluga, *Delphinapterus leucas*

9' When skull is viewed in profile, top of rostrum distinctly concave between anterior edge of nares and distal tip of premaxillae (Fig. 20.30); teeth vary in number, usually exceeding 10/8; dorsal fin usually present, color various (Fig. 20.31) ..... **Delphinidae** (in part) all genera except *Grampus*

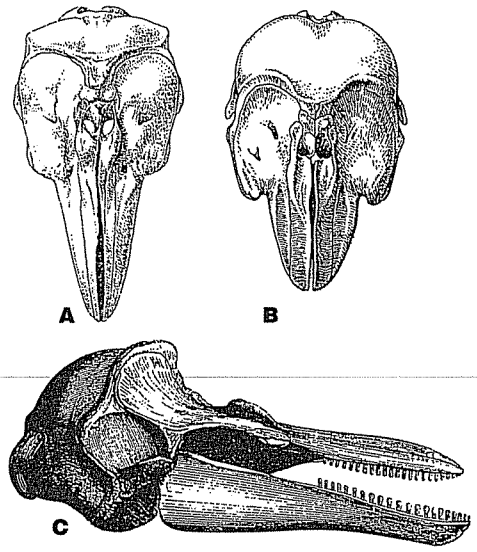

Figure 20.26 Skulls of representative Phocoenidae. (A) Dorsal view of skull of the harbor porpoise, *Phocoena phocoena;* (B) dorsal view of skull of the finless porpoise, *Neophocaena phocaenoides;* and (C) lateral view of a phocoenid skull showing the bosses anterior to the external nares.
(A and B, Gromov et al. 1963; C, Gervais 1855)

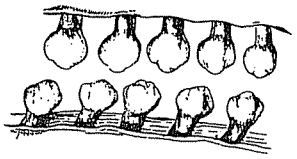

Figure 20.27 The laterally compressed teeth of a porpoise, Phocoenidae.
(Flower and Lydekker 1891)

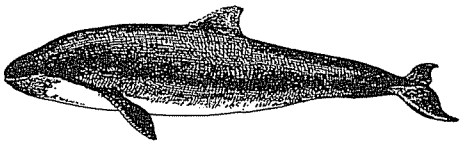

Figure 20.28 A phocoenid, *Phocoena phocoena.*
(Cabrera 1914)

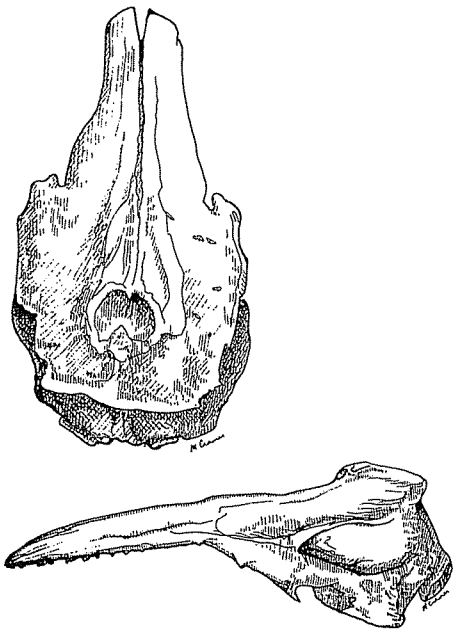

Figure 20.29 Dorsal and lateral views of the cranium of a white whale or beluga, *Delphinapterus leucas,* Delphinidae.
(Mary Ann Cramer from Tomilin 1962)

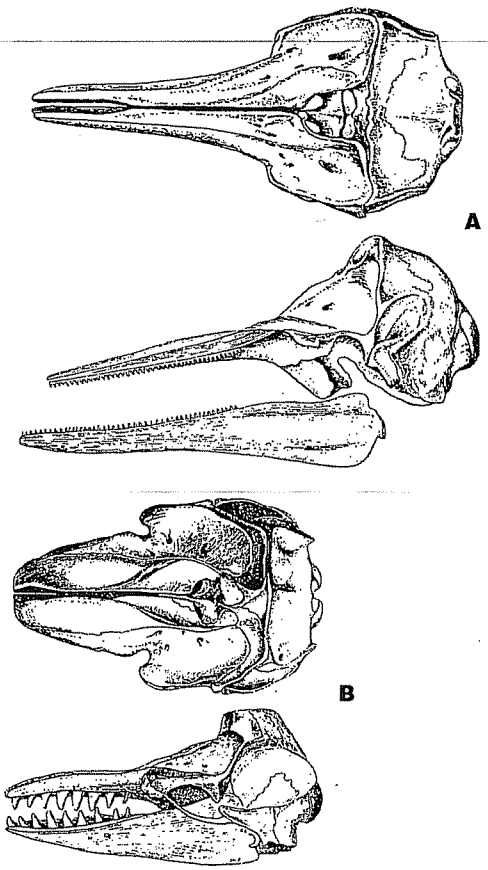

Figure 20.30 Dorsal and ventral views of skulls of two of the many species of Delphinidae. (A) The striped dolphin, *Stenella coeruleoalba;* and (B) the false killer whale, *Pseudorca crassidens.* Not to same scale.
(Tomilin 1962)

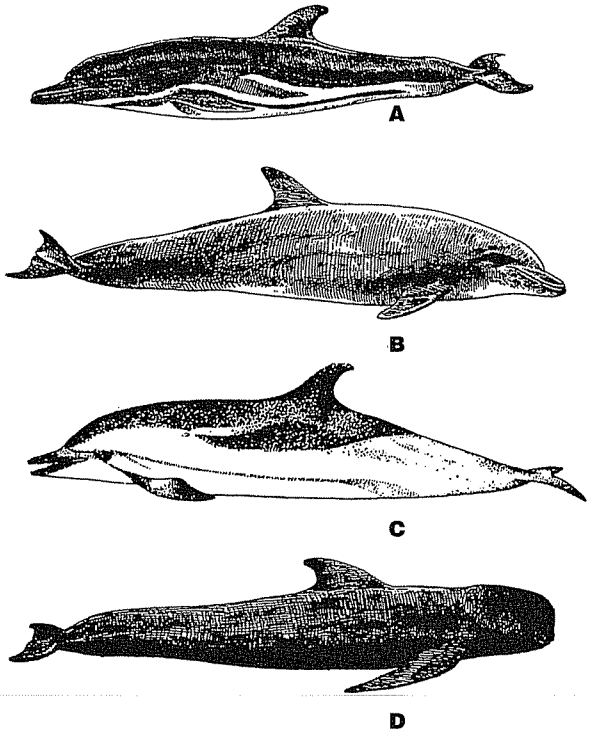

Figure 20.31 Representative Delphinidae. (A) The saddle-back dolphin, *Delphinus delphis;* (B) the bottle-nosed dolphin, *Tursiops truncatus;* (C) the striped dolphin, *Stenella coeruleoalba,* and (D) the long-finned pilot whale, *Globicephala melas.* Not all to same scale.
(A, B, and D, Cabrera 1914; C, Tomilin 1962)

COMMENTS AND SUGGESTIONS ON IDENTIFICATION

Each of the families Monodontidae, Physeteridae, and Ziphiidae is distinctive and, with practice, easily recognizable by either external or cranial characters. The Platanistidae resemble some Delphinidae externally but generally have longer, more slender beaks and lower, more broadly based dorsal fins. Cranially, the rostrum is more slender, and their teeth more numerous than in other families. The members of the Phocoenidae are all similar in appearance, but externally they also resemble several species of Delphinidae. The characters given in the key will identify the skulls, but external identification will require learning to recognize the various species individually.

Many authors have written keys based upon external characteristics of cetaceans. However, unless you are aboard a tuna boat, are scuba diving, or come upon a beached animal, you will rarely have external appearance as a guideline for identification. The only species commonly to be found in marine "zoos" are a few species of Delphinidae, the boto, and the beluga.